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19th Annual Scientific Meeting, College of Pathologists, Academy of Medicine of Malaysia: Pathology and Laboratory Medicine: Current, Advancement and Emerging Trends, co-organised by Department of Pathology, Hospital Melaka, Department of Clinical Diagnostic Laboratories, Hospital Universiti Teknologi MARA (HUiTM) and the College of Pathologists, Academy of Medicine of Malaysia and held virtually on 22nd-24th June 2022. Abstracts of K. Prathap memorial lecture, plenary, symposium and paper (oral and poster) presented are as follows:

K. Prathap Memorial Lecture: Viral infections of pregnancy, beyond diagnosis to treatments

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Advances in understanding viral infections such as congenital CMV continue to be introduced into clinical practice. There remain areas where additional data are needed to guide use of diagnostics, antivirals and vaccines. Areas of particular interest include i) the pathogenesis of congenital infection, particularly mechanisms of mother to child transmission (MTCT), placental cell infection, and viral genomic variability, ii) models of infection including multicellular human organ/organoid and animal models, iii) issues of transmission including screening of pregnant women routinely, biomarkers of transmission, timing of subsequent pregnancy post-primary infection, iv) clinical presentation and definitions, v) complications of infection, particularly the role in chronic disease, long term effects of infection on asymptomatic infants, long term effects of neonatal antiviral therapy, vii prevention strategies including education, primary prevention and universal newborn screening, and viii) vaccine delivery, models and new vaccines. My focus will be on diagnosis of infection, particularly in relation to congenital Cytomegalovirus (CMV). I will reflect upon how our studies of pathogenesis, prevention, and complications influences how we approach the diagnosis of congenital infection, particularly congenital CMV. Pathogenesis studies have advanced our understanding of the progress of infection during MTCT, with evidence of CMV dysregulation of cellular proteins showing specific pathways are altered. Diagnosis and complications of congenital CMV complications with new assays to identify symptomatic (mortality in 1-2%), and longer term adverse neurodevelopmental outcomes in otherwise asymptomatic infants. Prevention of CMV and CMV vaccines are occurring in many countries. This herald a new era in reducing the burden of congenital CMV in all countries.

Plenary 1: Digital Pathology and Artificial Intelligence: Embracing the Future of Modern Technology (Plenary)

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In-silico reporting holds significant advantages in relation to traditional, microscope-based reporting, including improvements in diagnostic accuracy, long-term cost-effectiveness, laboratory quality and accreditation, and other measures of diagnostic quality such as turn-around time. In addition, the opportunity of remote reporting has become increasingly relevant after situations such as the COVID-19 crisis. Indeed, digital pathology is able to facilitate remotely the full extent of the pathological routine: access to slides, laboratory requests and clinical information; intradepartmental consultations, sign-outs and resident teaching; attendance to multidisciplinary team meetings; remote interdepartmental expert consults and remote, extramural teaching. However, the main advantage of diagnostic digitisation in routine pathology is only beginning to be a practical realisation, holding significant promise to represent a true disruptive diagnostic approach: the application of digital pathology and artificial intelligence tools in diagnostics, either as clinical decision support tools or as automated diagnostic decision algorithms. These tools are beginning to emerge at many levels, applied to H&Es, immunohistochemistry or new, complex hybridisation approaches such as multiplex immunofluorescence. This plenary lecture will review this evidence in some detail, placing these developments in the overall evolution of microscopic pathology since its establishment as a clinical discipline.

COVID-19 antibodies: myths and facts

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Antibodies to COVID-19, a disease caused by SARS-CoV-2 can be detected in the blood of people who either have recovered from COVID-19 or have received COVID-19 vaccines. Detection of antibodies against COVID-19 does not serve to diagnose acute infection with SARS-CoV-2 but rather provides further information on the individual's immune system and on how long antibody protection against COVID-19 lasts. Antibodies to the targeted protein of the SARS-CoV-2 can differentiate people who have antibodies from infection, from people who have antibodies from vaccination, or both. Currently, many serological tests via various platforms either as a qualitative or quantitative assay in detecting the COVID-19 antibodies are available in the market. Different assays may provide different information on the COVID-19 antibodies. All serological test results of COVID-19 antibodies should be interpreted accordingly, taking into consideration the patient clinical history, the assay type and types of detected antibodies. Many myths on COVID-19 antibodies are circulating while more facts on COVID-19 antibodies emerges as new information becomes available.

Repurposing Ivermectin: Antiviral and Antiparasitic

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The long known antiparasitic drug ivermectin was approved for animal and human use. Over 3-7 billion of ivermectin treatments were used to eliminate onchocerciasis. The wide therapeutic window and pharmacokinetic profile of ivermectin suggest the strategy of repurposing this drug in treating other diseases. Promising *in-vitro* data reported the potential antiviral activity of ivermectin against the SARS-CoV-2 clinical isolate. This led to several human trials that aim to evaluate the possible benefits of ivermectin in SARS-CoV-2 infected patients. Several conflicting outcomes were reported from various sources. Ivermectin was described to reduce the inflammatory marker levels or shorten the time to viral clearance in patients with mild symptoms whilst other studies indicated no effect or even negative effect. A recent systematic review published by Cochrane Database of Systematic Reviews has provided evidence profile of all the studies involved in investigating the efficacy and prophylaxis of ivermectin in treating patients with COVID-19. The study concluded very low- to low-certainty evidence about the efficacy and safety of ivermectin used to treat patients with COVID-19 in the inpatient and outpatient setting and prevention of SARS-CoV-2 infection. To date, both FDA and WHO allow the use of ivermectin for clinical trials involving COVID-19. The use of ivermectin in treating patients infected with SARS-CoV-2 warrant further investigation mainly randomised control trials with comparable study arms.

ABSTRACT

ANATOMIC PATHOLOGY, FORENSIC PATHOLOGY AND GENETIC PATHOLOGY

AP01 Intracranial myxoid mesenchymal tumour: a novel diagnostic entity in WHO 5th edition

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Introduction: Primary mesenchymal tumours of the central nervous system (CNS) are rare. In the recent WHO 5th edition, a new diagnostic entity of non-meningothelial tumours of uncertain differentiation known as intracranial mesenchymal tumour, FET-CREB fusion-positive has been described. It has uncertain histogenesis with variable morphology and characterised by presence of FET-CREB fusion gene. *Case report*: A 61year-old-lady with underlying invasive breast carcinoma diagnosed 17 years ago and treated with chemoradiation, mastectomy and tamoxifen, recently presented with forgetfulness, headache, and right sided weakness for 6 months. MRI showed a multiloculated, multiseptated lesion at the left parieto-temporo-occipital lobe. Craniotomy and tumour excision was done, showing an intraaxial brain tumour with no dural attachment. Initial microscopic examination was reported as chordoid meningioma. The case was reviewed back after meningioma stains were negative. Histologically, the tumour showed neoplastic spindle cells within a bluish myxoid background. Only vimentin and ER reactivity were seen after an exhaustive panels of immunostaining were done. EWSR1 gene rearrangement was negative. *Discussion*: The differentials for this case are wide including chordoid meningioma, metastatic breast carcinoma as well as metastatic and primary intracranial sarcoma. After exclusion using immunostains and limited molecular study, intracranial mesenchymal tumour FET-CREB fusion-positive was suspected. However, further molecular testing needed for confirmation was not available locally, with prohibitive cost to send overseas. Further development of national molecular services are needed to keep abreast of newer diagnostic CNS entities.

AP02 Fibrosarcomatous dermatofibrosarcoma protuberans

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Introduction: Dermatofibrosarcoma protuberans (DFSP) is a fibrohistiocytic tumour that commonly recurs locally due to its infiltrative growth. Classically, DFSP comprise of tumour with prominent storiform growth and diffuse CD34 expression. 'Fibrosarcomatous' dermatofibrosarcoma protuberans (FS-DFSP) is more aggressive compared to DFSP. *Case Report:* A 56-year-old man with left gluteal mass underwent a wide local excision (WLE) with initial diagnosis of DFSP. He developed two recurrences despite WLE with clear surgical margins. The recurrent tumour displayed fascicular growth as opposed to storiform pattern. There was nuclear atypia with tumour giant cells. Mitosis was 38/10hpf with atypical forms and loss of CD34 expression. Metastatic deposits were identified within the inguinal lymph node. *Discussions:* DFSP is an uncommon superficial tumour affecting adults between the third and sixth decades. FS-DFSP is a rare variant with a higher risk of local recurrence, metastasis, and death from disease. FS-DFSP is mainly seen on the trunk and the proximal extremities similar to DFSP. For FS-DFSP diagnosis, the "sarcomatous" component constitutes 5-10% of the tumour. The neoplastic cells are in fascicular pattern rather than the classical storiform growth. There is nuclear atypia with increased mitosis of > 7 mitosis/10 hpf. CD34 immunoreactivity is often lost. Adjuvant radiotherapy and targeted therapy by detection of COL1A1-PDGFB fusion gene is beneficial to reduce local recurrence and metastasis. *Conclusion*: FS-DFSP imposed significant morbidity due to its more aggressive behaviour. Hence, thorough assessment of recurrent DFSP and use of ancillary diagnostic testing is helpful to confirm the diagnosis and treatment.

AP03 Unusual molecular alteration in a synovial sarcoma

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Introduction: Synovial sarcoma (SS) is a soft tissue sarcoma with specific chromosomal translocation, t(X;18)(p11.2;q11.2) that creates SS18-SSX1, SS18-SSX2 and SS18-SSX4 fusion proteins. In the routinely used fluorescence in situ hybridization (FISH) assay applying SS18 break-apart dual-colour signal probe, the common criterion for positive evaluation is seeing unpaired (isolated) red and green signals. We herein report a synovial sarcoma case with unusual FISH analysis finding. *Case report:* A 24-year-old man with no past medical history presented with left thigh swelling for 5 months, dyspnoea and cough for 2 days. Imaging revealed a 25 cm multiloculated, multiseptated mass arising from posterior thigh and a huge heterogeneous mass in the left hemithorax with pleural effusion. Biopsy of the thigh mass showed high grade spindle cell lesion with positivity towards CD99, pan-cytokeratin and BCL2. FISH analysis for SS18 gene showed many nuclei with loss of green signal with 1 to 2 extra red signals and 1 to 2 fused signals. The findings were consistent with synovial sarcoma with peculiar unbalanced rearrangement of the SS18 gene. *Discussion:* Synovial sarcoma showing loss of a green signal in the SS18 FISH has been reported as a variant positive FISH pattern for the molecular diagnosis of SS. This is following positive SS18-SSX gene fusion transcripts on reverse transcriptase-polymerase chain reaction (RT-PCR) and sequencing in cases with similar FISH findings. Postulated mechanisms in this type of FISH appearance include monosomy of chromosomes X and 18, aneuploidy of chromosome 18 or amplification 18q with deletion in a part of the 3' end.

AP04 Leiomyosarcoma with partial rhabdomyoblastic differentiation

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Introduction: Leiomyosarcoma (LMS) is a malignant neoplasm showing pure smooth muscle differentiation. LMS with rhabdomyoblastic component in the soft tissue is a rare entity described in only few cases in the literature. Previous studies of LMS with rhabdomyoblastic differentiation have indicated a poorer prognosis of this tumour compared to the classical LMS. *Case Report:* A 78-year-old male patient presented with a painful mass at the right scapula for 4 years. Excision was performed and histopathological diagnosis was LMS grade 2 with involvement of the surgical margins. Subsequent serial radiological scans revealed no disease progression. However, he developed recurrence one year after the initial excision. A second wide local excision was performed with right total scapulectomy. The tumour showed hypercellularity with a mixture of caldesmon and desmin positive spindled cells arranged in fascicles and desmin positive large multinucleated cells with abundant cytoplasm (rhabdomyoblastic cells). Areas of positivity towards myogenin were also seen. Thus, a diagnosis of recurrent LMS with partial rhabdomyoblastic changes was rendered. *Discussion:* Leiomyosarcoma of the soft tissue account for 5 to 10% of soft tissue sarcoma. The presence of rhabdomyoblastic cells has been reported in various types of malignancy and has been determined to be a predictor of aggressive behaviour of neoplasms regardless of tumour histogenesis. The coexistence of rhabdomyoblastic component within LMS represent a poorer prognostic parameter.

AP05 Glomerular tip adhesion in IgA nephropathy: a case report

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Introduction: IgA nephropathy, defined by the deposition of immunoglobulin A in the glomerular mesangium with mesangial cell proliferation, is the commonest glomerulonephritis. This disease has a variable clinical course. Numerous studies have been done correlating histopathological findings and clinical outcome, among them including focal segmental glomerulosclerosis (FSGS) lesions. *Case report*: A 30-year-old gentleman with no known medical illness presented with nephrotic nephritic syndrome and acute kidney injury. He was treated with steroids, however had multiple episodes of relapse. Anti-PLA2R and hepatitis screening was negative. Renal biopsy was performed. Microscopically, mesangioproliferative pattern with glomerular tip adhesion FSGS was seen in one glomerulus. No membranous pattern or active glomerular lesions were seen. Immunofluorescence studies showed granular mesangial IgA immune complex deposits. *Discussion*: FSGS lesions are commonly associated with IgA nephropathy and have been described as a histological risk factor for accelerated renal failure. Glomerular tip variant, a subtype of FSGS, has been found to be associated with poorer outcome in IgA nephropathy. In terms of patient presentation, while nephrotic syndrome is an uncommon presentation in IgA nephropathy, it is usually seen in FSGS. Additionally, although patients with primary FSGS respond to steroid treatment, patients with IgA nephropathy do not.

AP06 Orbital myeloid sarcoma: a report of three cases

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Introduction: Myeloid sarcoma (MS) is extramedullary manifestation of myeloid blasts that may be associated with a concurrent myeloid neoplasm involving bone marrow. MS may precede onset of myeloid disease or presents as tumour relapse in patients with previously treated disease. The presence of MS is diagnostic for acute myeloid leukaemia (AML). In paediatric age group, frequently affected areas include skin and orbit. Orbital MS can present as unilateral or bilateral lesions. *Case report:* Three cases of orbital MS were retrieved from the database of Department of Pathology, Hospital Serdang. Orbital MS occurred in two males and a female patient of the ages of 17, 16 and 19 (mean age: 17.3 years old) respectively. All cases showed progressive painless unilateral proptosis (varies from 2 weeks to 18 months). One patient was a known case of AML with t(8;21) in remission. AML was detected in postoperative bone marrow study in another two patients. Two patients died within one year. Histologically, all tumours were characterised by malignant pleomorphic cells with myeloperoxidase and CD43 expression. CD34, CD56, CD117 and CD99 showed variable staining pattern. CD3 and CD20 were negative in all 3 cases. Focal Tdt expression was found in two cases. *Discussion:* The possibility of orbital MS has to be included in differential diagnosis when encountering young patients with painless proptosis. A panel of immunohistochemical study are essential to achieve the correct diagnosis. We found that CD43 and MPO immunostaining are useful diagnostic tools to assist in the identification of MS.

AP07 Enhancer of zeste homology 2 (EZH2) and isocitrate dehydrogenase 1 (IDH-1) immunoexpressions in gliomas and their correlations with clinicopathological parameters

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Introduction: Enhancer of zeste homolog 2 (EZH2) and isocitrate dehydrogenase (IDH) gene mutations are associated with gliomagenesis. The aim of our study was to determine EZH2 and IDH1 immunoexpressions in gliomas, and its association with clinicopathological parameters, as well as its usefulness for prognostication. *Materials and Methods:* This was a retrospective, cross sectional study of 55 cases of gliomas. The formalin-fixed, paraffin-embedded tissue blocks were retrieved for immunohistochemical studies using IDH1 and EZH2 antibodies. Cytoplasmic staining cells of IDH1 ≥10% were defined as positive. EZH2 immunoexpression was scored using immunoreactive score in which a final score of ≥5 was considered as high expression. *Results:* Eight histopathological types of gliomas were included, in which astrocytoma grade 4 (23, 41.8%) being the most common histological subtype. EZH2 was highly expressed in high grade gliomas, WHO grade 3 (n=8, 66.7%) and WHO grade 4 (n =17, 68%) (p <0.001). High EZH2 expression was significantly associated with poor 5-year overall survival (OS) (mean=21.484 months, p=0.001) and 5-year progression-free survival (mean=13.532 months, p<0.001). No significant association between IDH1 immunopositivity with clinicopathological parameters and survival. High grade gliomas were associated with decreased 5-year PFS (p<0.001) and 5-year OS (p=0.009). Combination of high EZH2 expression with IDH1 positive or negative showed poor PFS (p<0.001) and OS (p=0.003). Multivariate analysis showed EZH2 expression was an independent prognostic factor with poor OS and PFS. *Discussion:* High EZH2 expression was associated with unfavourable independent prognostic factor in gliomas patients, which may provide a guidance to orient treatments targeting EZH2 in gliomas.

AP08 A rare case of glomus tumour of the finger

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Introduction: Glomus tumours are uncommon soft tissue tumours, accounting for less than 2% of soft tissue tumours. They occur in young adults between ages 30-50 and are most prevalent in the superficial soft tissue of the distal extremities. *Case report:* We report the case of a 28-year-old woman who presented with a tender nodule on the left middle finger. Histopathological examination showed uniformly small and round glomus cells arranged in sheets and trabeculae which was positive with SMA and negative for CD34 with presence of myxoid stroma in between tumour trabeculae. *Discussion:* Glomus tumours have a slow growth and often present with non-specific symptoms, leading to a lengthy time to diagnose and manage appropriately. This rare entity should be considered when dealing with painful nodules of the extremities, as surgical excision is often curative with good prognosis. There are reported cases of malignant glomus tumours although this is exceedingly rare. Histopathological examination is crucial in diagnostic confirmation and accurate assessment of the actual prevalence.

AP09 Mature teratoma of the placenta: a rare encounter

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Introduction: Placental non-trophoblastic tumours are relatively uncommon, the commonest being chorangioma. Placental teratomas are extremely rare, with less than 50 cases reported hitherto. It denotes an interesting anomaly in the placental development, resulting from possible aberrant migration of germ cells from the yolk sac through the umbilical cord to the placenta. *Case report:* A 28-year-old primigravida presented at 40 weeks of gestation in active phase of labour. Antenatally, she was diagnosed with anaemia in pregnancy. A healthy baby girl weighing 2500g was delivered with Apgar scores of 9 and 10 at 1 and 5 minutes. The placenta and membranes were delivered spontaneously a few minutes later. A huge ovoid mass measuring 135 x 100 x 50mm was observed along the edge of the placenta, connected by a segment of blood vessels. Microscopic examination of the mass revealed an admixture of mature tissue which are derived from the ectoderm, mesoderm and endoderm layers. The outer surface of the mass is lined by benign keratinising stratified squamous epithelium with underlying benign skin adnexal structures including pilosebaceous apparatus and sweat glands. Other components such as adipose tissue, cartilage, smooth muscles, brain and bone tissue were readily apparent. No immature element was identified. The placenta was grossly and histologically unremarkable. A diagnosis of placental teratoma was rendered. *Discussion:* Although placental teratoma probably has no clinical significance, the findings of teratoma within placenta further strengthen the idea that placenta could have a rich source of stem/germ cells.

AP10 Placental Cyclophilin A expression in mothers with hypertension in pregnancy

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Introduction: Cyclophilin A was found to be increased in serum of mothers with preeclampsia and is implicated in the pathogenesis of preeclampsia. This study aimed to determine the expression of cyclophilin A in placenta of mothers with and without hypertension, and to correlate its expression with maternal complications and adverse perinatal outcomes. *Materials and Methods:* This study consisted of a total of 70 cases (35 cases of hypertensive mother and 35 normotensive mother as control). Cyclophilin A immunohistochemistry was performed on paraffin embedded tissue sections of placenta submitted as full thickness to evaluate the expression in foetal endothelial cells, cytotrophoblasts, syncytiotrophoblasts, maternal endothelial cells and decidual cells. Cyclophilin A expression was scored as weak, moderate and strong intensity and the percentage of expression was determined. *Results:* Hypertensive mothers were more likely to have preterm delivery ($p < 0.0001$), had caesarean section ($p < 0.0001$) and infants admitted to neonatal intensive care unit ($p < 0.001$). Fifty-one percent of the fetal endothelial cells and cytotrophoblasts expressed cyclophilin A in hypertensive mothers, compared to only 28.6% in normotensive mothers. However, the difference was not statistically significant ($p=0.086$). Strong expression was observed in the decidual cells in all cases and was completely absent in the syncytiotrophoblasts in all cases, in both groups. There was no statistically significant difference in Cyclophilin A expression in hypertensive mothers with and without maternal complications, adverse perinatal outcomes and placental histological changes associated with hypertension. *Conclusion:* We found no significant difference in placental cyclophilin A expression between hypertensive and normotensive mothers. There was also no difference in expression in mothers with and without maternal complications and adverse perinatal outcomes. As the number of cases with maternal complications and stillbirth were low in our study, a larger study is needed to validate our findings.

AP11 Radiation-induced angiosarcoma of the breast: a rare long-term complication

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Introduction: Radiation-induced angiosarcoma (RAIS) of the breast is a rare late complication of breast cancer treated with radiotherapy, with an incidence of approximately 0.1-0.3%. The outcomes of RAIS are poor with a 5-year survival of only half of the cases. Here, we report a case of RAIS occurring 12 years after previous surgery for breast cancer. *Case Report:* A 64-year-old woman presented with one-month history of skin nodules at the previous site of mastectomy. Twelve years ago, she had a history of mastectomy and radiotherapy management of invasive breast cancer. Clinical impression was a radiation-induced sarcoma with skin metastasis. Gross examination showed a piece of skin with multiple raised, hyperpigmented nodules measuring 2-7 mm in diameter. Microscopically, the nodules are composed of malignant cells forming dilated anastomosing channels. These malignant cells demonstrate large, plump and hyperchromatic nuclei with prominent nucleoli. Mitoses are frequently observed. Immunohistochemically, the malignant cells are immunoreactive toward CD31 and CD34. Interestingly, one of the nodules was a benign capillary haemangioma. *Conclusion:* As this is rare tumour, pathologists need to be aware of this classical tumour occurring after a long latency period post radiation for breast cancer, to prevent misdiagnosis. Ancillary study using immunohistochemistry will be helpful in its confirmation. Our case suggests that all skin nodules need to be examined as benign vascular lesion may be intermingled with the angiosarcoma.

AP12 Large cell neuroendocrine carcinoma of cervix: a case report

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Introduction: Large cell neuroendocrine carcinoma (LCNEC) of cervix is rare, highly aggressive malignancy, and typically has an unfavourable prognosis. It accounts for less than 2% of all invasive cervical malignancies. *Case report:* This is a case report of a 44-year-old Malay female, presented with 4 months of prolonged menses. A vaginal speculum examination revealed a 7cm fungating mass with an irregular surface that occupied the whole cervix. The diagnosis of large cell neuroendocrine carcinoma was made based on histomorphology and immunohistochemical findings. The patient underwent concurrent chemoradiotherapy, however she experienced recurrence after less than 1 year. *Discussion*: Histologically, these tumours are poorly differentiated and various differential diagnosis should be taken into consideration. Among the differential diagnosis are poorly differentiated squamous cell carcinoma, poorly differentiated adenocarcinoma, epithelioid sarcoma, malignant melanoma, and lymphoma. Not only therapeutic management, the morphological distinction between cervical large neuroendocrine carcinoma and other differentials diagnosis represents a major diagnostic challenge. Therefore, recognition of its cytology and histopathology with the aid of immunohistochemical staining is important for the diagnosis.

AP13 "Too little, too late". Hemophagocytic Lymphohistiocytosis (HLH): a case report

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Introduction: Hemophagocytic Lymphohistiocytosis (HLH) is a rare, life-threatening disease characterised by an ineffective and uncontrolled hyperinflammatory condition. The incidence of HLH is approximately 1 in 100,000 in children <18 years old. It can be classified either into primary, those linked to mutation impairing NK/T cell function; or secondary, which is linked to autoimmune disease, infection, or neoplasm. Regardless, early diagnosis is crucial as HLH quickly leads to multiorgan failure with high mortality rates. *Case Report:* A 1.5-year-old Malay child was brought in dead to the Forensic Department, Tengku Ampuan Rahimah Hospital for a post-mortem examination. During her life, she had multiple hospital admissions for prolonged fever and had been treated with several courses of antibiotics. However, they defaulted subsequent follow-up appointments. Autopsy showed deep jaundice, generalised petechiae, generalised lymph nodes enlargement, marked hepatosplenomegaly, ascites, and pale organs. The histopathological examination of various tissues revealed infiltration of benign-appearing histiocytes with hemophagocytic activity, predominantly red blood cells and lymphocytes. The diagnosis of HLH was made following staining the bone marrow with an extensive panel of immunohistochemical markers, and the patient met five of the eight HLH-2004 criteria including fever, splenomegaly, bicytopenia, hyperferritinemia, and hemophagocytosis. Coincidentally, the RT-PCR CMV Genome was detected in the spleen and liver. *Discussion:* The autopsy case here presented death as a consequence of HLH. The correlation between CMV and HLH in this case is inconclusive as further studies are required. This case emphasises the importance of early diagnosis and trigger factors for prompt treatment to enhance survival.

AP14 Rare case of combined small cell lung carcinoma with adenocarcinoma and squamous cell carcinoma presented as brain metastasis: a case report

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Introduction: There is about 30% of small cell lung carcinoma containing distinct areas of non-small cell morphologic component, defined by the World Health Organization (WHO) as combined small cell lung carcinoma (CSCLC). The non-small cell entity includes adenocarcinoma, squamous cell carcinoma (SCC) and large cell neuroendocrine carcinoma (LCNEC). *Case report:* The patient is a 53-year-old gentleman who presented with headache, poor oral intake and lethargy. Contrast-enhanced computed tomography (CECT) brain showed multiple intra-axial cystic mass in both cerebral hemispheres with the largest measuring 6.6 x 6.1 x 5.4 cm with left lung mass seen on chest x-ray (CXR). Neurosurgery for tumour debulking was done. Histological examination revealed tumour fragments composed of small cell component which expressed Synaptophysin, Chromogranin and CD56, intermingled with adenocarcinoma (>10%), which expressed TTF-1, as well as squamous cell carcinoma (>10%) entities. EGFR mutation (Exon 19 deletion) was detected. Patient was given a trial of Gefitinib. However, disease progression was detected after 4 months of the initial treatment given. Hence, a change to chemotherapy was planned. *Discussion:* CSCLCs are currently considered a subset of SCLC by the WHO. Knowing the significant difference in treatment strategy between SCLC and NSCLC, an accurate analysis of CSCLC at the level of immunophenotype and genotype, is of great importance.

AP15 Prostatic ductal adenocarcinoma presented as bladder neck tumour: a case report

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Introduction: Prostatic ductal adenocarcinoma (DAC) is previously known as “endometrioid” or “papillary” carcinoma of the prostate. DAC is a rare subtype of prostate cancer. A Gleason score of 4 + 4 = 8 (Grade group 4) is assigned to tumours composed of pure DAC. It is known to have different biological behaviour from the more common acinar adenocarcinoma (AAC). Patients generally present with a lower PSA, higher tumour stage, unusual metastasis locations and relatively worse clinical outcomes. Distinct clinical management strategies are required. Thus, it is pertinent for a pathologist to be familiar with this entity. *Case report:* We report a case of DAC with bladder invasion. A 75-year-old man came with clinical symptoms related to bladder outlet obstruction. Flexible cystoscopy showed a 3 cm papillary tumour at the bladder neck extending to the prostatic urethra. The prostate size was within the normal limit. The PSA value was 13.4 ng/mL. Transurethral resection of the bladder and prostatic urethral tumour was done. Histologically, the tumour was composed of invasive malignant glands with complex tubular, cribriform, focal papillary and minimal solid growth patterns. The lining cells were pseudostratified tall columnar with elongated nuclei and amphophilic cytoplasm. The tumour cells were positive for PSA and AMACR stains. GATA3 and P63 stains were negative. *Discussion:* The main differential diagnosis is infiltrating urothelial carcinoma, particularly in cases presenting as a bladder lesion. Awareness of the histomorphological features of DAC with supporting immunohistochemical profiles will resolve the diagnostic dilemma.

AP16 Adenolipoma of thyroid gland: a rare entity

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Introduction: Adenolipoma, thyrolipoma or lipoadenoma of the thyroid gland is a rare benign encapsulated tumour composed of follicular adenoma with interspersed mature adipose tissue. *Case Report*: A 60-year-old gentleman with incidental finding of right hypodense thyroid nodule measuring 2.5cm x 3.1cm during computed tomography thorax following Covid-19 infection. Ultrasonography of thyroid showed a right thyroid nodule, TIRADS 4. Fine needle aspiration cytology was performed, suggestive of follicular neoplasm. The thyroid function test was otherwise normal. Right hemithyroidectomy was performed. Grossly there was a well-encapsulated tumour extending from the right upper pole to the lower pole measuring 4.2x2.2x1.7cm. The tumour was firm and brownish with fleshy cut surface with no capsular breach seen. Microscopically, the tumour was well-circumscribed and surrounded by a thin fibrous capsule displaying proliferation of thyroid follicles arranged in solid and compact follicular pattern. Multiple islands of mature adipocytes were present within the tumour, amounting to around 30%. The thyroid follicular cells were positive for TTF-1 and heterogeneously positive for CK19. They were negative for chromogranin and synaptophysin. *Discussion*: Adipose tissue is an unusual finding within the thyroid gland. The origin of adipocytes in thyroid tissue is unclear. Immunohistochemical staining plays a role in distinguishing adenolipoma of the thyroid gland and adenolipoma of the parathyroid gland. Surgical excision is curative.

AP17 Low grade central osteosarcoma of the rib, a diagnostically challenging entity

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Introduction: Low-grade central osteosarcoma (LGCOS) is a rare entity. Its common locations are metaphysis of long bones, jaw bones, small tubular bones, and axial bones. Ribs are rarely involved and pose a diagnostic challenge. Herein we report a case of LGCOS involving the 8th rib, highlighting the diagnostic challenges. *Case report:* A 63-year-old Malay male, presented with a rib swelling, incidentally detected by chest X-ray. There were no local symptoms or constitutional symptoms. On chest X-ray, there was a left 8th rib lesion with ground glass appearance. CECT thorax showed an expansile lytic lesion with cortical erosion, associated with soft tissue extension. There was significant enlargement in size within 6 months. Macroscopically, resection of 7th - 9th rib with 8th rib tumour was received. The tumour has a homogenous lobulated solid grey-white cut surface, with no haemorrhage or necrosis seen. Microscopic sections showed a circumscribed tumour with pseudocapsule composed of cellular fascicles of spindle cells in a fibrosclerotic stroma. Scattered mitotic figures are identified. Lace-like osteoid deposition and short woven bone trabeculae with parallel arrangement and entrapped cortical bone lamellae are seen. There is no necrosis, dedifferentiation or high-grade features detected. The tumour cells show homogenous nuclear reactivity to SATB2. Fluorescence In-Situ Hybridisation (FISH) for MDM-2 was performed and showed amplification. *Discussion:* LGCOS poses diagnostic difficulty particularly at unusual locations. It can mimic other morphologically similar tumours. Thus, ancillary testing is essential for accurate diagnosis. A wide resection and the absence of dedifferentiation are critical factors for a good prognosis.

AP19 Uterine adenosarcoma: a rare entity

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Introduction: Uterine adenosarcoma is an uncommon biphasic tumour composed of benign epithelial components and malignant stroma. It accounts for 8% of uterine sarcoma. *Case report:* This is a case report of a 60-year-old Malay lady who presented with vaginal bleeding for 1 month. Computed tomography of abdomen and pelvis revealed an endometrial mass with multiple uterine masses. The patient underwent abdominal hysterectomy, bilateral salpingo-oophorectomy, omentectomy, and pelvic lymph node dissection. Macroscopically, a polypoidal and pedunculated mass was seen arising from the endometrium, which was lobulated with papillary form-like structures over the surface. The myometrium showed multiple fibroids within. Microscopically, the tumour mass is composed of the proliferation of both epithelial glandular and stromal cell components. Prominent phyllodiform cleft-like architecture, periglandular cuffing and rigid cystic dilation are observed. The glandular epithelial components are positive for ER and stromal components are positive for CD10, ER and SMA. A diagnosis of adenosarcoma with FIGO stage IA was made, based on histomorphology and confirmed with immunohistochemistry. *Discussion:* The differential diagnosis is broad and includes primarily benign entities, such as adenomyoma, atypical polypoidal adenomyoma, and endometrial polyps with unusual features, in which both epithelial and stromal components are benign. Carcinosarcoma, endometrial stromal tumour and leiomyosarcoma should be considered in the differential diagnosis in the presence of malignant epithelial component with high grade sarcoma or sarcomatous overgrowth.

AP20 Castleman disease post COVID-19 vaccination: causal or coincidental?

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Introduction: Patients with underlying malignancy are considered a high-risk group for SARS-Cov-2 (COVID-19) infection with vaccination was widely recommended. COVID-19 vaccine-related lymphadenopathy has been reported with the axilla is the most common site of occurrence. *Case report:* A 40-year-old lady with a history of Hodgkin lymphoma in 2019 was in remission after chemotherapy treatment. She recently developed bilateral enlargement of cervical lymph nodes, more predominant on the right side, for two months prior to current presentation. She noticed that the swelling was getting progressively larger after the second dose of mRNA-based COVID 19 vaccine. Biopsy of the right cervical lymph node was performed to exclude lymphoma recurrence. The histopathological findings show features consistent with Castleman Disease, hyaline vascular type with no evidence of malignancy. *Discussion:* Post vaccination lymphadenopathy posed a diagnostic dilemma because it may mimic lymphoid neoplasm or signify a recurrent disease. Thus, excision biopsy and histopathological evaluation of the lymph node may be necessary to reach a conclusive diagnosis.

AP21 Primary pancreatic NK/T cell lymphoma masquerading as an adenocarcinoma: a case report

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Introduction: Primary pancreatic extra-nodal lymphoma is rare and is most commonly B cell type. NK/T cell lymphoma is an aggressive form of lymphoma most frequently observed in nasal cavity, nevertheless extra-nasal locations are also reported. *Case report:* A 51-year-old man presented with an abdominal and back pain associated with poor appetite and loss of weight for one month. There is no history of prolonged fever or night sweat. CT-scan of the abdomen showed an ill-defined heterogenous hypodense mass measuring 4.6 cm, arising from the head, neck and body of pancreas which has encased the coeliac trunk and superior mesenteric artery with an enlarged paraaortic lymph node, few lung nodules bilaterally and a lytic sclerotic lesion at L4 vertebral body. There was no other lymphadenopathy nor hepatosplenomegaly. Based on the CT scan, a suspicion of pancreatic adenocarcinoma with lung, bone and lymph node metastasis was raised. The white cell count and serum amylase level were normal however, the serum lactate dehydrogenase level was elevated at 370 U/L. A needle biopsy of the pancreatic mass was performed with a histopathological findings of an NK/T cell lymphoma. *Discussion:* Albeit rare, primary pancreatic lymphoma should be considered as one of the differential diagnosis of pancreatic tumour. Pancreatic lymphoma can be misdiagnosed in imaging as adenocarcinoma therefore, histopathological examination of the pancreatic tumour biopsy aided by immunohistochemistry and in-situ hybridisation studies are important to reach a definitive diagnosis.

AP22 High grade endometrial stromal sarcoma presenting as prolapsed fibroid

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Introduction: High grade endometrial stromal sarcoma (ESS) is a rare tumour of endometrial stromal origin. It is an aggressive tumour and has poor prognosis. *Case report:* A 37-year-old lady, para 1+1 and subfertility for 14 years, presented with menorrhagia and postcoital bleeding for the past 9 months. Gynaecological examination revealed a uterus the size of 12 weeks pregnancy. Gynecological ultrasound showed a cervical fibroid measuring 9cm x7cm. She was given Gonadotropin-releasing hormone (GnRH) injection for 6 months and proceeded with laparatomy myomectomy for prolapsed submucosal fibroid. Histopathology report revealed diffuse sheets of round cells with vesicular nuclei dissecting through myxoid matrix and collagenous plaques with areas of low-grade ESS. Immunohistochemical studies showed diffuse cyclin D1 and heterogenous CD10 and smooth muscle actin positivity. Desmin, caldesmon and pancytokeratin were negative. CT Thorax, Abdomen and Pelvis showed a bulky, heterogeneous cervix with ill-defined margins suspicious of urinary bladder infiltration. Subsequently, she underwent total abdominal hysterectomy and bilateral salpingo-oophorectomy (TAHBSO), omentectomy and pelvic lymph node dissection. *Discussion:* High-grade ESS is an aggressive and genetically heterogeneous tumour. They typically harbour YWHAE-NUTM2A/B fusions, ZC3H7B-BCOR fusions or BCOR ITD. Anthracycline based chemotherapy may benefit patients with YWHAE-NUTM2A/B sarcomas while MDM2 or CDK4 inhibitors may have potential role in BCOR rearranged sarcomas. Molecular tests are useful in the differential diagnosis and specific target therapy of uterine sarcomas.

AP23 Human iPSCs-derived lung organoids as personalised cancer model to investigate tumour microenvironment of non-small cell lung cancer (NSCLC)

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Introduction: Lung cancer (LCa) remained as the major contributor to the worldwide mortality where 85% of total cancer diagnoses are NSCLC. Tyrosine kinase inhibitors (TKIs) were approved as first-line therapy for NSCLC patients harbouring EGFR mutations. Unfortunately, prolonged treatment exerts TKI-induced selective pressure resulting in acquired resistance. Numerous studies have proven the involvement of the tumour microenvironment (TME) driving metastatic spread and decreasing therapeutic efficacy. Furthermore, the lack of high-fidelity models recapitulating TME cancer biology remains a significant challenge. Recent advances in single-cell transcriptomic analysis revealed lung organoid from human induced pluripotent stem cells (hiPSCs) recapitulated human lung morphogenesis. Therefore, lung organoid may serve as an ideal model for respiratory diseases including lung cancer. Here, we aimed at investigating the paracrine-cytokines interplay between NSCLC cell lines-lung organoid and explore its association with malignant transformation. *Materials & Methods:* We established and molecularly characterised hiPSC-derived lung organoid (hiPSCs-LBTO) for pulmonary-alveolar markers. Thereafter, we demonstrated indirect co-culture by culturing hiPSCs-LBTO in the conditioned medium (CM) of H1975 and TKI-resistant cell lines (OR4). Co-cultured hiPSCs-LBTO cells and CM were collected after 7 days for cytokines and gene expression analysis. *Results*: Our qPCR and western blot analysis showed upregulation of $NKX2.1^{+}$, $SFTPC^{+}$ and $SOX9^{+}$

expression in hiPSCs-LBTO. Co-culture results indicated the presence of phenotypic changes, up-regulation of EMT and proinflammatory expression in hiPSCs-LBTO. *Discussion:* We successfully generated hiPSCs-LBTO *in-vitro* as evident by phenotypic and genotypic characterisation. Cytokines and EMT-associated genes identified in TME co-culture model warrants further in-depth molecular analysis. Nevertheless, hiPSCs-LBTO can be used as a personalised disease model in clinical settings to enhance our understanding of the interaction between NSCLC and non-cancerous cells in TME.

AP24 Myoepithelial carcinoma of parapharyngeal space: a rare entity

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Introduction: Tumours of the parapharyngeal space are rare, accounting for 1.5% of all head and neck neoplasms. We present a rare case of primary myoepithelial carcinoma of the parapharyngeal space. *Case report*: A 30-year-old lady presented to our otorhinolaryngology department with a slow-growing painless swelling on the left side of the neck for nine months. Clinical examination revealed a left parapharyngeal mass with normal vocal cords. An ultrasound guided biopsy was diagnosed as low-grade myoepithelial carcinoma. The tumour was surgically excised through trans cervical approach along with removal of left Level II cervical nodes. Macroscopy showed a circumscribed solid tumour measuring 4 x 3 cm, with associated subcentimetre cervical lymph nodes. Microscopy showed an encapsulated cellular tumour with residual minor salivary tissue at the periphery, composed of uniform short spindle cells arranged in cords and nests, with a haemangiopericytoma-like pattern. Focal capsular invasion was present. The tumour cells were positive for cytokeratin MNF 116, vimentin and smooth muscle actin and negative for STAT 6, CD 34, S-100, Synaptophysin and TLE-1. The Ki 67 proliferative index was less than 5%. The post-operative recovery was uneventful. Patient defaulted her scheduled MRI and was lost to follow up. *Discussion*: Myoepithelial tumours of the parapharyngeal space pose a diagnostic challenge due to tumour heterogeneity. Immunohistochemical studies are necessary for a definitive diagnosis. Low-grade tumours with minimal mitotic activity may metastasise. Studies show that complete excision is the treatment of choice and may be curative.

AP25 46, XY DSD and dysmorphism in a girl with benign microsatellite variant of AR gene

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Introduction: The 46, XY disorders of sex development (DSD) are a heterogeneous group of congenital conditions characterised by the discordance between an individual's sex chromosomes and anatomical sex. According to the Danish Cytogenetic Central Registry, the prevalence of 46, XY females was 6.4 per 100 000 live births, with androgen insensitivity syndrome and gonadal dysgenesis being the most common causes. *Case report:* We present a case of a 2-year-old girl who was incidentally discovered to have 46, XY karyotype. The baby was born via elective caesarean section at 36 weeks gestation. The baby was found to have complete female genitalia with dysmorphic features including microcephaly, bilateral cleft lip and palate, widely spaced nipple and bilateral congenital talipes equinovarus. Karyotyping revealed 46, XY chromosome complement with no numerical or structural chromosomal aberrations observed by conventional cytogenetic analysis to explain the dysmorphism. The Sex-determining Region Y protein (SRY) gene was detected using molecular technique favouring male genotype. Pelvic imaging revealed the presence of bilateral ectopic testis with absent uterus and ovaries. Therefore, the diagnosis of complete androgen insensitivity syndrome was suspected, and the Androgen Receptor (AR) gene was sequenced. AR gene mutation analysis revealed a microsatellite variant at exon 1(NM_000044.6(AR):c.171GCA[22],p.Gln80del) consistent with benign variant. *Discussion*: Negative AR mutation analysis may be due to limitation of the test or may suggest other genetic causes of 46, XY DSD. Ideally, advanced genetic technologies employing next-generation sequencing or targeted CGH array are recommended. We have described a unique patient with incidental discovery of 46, XY DSD bearing benign variant in the AR gene.

AP26 Unexpected haematological malignancy encountered in autopsy: a case report

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Introduction: Acute myeloid leukaemia (AML) is the most common form of acute leukaemia encountered in adults, with clinical features developing as a result of bone marrow failure. Death may occur as a result of overwhelming infection, uncontrolled bleeding or both. Undiagnosed haematological malignancy may only be discovered during autopsy, especially

in individuals who do not seek timely medical attention. *Case report:* A 44-year-old Indonesian female was brought in dead to the hospital. She had developed fever, abdominal pain and headache for three days prior to her demise. Autopsy examination revealed massive intracranial bleeding as well as hemorrhages involving the lungs, liver and spleen suggestive of disseminated intravascular coagulopathy (DIVC). Cultures collected from blood and organs showed negative findings. Histological examination demonstrated accumulation of myeloblasts in the brain, lungs, liver and kidney. *Discussion:* Haematological malignancies are a rare cause of fatal intracranial bleeding. Although diagnosis of acute leukaemia may be difficult in the postmortem period, owing to the poor preservation of blast cells in peripheral blood; histology of various organs can show leukemic infiltration and can aid in providing a diagnosis. This case therefore emphasises the importance of correlating the circumstances of death, autopsy findings and further investigations in cases of sudden death, especially one with features of DIVC.

AP27 Expression of FoxP3+ Tregs and its association with stage and grade of colorectal cancer patients

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Introduction: Forkhead-box protein P3 regulatory T cells (FoxP3+ Tregs) has been postulated as a main mediator in immune escape and tumour progression. However, the prognostic relevance of these FoxP3+ Tregs in colorectal cancer (CRC) remains controversial. The study aimed to determine the association between the expression of FoxP3+ Tregs with the stage and grade of CRC. *Materials & Methods*: A cross-sectional study involving 202 CRC cases was conducted in Hospital Sultanah Bahiyah (HSB), Kedah and Hospital Universiti Sains Malaysia (HUSM), Kelantan, between January 2017 and December 2019. FoxP3+ Tregs immunohistochemistry expression in colorectal cancer from formalin-fixed paraffin-embedded tissue was divided into a low and high group expression using the median value (19.7) as a separating point. Pearson's Chi-square test and Fischer's exact test were used to analyse the association. A level of significance of less than 0.05 was considered as statistically significant. *Results:* A total of 102 out of 202 (50.5%) cases showed high expression, and 100 out of 202 (49.5%) cases showed low expression of FoxP3+ Tregs within the intra- and peritumoural stroma of CRC. There is a significant association between the expression of FoxP3+ Tregs with pathologic T stage (p=0.001), the status of nodal metastasis (p=0.025), and Modified Dukes staging (p=0.032). *Discussion*: The high expression of FoxP3+ Tregs was significantly associated with tumour stage, nodal metastasis, and Modified Dukes staging. These results demonstrate that FoxP3+ Tregs could be implemented as a reliable or promising marker to predict prognosis and its potential for classifying early-stage CRC in the future.

AP28 Clinicopathological characteristics of young-onset colorectal cancer in Hospital Universiti Sains Malaysia

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Introduction: Early detection of young-onset colorectal cancer (YOCRC) is challenging as its clinicopathological features are not well recognised. We aimed to investigate the clinicopathological characteristics of YOCRC in HUSM. *Methodology:* This cross-sectional study involved a retrospective study of YOCRC among patients aged 20 to 49 years in HUSM from January 2013 to December 2021. Patients' selected information was gathered from the Laboratory Information System (LIS) and patient files in Medical Record Units. The data was analysed using descriptive statistics; mean (SD) and frequency (percentage). *Results:* There were 321 CRC cases diagnosed, with 256 cases (79.8%) as adult CRC and 65 cases (20.2%) as YOCRC. The mean (standard deviation (SD)) age of YOCRC patients was 38.61 (7.87) years, with 50.8% occurrence in females. The YOCRC was left-sided (82.3%) diagnosed mainly at the distal colon (50.8%) and rectum (32.3%). The cancer was more sporadically seen (76.9%) in patients without a family history of CRC. Moderately differentiated adenocarcinoma was the common histological type (62.9%) diagnosed mainly at advanced stages of stage III (37%) and stage IV (35.4%), with lymph nodes involvement of 72.4%. *Discussion:* The proportion of YOCRC in HUSM was 20.2%, majorly located on the left side, with distal colon and rectum are the most affected parts. The cancer was diagnosed majorly at the advanced stages of stage III and IV, making effective treatment very difficult at these stages. Therefore, there is a need for the implementation of the CRC screening program and more public awareness for early detection and treatment of YOCRC.

AP29 Mixed mucinous carcinoma with invasive lobular carcinoma of the breast following neoadjuvant chemotherapy

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Introduction: Mixed carcinoma of the breast is diagnosed when the usual invasive breast carcinoma of no special type (IBC-NST) is present along with additional subtype that make up between 10-90% of the total tumour volume. Therefore, mixed carcinomas are rarely encountered. Herein, we share a case of mixed mucinous carcinoma with invasive lobular carcinoma (ILC), which is rarer still, diagnosed from a mastectomy following neoadjuvant chemotherapy. *Case report:* A 66-year-old, nulliparous, postmenopausal woman, presented with a painless hard mass over the left breast for 2 years, which confirmed as invasive carcinoma with mucinous component. Neoadjuvant chemotherapy followed by mastectomy with axillary clearance was performed. Histopathological examination showed an 85mm-sized solid tumour composed of mixed mucinous carcinoma and ILC which constitute about 70% and 30% of tumour volume respectively. The former is characterised by neoplastic cells suspended in abundant extracellular mucin while the latter showed discohesive neoplastic cells in cords infiltrating the desmoplastic stroma. Mitotic activity was low in both components. Lobular carcinoma-in-situ (LCIS), lymphovascular invasion, perineural permeation and lymph nodes metastasis were also present. The E-cadherin immunohistochemistry stained strongly for mucinous carcinoma and the expression is loss in ILC. We concluded our diagnosis as mixed mucinous and ILC, ypT3 ypN2a. *Discussion:* Mixed mucinous carcinomas have a worse prognosis with increased incidence of lymph node metastasis than pure variants. A careful assessment including ancillary tests on the material submitted is necessary to ascertain whether this phenomenon was contributed by a prior chemotherapy.

AP30 ALK+ anaplastic large cell lymphoma mimicking preseptal cellulitis in a 3-year-old boy

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Introduction: Ocular adnexal lymphoma among the paediatric is rare, and most of them were of B-cell phenotype. The incidence of T-cell lymphoma in this age group is rare and the incidence of ALK+ Anaplastic Large Cell Lymphoma (ALCL) is rarer still. In this case report, we present an instance of ALK+ ALCL in a 3-year-old boy. *Case report:* This unfortunate boy was referred for worsening of preseptal cellulitis despite antibiotic. The swelling was seen at the left lower eyelid associated with redness measuring 6.5x5.0cm, extending to the maxillary region. Visual acuity and eye motility were unaffected. A CT-scan revealed a heterogenous mass with the epicenter in the left maxillary sinus, extending to the left orbital extraconal space, abutting the extraocular muscles and eroding the maxillary wall. Biopsy from the lesion revealed a lymphoreticular neoplasm comprising of sheets of neoplastic lymphoid cells exhibiting pan-T-cell markers (CD2+/CD3+/CD7+), intermingled with neoplastic cells with abnormal mitosis, mature lymphocytes and apoptosis. The neoplastic cells showed moderate nuclear pleomorphism, small nucleoli, finely clumped chromatin and irregular cellular outline. Other immunoprofiles showed positivity with CD30(diffuse), Anaplastic Lymphoma Kinase (ALK) and EMA (focal). The ki-67 proliferative index was 80%. Thus, a diagnosis of ALK+ ALCL was established. The boy was referred to paediatric oncologist for chemotherapy and responded well with treatment. *Discussion*: A high index of suspicion is required to reach the diagnosis. A biopsy of the affected area, immunohistochemistry study, radiological examination and haematological input are critical to stage the disease and will definitely offer a good prognosis and outcome.

AP31 Growing teratoma syndrome: a rare clinical entity

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Introduction: Growing teratoma syndrome (GTS) is rare and likely underreported. It may occur as rapidly growing solid extraovarian deposits during or after treatment with chemotherapy for ovarian germ cell tumour. *Case report:* We report a case of GTS in a 23-year-old lady who initially presented with acute abdominal symptoms. She underwent emergency laparotomy and was found to have a ruptured right ovarian tumour and an intact left ovarian cyst. Both tumours and abdominal deposits were removed and histopathological examination (HPE) revealed grade 3 immature teratoma of the right ovary and left ovarian mature cystic teratoma. She was planned for 4 courses of chemotherapy but only completed 3 cycles as she was unable to tolerate the side effects. CT scan surveillance showed growing pelvic masses. However, her tumour markers were normal. She underwent an operation to remove the masses. The latest HPE was reported as mature teratoma and multiple abdominal deposits came back as mature neuroglial tissues. However, no immature components were found. *Discussion:* Regrowth of primary immature teratoma after its complete removal; during and after chemotherapy with normal tumour markers should raise the possibility of GTS. Unnecessary chemotherapy can be avoided in this instance.

AP32 A case report of angiomyofibroblastoma of the female genital tract

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Introduction: Angiomyofibroblastoma is a rare, benign, mesenchymal tumour with myofibroblastic differentiation. It usually involves the vulvovaginal region of middle-aged women during reproductive years. This tumour usually expresses oestrogen and progesterone receptors, suggesting a neoplastic proliferation of hormonally responsive mesenchymal cells.
Case report: A 33-year-old Malay lady, nulliparous, presented with left labia mass for 2 years which was progressively increasing in size and associated with pain. On examination, there was a huge mass (20x15cm), arising from the left labia majora. The mass was firm, and the overlying skin showed engorged superficial veins. Macroscopically, a circumscribed firm greyish mass measuring 200x180x75mm and weighing 927g. Serial sections showed cystic and solid homogeneous cut surface with patchy necrosis and gelatinous areas. Microscopic sections showed an unencapsulated, well circumscribed tumour with alternating zones of hypocellular and hypercellular areas associated with prominent vascular components. The cells are arranged singly, in cords and small nests, composed of a mixture of spindle, plump epithelioid and ovoid cells with bland chromatin, inconspicuous nucleoli and eosinophilic cytoplasm. Scattered clusters of epithelioid cells are seen with perivascular orientation. Hypocellular areas are oedematous with fine stromal collagen. Immunohistochemistry for Desmin, ER and PR are positive, whereas CKAE1/AE3, SMA, Desmin, CD34, Calponin, S100, Myogenin and EMA are negative. *Discussion:* Angiomyofibroblastoma in the lower genital tract of women is a very rare neoplasm. It can be mistaken clinically and morphologically with other more common tumours in the same location. Complete excision is curative. Therefore, an accurate diagnosis is crucial to avoid aggressive treatment.

AP33 Bothersome lump in my jaw - metastasis to the mandible

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Introduction: Metastasis of breast carcinoma to the oral cavity is rare as compared to metastasis to the lung and liver. The non-specific presentation of metastatic lesions clinically and radiographically poses a diagnostic challenge. We present an interesting case of metastatic carcinoma to the right mandible provisionally diagnosed as a benign lesion of the alveolar ridge. *Case report:* A 76-year-old woman with a history of right breast carcinoma diagnosed in 2018, presented to Oral and Maxillofacial Surgery Department with right zygomatic and bilateral medial condylar head of the mandible fractures from a fall. Upon review of her maxillofacial injuries, she mentioned a growth in her oral cavity. There was a large bluish pink nodule on the right lower alveolar ridge over the molar region. The nodule was smooth-surfaced with well-defined borders and had soft to firm consistency. Orthopantomographic (OPG) imaging showed a mass with multilocular radiolucency and scalloped irregular margins on the right body of mandible. Clinical impression was a benign cyst. Biopsy was performed and histopathological examination confirmed metastatic breast carcinoma. *Discussion:* Distant metastasis is common for breast carcinoma, however, spread towards the head and neck region is rare. Oral metastases may appear clinically and radiographically benign within the dental setting, causing low index of suspicions of such lesions. The patient may present with non-specific signs and symptoms such as pain, ulceration, bleeding, trismus or even be asymptomatic. Any suspicious oral lesions in patients with history of breast carcinoma, a differential diagnosis of metastasis from primary site should be considered.

AP34 Generation of lentivirus-directed induced pluripotent stem cells

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Introduction: Research of induced pluripotent stem cells (iPSCs) has opened exciting possibilities in the medical field, especially in regenerative medicine. The ability to reprogram back somatic cells into embryonic stem (ES)-like status has made patient-specific cells therapy possible without ethical and practical dilemmas associated with embryonic stem cells. However, in Malaysia, the current research on iPSC is still in its infancy. Although there have been several reports on the generation of iPS cells, there are still many challenges to overcome; (i) high cost in the production of iPSCs, (ii) batch-to-batch variation of cells and reagents, which affects reprogramming efficiency. Consequently, assay sensitivity, robustness, and reproducibility are modified (iii) lack of technical expertise. Therefore, to overcome the challenges, establishing an in-house protocol for developing an induced pluripotent stem cell (iPSC) is needed. *Materials & Method:* In this study, we utilised a polycistronic lentiviral vector (LV) carrying the Yamanaka's factors (Oct4, Sox2, Klf4, c-Myc) for reprogramming under defined culture conditions. Primary fibroblasts from wild-type C57BL/6 mice were transduced with an optimal multiplicity of infection of the virus produced. Suspected iPS cell colonies were picked within 14 days post-transduction. *Results:* The

results showed that iPS cells derived from the mouse fibroblast were successfully generated in defined culture conditions. The induced iPS cells are similar to embryonic stem cells in many aspects, including morphology, their properties of self-renewal and pluripotency, and *in vitro* differentiation into the three primary germ layers. *Conclusion:* Developing an in-house protocol for the generation of IPSCs was successful.

AP35 Mesonephric-like adenocarcinoma of the ovary: a trick to spot a wolf in sheep's clothing

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Introduction: Ovarian mesonephric-like adenocarcinoma is a rare tumour which was recently recognised in the WHO 2020 Classification of Female Genital Tract Tumours. This is an adenocarcinoma with unclear pathogenesis and is believed to have derived from the embryonic remnants of the Wolffian system in the paraovarian region. The tumour displays mesonephric differentiation and portrays a similar growth pattern to other gynecologic mesonephric carcinomas. *Case report:* A 46-year-old nulliparous lady presented with painful pelvic mass which was preceded by 8-months history of dysmenorrhea. Examination revealed a firm 16-week sized pelvic mass. On imaging, there was a 16cm lobulated complex solid-cystic mass of ovarian origin. TAHBSO, appendicectomy and omentectomy were performed revealing an intact 105mm-sized unilocular right ovarian tumour with papillary excrescences and a 3mm-sized uterine serosal nodule. The ovarian tumour and the uterine serosal nodule exhibited malignant cells forming a tubulocystic, villiform, slit-like ducts, papillae, sheets and eosinophilic colloid-like tubules. The tumour cells showed moderate nuclear pleomorphism and cytoplasmic hobnails. A similar tumour was also present within the serosa of the right fallopian tube. There were also leiomyoma and adenomyosis. The tumour expressed TTF-1(diffuse), CD10 (luminal), p16 (diffuse), GATA3, CK7 and p53(wild-type). The tumour was negative for PR, ER, WT-1, CK20 and Calretinin. With these, a diagnosis of right ovarian Mesonephric-like adenocarcinoma was established. *Discussion*: Mesonephric-like adenocarcinoma is a challenging-to-diagnose entity, requiring improved histological evaluation supported by immunohistochemistry studies. A molecular input is needed to confirm the diagnosis as well as to understand the pathogenesis and biology of the tumour.

AP36 Undiagnosed right coronary artery hypoplasia? Associated with sudden death

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Introduction: Hypoplastic coronary artery disease is a rare abnormality and to attribute death, there has been a requirement for a diminutive coronary artery or arteries, an absence of compensatory collateral circulatory vessels, microscopic evidence of cardiac ischemia, and the exclusion of other causes of death. *Case report:* A 45-year-old male, no known medical illness, who was found died sitting on the chair at the cyber cafe and autopsy revealed no fatal injury that contributed to his death. He had a dominant, small-caliber, right coronary artery, with generalised pallor of myocardium and concentric left ventricular hypertrophy. The lungs were congested and oedematous. The liver showed cirrhotic changes and reactive serologically for hepatitis C infection. *Discussion:* This case is the first description of an isolated hypoplasia of a coronary artery branch with no other abnormalities of the other coronary arteries or concomitant congenital heart disease and demonstrates that coronary arteries with small calibers are linked to a fatal outcome. Given the challenges in evaluating whether there is a causative link between small coronary artery caliber and death, it's probable that this is an underdiagnosed cause of sudden cardiac death rather than a minor coincidental finding.

CHEMICAL PATHOLOGY

CP01 Refractory hyperkalaemia in an elderly lady with myeloproliferative neoplasm: a case report

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Introduction: Hyperkalaemia is an in-vivo elevation of serum potassium more than 5.5 mmol/L and is potentially life-threatening. In contrast, pseudohyperkalemia is a factitious in-vitro elevation of serum potassium levels due to various causes. Herewith, we presented a case of pseudohyperkalaemia initially treated as true hyperkalaemia. *Case report:* A 75-year-old woman with a known case of essential thrombocythemia and chronic kidney disease (CKD) stage IV complained of one-day dyspnoea and six-month chronic nonproductive cough. Physical examination showed no signs of cardiovascular and lung pathology. Initial laboratory investigations showed marked thrombocytosis of $1900x10^9$/L, hyperkalaemia of 6.40 mmol/L, eGFR of 9.9 mL/min /1.73m^2 and normal C-reactive protein. She was initially diagnosed with tumour lysis syndrome (TLS) and hyperkalemia secondary to CKD. Cytarabine was commenced for TLS, and the hyperkalaemia was managed using oral Kalimate, lytic cocktails and even haemodialysis. However, despite immediate and vigorous interventions to normalise the serum

potassium, hyperkalaemia persisted, ranging between 5.6-7.6 mmol/L with thrombocytosis ranging from 1224-1621x10^9/L. Given the refractory hyperkalaemia in the background of thrombocytosis, pseudohyperkalaemia was anticipated. Therefore, concurrent serum and plasma potassium were requested in serum separator gel and lithium heparin tube. The measured serum and plasma potassium showed a discrepancy of more than 0.4 mmol/L, supporting the pseudohyperkalaemia secondary to thrombocytosis. *Discussion:* Marked thrombocytosis caused an in-vitro increase in serum potassium during the clotting process resulting in pseudohyperkalaemia. It is paramount to distinguish between the true and pseudohyperkalaemia in all cases of hyperkalaemia. The laboratory shall play an active role in the education of such interference.

CP02 In-patients' specimen rejection in Hospital Sultan Ismail Petra: a retrospective study

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Introduction: Assessment of specimen rejection rate is an important laboratory quality measure for laboratories because of a potential negative impact on patient care and financial. It reflects on processes of specimen collection and transportation, techniques of testing, performance of analysers and processing to obtain accurate and reliable results to provide effective patient care. We studied specimen rejection at Hospital Sultan Ismail Petra, Kelantan. *Materials & Methods:* A retrospective study was conducted by collecting secondary data of in-patient specimens received in the laboratory during a 1-year period of 2021. The data was extracted from eDelphyn Laboratory Information System. We performed a descriptive analysis of rejection rate, reason for rejection and requesting site. *Results:* 2754 out of 145,098 in-patients' specimens received in the laboratory during this period were rejected. Average rejection rate for in-patient specimens was 1.9%. Monthly rejection rate ranging from 1.51% to 2.25%. The most common reasons for rejection were clotted specimen (n=866, 30.9%), haemolysed (n=552, 19.7%) and inappropriate retesting interval (n=513, 18.3%). Highest percentage of specimens were rejected from male medical ward 6A (18.53%), female medical ward 6B (16.61%) and ICU (13.92%). *Discussion:* Overall in-patient specimen rejection rate in our hospital exceeded MSQH standard of <1.0%. Specimens rejected were mainly due to improper specimen handling technique and redundant test request. The factors associated with rejection are remediable by improved training and quality assurance measures. Policies and procedures specific to specimen collection, transportation, and preparation should be strictly followed.

CP03 Urgent test requests: is it really what it seems?

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Introduction: An urgent test request is defined as a test where the result is likely to influence the clinical decision and management of a patient before the result would be routinely reported. However, it is interesting to note that not all urgent test requests are urgent, and abuse do take place. *Materials & Methods:* To identify the possible abuse of urgent test requests among clinicians we conducted a mini clinical audit at a tertiary hospital in Kuala Lumpur from 26th of July 2021 to the 3rd of August 2021, where all urgent test requests were evaluated for validity solely based on the diagnosis and clinical history given. *Results:*734 urgent test request were received by the chemical pathology laboratory. 45% of the test requests were non-indicated. Medical & Oncology Daycare were the top two locations with highest non-indicated requests. 75% of the non-indicated requests were due to non-clinical reasons. *Discussion:* Further probing identified the issues contributing to the abuse, pre-labelling all lab request forms as urgent, clinicians randomly picking urgent and non-urgent lab forms for convenience, logistical issues, patient convenience and non-urgent clinical conditions. Suggestions to overcome these issues include lab screening of urgent test requests, direct discussion with Heads of Departments, medical education, periodical audits. We would like to highlight the abuse of urgent test requests and the importance of clinicians to request urgent tests that are really indicated to avoid unnecessary backlog in workload, thus delaying the results of patients who are truly in dire need of urgent test results.

CP04 A case of lithium toxicity in prerenal acute kidney injury

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Introduction: Lithium has a narrow therapeutic index. Therapeutic doses of lithium may turn toxic in prerenal acute kidney injury. *Case report:* A 47-year-old gentleman with bipolar 1 disorder in remission, on tablet lithium 600mg twice daily (BD) presented with disorientation and lethargy following history of fever, watery stool and reduced oral intake for one week. On

examination, he was dehydrated, and disoriented to time, place, and person. He was feverish, tachycardic, hypotensive and, tachypnoeic with oxygen saturation of 100% under room air. He was admitted for acute gastroenteritis in sepsis. Investigations revealed elevated serum lithium of 2.7mmol/L (therapeutic range: 0.6-1.2mmol/L), and renal impairment (urea 17.7mmol/L, creatinine 205 μmol/L) consistent with prerenal acute kidney injury (AKI) (high urine osmolarity; more than 500mosm/KgH20, and urine to serum osmolarity ratio of more than 1.5). Lithium was withheld and intravenous (IV) ceftriaxone 1gram BD was administered. With fluid resuscitation, urine output improved from less than 500mls/day to 1Litre/day. Patient showed clinical improvement with serum lithium reduction. *Discussion:* Lithium is a mood stabiliser. In state of volume depletion its narrow therapeutic index can result in excessive reabsorption and impaired excretion, hence tissue toxicity. Although this patient was taking lithium per prescription, prerenal AKI resulted in an enhanced lithium renal reabsorption and impaired elimination causing neurological manifestation. Fortunately, it was reversed with early lithium withdrawal and treatment of underlying illness. In conclusion, lithium's narrow therapeutic index may trigger toxicity even at a previously established therapeutic dose. Therefore, caution must be taken in those with acute underlying illness.

CP05 Neonatal total serum bilirubin critical value notification rate: where do we stand?

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Introduction: Timely notification of neonatal total serum bilirubin critical value is imperative to allow urgent treatment, hence reducing rate of morbidity and mortality. This is in line with the Malaysian Patient Safety Goal and Malaysian Society for Quality in Health (MSQH) Hospital Accreditation Standards. *Materials & methods:* A clinical audit in a Chemical Pathology laboratory of a hospital in Klang Valley, involving notification of neonatal total serum bilirubin results of more than 300μmol/L was performed. The audit involved a six-month retrospective data collection ranged from 1st October 2020 to 30th of June 2021. The time of result availability to notification documentation were extracted from both hard copy and Laboratory Information System (LIS). The duration of notification made after result availability was calculated, and the proportion (%) of results notified within 30 minutes for each month was derived. The local key performance indicator (KPI) set was a more than 95% notification rate made within 30 minutes. *Results:* Monthly achievement from hard copy documentation ranged from 10 to 75% while those from LIS ranged from 14.3 to 28.6%. *Discussion:* This audit is made in preparation for the MSQH Hospital Accreditation. The timeliness of critical value notification outlined in the 6th edition of 2021 Service Standard 15 states a KPI that shall meet patient care need of the facility. Discrepancy observed could be attributed to the manual methods of documentation. Therefore, this audit could help serve a platform for future improvisation to the documentation system and overall critical value notification policy.

CP06 Estimating glomerular filtration rate: comparison of chronic kidney disease epidemiology collaboration (CKD-EPI) and modification of diet in renal disease (MDRD) equations with the effect of age in a tertiary hospital in Terengganu, Malaysia

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Introduction: The CKD-EPI equation was developed to address the underestimation of the estimated glomerular filtration rate (GFR) by the Modification of Diet in Renal Disease (MDRD) equation at a level >60 mL/min/1.73m² hence Ministry of Health Malaysia recommends the use of the CKD-EPI equation in their Clinical Practice Guideline 2018. The objective of this study is to evaluate the performance of CKD-EPI equation in our population focusing on the effect of age and inter-rater agreement between both equations particularly in elderly. *Material & Methods*: Cross sectional study of all serum creatinine results were extracted from the lab information system (LIS) of Hospital Sultanah Nur Zahirah, Terengganu for a 1-year duration (January 2019 – December 2019) in a patient more and equal to 18 years old (≥18 years old). The first available creatinine result from 69,329 people was used to estimate GFR using both equations and agreement assessed. *Results*: Introduction of CKD-EPI compared to MDRD equations revealed lower mean eGFR (82.63 vs 85.42 mL/min/1.73m², p<0.001) and overall reduce in prevalence of chronic kidney disease (CKD) (25.7% vs. 28.4%). When subdivided by age, the prevalence of CKD reduced in age group 18-79 years but increase in elderly age >80 years. Numerical agreement of eGFR was excellent (ICC = 0.883) and categorical agreement of CKD was almost perfect in all age group. (κ= 0.932). *Discussion*: CKD-EPI is an appropriate alternative for the MDRD equation in all ages including in the elderly. However further validation studies involving a large multiethnic and adequate elderly population in Malaysia are much needed.

CP07 Evaluation of Sebia Capillarys 3 OCTA in HbA1c analysis

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Introduction: Sebia Capillarys 2 Flex Piercing (CE2FP) and Sebia Capillarys 3 OCTA (CE3O) analysers are used for haemoglobin A1c (HbA1c) measurement using the principle of capillary electrophoresis. CE3O is the latest Sebia automated capillary electrophoresis analyser. This study is to assess the performance of CE3O analyser and its comparison with CE2FP. *Materials & Methods:* The precision study was done for within and between run (n=25 each) using quality control at normal and high levels. The data were evaluated for mean, standard deviation (SD), and coefficient of variation (CV). Linearity study was done by mixing normal and high HbA1c samples (4% and >10% respectively) into seven different concentrations with volume ratios of 100:0. 90:10, 75:25, 50:50, 25:75, 10:90 and 0:100. The results were analysed using linear regression. Comparison study was performed for normal to high HbA1c samples (n=40) by analyzing on CE3O then immediately on CE2FP. *Results:* The results showed good precision (within and between run) with SD less than the verification values and CV of less than 1.6% and 1.0% for normal and high HbA1c respectively which is less than 2.0% of required CV for analytical reproducibility. Linearity study was excellent for HbA1c values ranging from 5.2% to 14.7% (r=0.999). Correlation analysis between the two analysers yielded good correlation with high correlation coefficient (r of 1.00). *Discussion:* The evaluation showed CE3O has good performance and produce reliable HbA1c values as CE2FP. However, CE3O has the advantages of having more advances in analyser features (throughput, maintenance and daily startup).

CP08 Subacute thyroiditis after mRNA Pfizer-Biontech Covid -19 vaccine: a case report

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Introduction: Subacute thyroiditis (SAT) is a transient inflammatory thyroid disorder and a rare cause of hyperthyroidism. It typically manifests itself two to eight weeks after contracting a viral upper respiratory tract infection. Rarely, subacute thyroiditis had been reported after seasonal flu vaccination. *Case Report:* In this case report, we will present a case of subacute thyroiditis after third dosage of mRNA Pfizer-BioNTech Covid-19 vaccine in a 27-year-old healthcare worker. She presented with fever one day after her vaccination and palpitation three days after. Her thyroid function test (TFT) revealed a low serum thyroid stimulating hormone (TSH) with an elevated free T4 (fT4) and free T3 (fT3) level, consistent with a hyperthyroid state. She had a low fT3 to fT4 ratio with high ESR and positive for anti-thyroglobulin. Other thyroid antibodies (TSH receptor and anti-thyroid peroxidase antibody) were negative. Without starting on anti-thyroid medication, her TFT was normalised, four months after the vaccination. *Discussion:* Cross-reactivity between coronavirus spike protein and antigens on healthy thyroid cells following mRNA Covid-19 vaccination, has been proposed as a possible mechanism. In a patient presented with symptoms of hyperthyroidism after contracting a viral upper respiratory infection, the diagnosis might be clear. However, in less straightforward cases, laboratory investigations help to distinguish SAT from other more common causes, such as Graves' Disease. Differentiating these two diseases are critical as their treatments are distinct. To the best of our knowledge, this is the first case report on subacute thyroiditis after Covid-19 vaccination in Malaysia.

CP09 Atypical presentations of hyperthyroidism

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Introduction: Thyrotoxic hypokalaemic periodic paralysis (THPP) is a known but rare presentation of hyperthyroidism. In an undiagnosed overt hyperthyroidism patient, absence of typical thyrotoxic manifestation might obscure an early diagnosis. *Case report:* A 58-year-old lady initially presented with unexplained episodes of headache, vomiting and recurrent lower limb weakness for 1 month duration. The weakness occurred following physical exertion and resolved spontaneously with rest. She had significant weight loss but denied having loss of appetite. On examination, she was tachycardic with heart rate of 98 bpm and hypertensive with blood pressure of 170/76 mmHg. Both of her upper and lower limbs showed normal tone, power and reflexes. There was no neck swelling observed. CT scan of the brain ruled out the presence of intracranial space occupying lesion. Investigations showed hypokalaemia of 2.8mmol/L with hypomagnesemia of 0.6mmol/L, which were initially thought to be secondary to her persistent vomiting. Subsequent thyroid function test proved a biochemical hyperthyroidism state with TSH <0.01 uIU/mL and fT4 > 64.35 pmol/L. Therefore, an ultrasound of the neck was performed which showed a right solitary thyroid nodule. Her final diagnosis was THPP within which an improvement of symptoms was observed. *Discussion:* THPP is a sporadic form of hypokalaemic periodic paralysis that arise in combination with weakness, hyperthyroidism, and hypokalaemia with or without hypomagnesemia. In the absence of typical thyrotoxicosis features, a high level of suspicion is required for early detection. Treatment aims at correcting hyperthyroidism-associated electrolytes imbalance. However, the definitive treatment is thyroidectomy or radioactive iodine.

CP10 Transferrin variants: the importance and effect in the diagnostics of Congenital Disorders of Glycosylation (CDG) and Carbohydrate Deficient Transferrin (CDT)

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Introduction: Congenital Disorders of Glycosylation (CDG) are rare, inherited metabolic disorders caused by defective glycosylation of transferrin (Tf). Presence of Tf variants hinder the diagnostic process for suspected CDG and interfere with the exact measurement of Carbohydrate Deficient Transferrin (CDT); a biomarker for chronic alcohol abuse. Our aim is to present the overview of Tf variants in suspected CDG patients. *Materials & Methods:* We retrospectively analysed sialo-Tf pattern in 455 patients from year 2019 to 2022 using Capillary Zone Electrophoresis on Capillarys 2 Flex Piercing System. Sialo-Tf was separated according to their isoelectric point and Tf variants were determined based on shifted sialo-Tf pattern from normal standard. Tf C variant was the predominant type (>95%) while Tf B (anodic shift) and Tf D (cathodic shift) variants were rare. *Results:* 26 samples were Tf variants (5.7%) with equal gender distributions. Tf BC variant was the most observed pattern (n=17, 65%) followed by Tf CD (n=7, 27%) and Tf BD (n=2, 8%). Majority of Tf variants were in pediatric group (n=21, mean age: 2 years old). Seven patients had elevated CDT values caused by variants interference. *Discussion:* Three types of Tf variants (B, C and D) were found with heterogeneity (BC, CD and BD). Tf variants hamper the diagnostics of CDG and CDT. Due to alteration in the Tf molecules, Tf B and D variants may resemble a sialo-Tf profile of CDG and interferes with the evaluation of CDT. Therefore, it is crucial to identify and exclude Tf variants to avoid misdiagnosis.

CP11 Evaluation of serum procalcitonin on Siemens Atellica IM in Hospital Sungai Buloh

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Introduction: Hospital Sungai Buloh included procalcitonin (PCT) as in-house test since March 2020 on Siemens Atellica IM. The assay is a 2-site sandwich immunoassay using direct chemiluminescent technology. This study aimed to evaluate the performance of procalcitonin on Siemens Atellica IM. *Materials & Methods:* Verification of PCT testing linearity, imprecision, limit of detection (LOD) & Functional Sensitivity (FS) and Reference Interval Verification. We also did monthly CV% monitoring, EQA program, method comparison between Atellica 1 and 2 and measurement of uncertainty estimation using 6-month IQC data. *Results:* Linearity claim of 0.02 to 50.0ng/ml is verified in all 3 replicates and its averages for all concentrations in both Atellica IM. Imprecision and repeatability are acceptable when compared to the Manufacturer Claim and Allowable Imprecision $_{desirable}$ = 4% (EFLM). FS is verified (0.022 at 12% CV), as it is less than manufacturer claim of <0.04 g/ml. For monthly IQC monitoring, all is within acceptance criteria of CV< 12% (Level 1) and CV< 8% (Level 2 and 3). For EQA RIQAS performance, all samples' target score was more than the acceptable limit (Target Score > 50). PCT results of both Atellica IM platform are comparable and bias at medical decision limit are acceptable. *Discussion:* The performance of the PCT Assay in Siemens Atellica IM has been verified and found to be acceptable for the measurement of procalcitonin in human serum.

CP12 Chlorate-induced methaemoglobinaemia in COVID-19 infection: a case report

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Introduction: Acquired methaemoglobinaemia, predominantly due to oxidising medications occurs when iron in haemoglobin is oxidised from ferrous to ferric and binds oxygen irreversibly leading to functional anaemia and tissue hypoxia. *Case report:* We report a case of a 60-year-old man with comorbidities diagnosed with COVID-19 who developed methaemoglobinaemia after consuming a chlorate-containing supplement. He presented with dyspnoea and cyanosis. An oxygen saturation gap (SpO_2 50% on pulse oximetry despite 15L/min supplemental oxygen with paradoxical normal PaO_2 on arterial blood gas) with characteristic chocolate-brown arterial blood indicated methaemoglobinaemia. Oxidative haemolysis was established with anaemia, reticulocytosis, anisocytosis, bite and blister cells on morphology with indirect hyperbilirubinaemia and elevated lactate dehydrogenase. Outsourced methaemoglobin was increased at 9.0%. His G6PD was normal. Despite intervention with intravenous methylene blue, tazocin, dexamethasone, oral azithromycin, blood transfusions, mechanical ventilation and dialysis, he passed away on day 5 of admission. *Discussion:* The degree of critical illness in elderly COVID-19 patients with comorbidities causes them to be more susceptible to medication-induced methaemoglobinaemia as they are under greater oxidative stress. The production of reactive oxygen species leads to both iron oxidation and haemolysis. Methaemoglobin has pro-inflammatory properties that can exacerbate disease severity. Refractory hypoxia may benefit from red-cell exchange. However, this patient succumbed to his illness before any further intervention. Although methaemoglobin assay is not readily available, acute hypoxia following consumption of an oxidising agent, chocolate-brown arterial blood, and discrepancy between SpO_2 and PaO_2 should raise a high index of suspicion for methaemoglobinaemia in an ill patient with COVID-19 infection.

CP13 Evaluation of frozen aliquots of Bio-Rad Lyphochek Diabetes Controls stability using Bio-Rad D-10 HbA1c analyser

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Introduction: Bio-Rad Lyphochek Diabetes Quality Control (QC) material is a human whole blood based, with a 3-year shelf life and 7-day reconstituted stability at 2-8°C. Thus, our aim is to evaluate the stability of open-vial (stored at 2 to 8°C) and frozen aliquots (stored at -20°C) if used beyond the recommended stability period. *Materials & Methods:* A total of 14 vials of each level were prepared and each vial of QC was reconstituted as per manufacturer recommendation. Triplicates of each QC level were run daily to determine repeatability, imprecision and bias (against respective peer group). Data was compared against appropriate quality specification for HbA1c; allowable imprecision of 2.5% (IFCC) and allowable bias minimum of 2.1% (EFLM, 2020). *Results:* Open vial QC (stored at 2 to 8°C) is still stable for up to 34 days (n=24). As for frozen aliquots, it demonstrates consistent stability throughout the study period of 93 days (n=63) for both QC levels. When compared to its peer group, frozen aliquot CV% was better suggesting that performance was acceptable. In terms of bias, frozen aliquot and extended days usage had higher bias of 2.1% and 1.73% respectively compared to manufacturer recommendation. *Discussion:* Open vial Bio-Rad Lyphochek Diabetes QC material is stable for up to 2 weeks if stored at 2 to 8°C while for frozen aliquoted kept at -20°C can be used up to 14 weeks. Users need to be cautious whenever there is a shift in QC trend once it exceeds the manufacturer recommended period.

CP14 Early neonatal death with Citrullinaemia type 1

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Introduction: Hyperammonaemia in neonates can lead to grave consequences if not treated early. *Case report:* An 8-day old baby boy, delivered uneventfully at 35 weeks+5 days, presented with lethargy and bradycardia. He was initially admitted on day 5 of life for phototherapy and then discharged the next day, to be followed up at a local clinic for jaundice monitoring. During the first follow-up, he was active and tolerated feeding well. However, he deteriorated the next day. He was immediately taken to the hospital, intubated, and treated for presumed meningitis. Initial investigations revealed mixed respiratory acidosis, high lactate (6 mmol/L), hyperammonaemia (1364 µmol/L) with normal liver function tests. He was hypotensive with neurological examination showing hypotonia and hyporeflexia. His ammonia level decreased to 524 µmol/L following administration of sodium benzoate, sodium phenylacetate and arginine. Plasma amino acid analysis revealed marked elevation of citrulline whilst urine organic acid analysis showed increased excretion of orotic acid. Dried blood spots also showed significant elevation of citrulline with normal arginine level. A diagnosis of Citrullinaemia type 1 was made. Unfortunately, he succumbed to death on day 10 of life. *Discussion:* Citrullinaemia type 1 is a rare autosomal recessive inherited metabolic disorder that occurs due to deficiency of arginosuccinate synthetase in the urea cycle. Although this patient was managed aggressively, he may have developed hyperammonemia coma due to the delayed presentation. For patients with inherited metabolic disease, early diagnosis, and management of their diseases are crucial to prevent irreversible organ damage and death.

CP15 Broad bands on serum protein electrophoresis: a diagnostic challenge

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Introduction: Serum protein electrophoresis (SPE) is one of laboratory investigations performed as part of multiple myeloma workup. Distinct band suggestive of presence of paraproteinaemia on SPE is usually proceeded with immunofixation to identify the clonality. However, the appearance of paraprotein bands on SPE may not be as straightforward to interpret. *Case report*: We described two different patients who had SPE performed as part of multiple myeloma investigation. Presence of broad bands were seen on respective SPE. Subsequent immunofixation electrophoresis (IFE) revealed presence of polyclonal differentiation of IgG, Kappa and Lambda light chains, and faint free lambda light chain in the gamma region for patient A. Whereas, IFE for patient B revealed presence of IgA Kappa paraprotein band in the background of polyclonal increase of gamma globulins migrating towards beta region ("band-in-band" appearance). Other laboratory findings including bone marrow examinations confirmed the polyclonality and monoclonality of these two cases, respectively. *Discussion*: It is crucial to differentiate monoclonal from polyclonal gammopathies. Monoclonal gammopathies are often associated with malignant or potentially malignant disease. This is usually demonstrated by a sharp peak and distinct band in the gamma region. In contrast, polyclonal gammopathies are often caused by inflammatory or infective causes, giving a broad band appearance in the gamma region. IFE is required to differentiate monoclonality from polyclonality of these gamma globulins. We highlighted the challenges in interpreting broad bands especially in identifying and quantifying the paraproteins.

CP16 Methanol poisoning - a rare cause of high anion gap metabolic acidosis

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Introduction: Methanol poisoning, although rare, carries a high risk of morbidity and mortality. Gastrointestinal manifestations and central nervous system suppression begin around 4 hours post ingestion, whilst a characteristic high anion gap metabolic acidosis (HAGMA) occurs between 6-24 hours. *Case report*: A 47-year-old Burmese man presented to the hospital with altered mental status, abdominal pain and vomiting. On examination, he showed decreased responsiveness, laboured breathing and mydriatic pupils sluggish to light. Physical examination of the chest, abdomen and brain imaging were unremarkable. Initial laboratory testing revealed profound HAGMA. Serum acetaminophen levels were below detection limits, ruling out pyroglutamate acidosis; whilst urine sample tested negative for paraquat. Salicylate levels were not measured, but concomitant respiratory alkalosis classical of salicylate poisoning were absent. Presence of normal plasma glucose and ketone rendered diabetic ketoacidosis unlikely; whereas uremic acidosis was ruled out by virtue of minimally impaired renal function. Plasma lactate was elevated but the degree of lactic acidosis was insufficient to account for the severity of acidosis and raised anion gap, leading to a suspicion of methanol or ethylene glycol poisoning. Empirical treatment with IV ethanol ensued. Despite supportive care, the patient eventually succumbed to his illness. Elevated blood methanol concentration of 24.1mg/dL released by the referral lab subsequently confirmed the diagnosis of methanol poisoning. *Discussion:* Rapid diagnosis is difficult where history and blood methanol testing are unavailable. In addition to physical examination, raised serum osmolar gap (due to methanol accumulation) and HAGMA (from lactate and formate accumulation) can aid clinicians in early treatment of methanol poisoning.

CP17 The assessment of interleukin-1 in chronic kidney disease patients with periodontitis following non-surgical periodontal therapy

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Introduction: Chronic kidney disease (CKD) and periodontitis have an impact on patient's morbidity and mortality. Periodontitis increases the inflammatory burden, which has been shown to impair renal function by altering serum inflammatory levels. Interleukin-1 (IL-1) has immunomodulatory properties that affect immunological responses of the host. Little is known regarding IL-1 alteration in CKD patients after non-surgical periodontal therapy (NSPT). Therefore, this study was aimed to assess and compare the level of IL-1 at baseline and after receiving NSPT. *Materials & Methods:* The study included twenty CKD patients with periodontitis (Group 1), twenty non-CKD patients with periodontitis (Group 2) and twenty healthy subjects (Group 3). During each visit, a blood sample was collected and the serum IL-1 concentration was analysed using enzyme-linked immunosorbent assay. *Results:* Our findings showed that IL-1 level was significantly higher ($p<0.05$) in Group 1 [Mean (SD) = 0.91(0.39)]pg/ml as compared to Group 2 [Mean (SD)= 0.79(0.27)]pg/ml and Group 3 [Mean (SD) = 0.57(0.39)]pg/ml. Following NSPT, there was significant reduction ($p<0.05$) in IL-1 level in Group 1 and Group 2. The eGFR has improved from [Mean (SD)= 25.25 (9.93)] mL/min/1.73m2 to 30.3(11.73) mL/min/1.73m2 post NSPT. *Discussion:* This study found that CKD patients with periodontitis exhibited a more severe systemic inflammatory response than non-CKD patients and healthy subjects. NSPT reduced the inflammatory markers and delay the progression of CKD. IL-1 is a promising inflammatory marker for monitoring CKD progression. Therefore, multicentre and larger sample size studies are needed in the future.

CP18 Diagnosis of organic aciduria in Malaysia: a 20-year high risk screening by GC-MS analysis

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Introduction: Disorders classified as organic acidurias (OAs) are a heterogeneous group of inborn errors of metabolism (IEM) and along with aminoacidopathies are the most prevalent IEM in a high-risk population. It is due to a deficiency in certain enzymes that are essential in amino acid, carbohydrate and lipid metabolism. OAs present with diverse clinical manifestations, affecting the entire bodily system, particularly the neurological system leading to physical and/or mental disability. We aimed to report cases of organic acidurias among high-risk patients diagnosed at Institute for Medical Research. *Materials & Methods:* We received urine specimens from 51,380 patients from hospitals all over Malaysia, suspected for organic acidemias from January 1998 to December 2017. Samples were subjected for organic acids analysis using liquid-liquid extraction followed by derivatization prior to analysis. Samples were then injected into gas chromatography-mass spectrometry (GC-MS). Peaks of organic acids were identified semi- quantitatively using Mass Hunter software. *Results:*

We identified 846 individuals with altered patterns of organic acid excretion characteristic of metabolic disorders. Among them 42%, n=355 were females and 58%, n=493 were males. The most frequent disorders in our high-risk population were methylmalonic academia (19.9%, n=168) followed by lactic academia of undetermined aetiology (10.6%, n= 90) and 3-methylglutaconic academia (7.7%, n=65). Fatty acid oxidation defects when combined gave a total of 104 cases (12.3%). *Discussion:* There were inconsistencies in presenting symptoms and laboratory findings subjected to physicians' ability to fill in our test request form. Despite this we were still able to report cases to physicians accordingly.

CP19 Ketogenic diet and dyslipidaemia

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Introduction: As obesity has become a major worldwide health problem with preventable complications, many dietary interventions were introduced to overcome this problem. A ketogenic diet is one of the citizens' most common dietary interventions. *Case report:* A 37-year-old lady was accidentally noted to have a grossly elevated lipid profile during her follow-up for constipation in a surgical clinic. She was then referred to an endocrine specialist to manage the issue further. Neither history of diabetes mellitus, metabolic syndrome, nephrotic syndrome, nor hypothyroidism was noted. She denies any family history of premature death or hypercholesterolaemia, which contributes to a high lipid profile. However, she admits to practising ketogenic diets for the past few years. Upon examination, no stigmata of hypercholesterolaemia, cushingoid or hypothyroid features were found, and her BMI was normal. Her total cholesterol (TC) was 17 mmol/L with an increased LDL of 3.47 mmol/L and low HDL of 1.13 mmol/L. Thus, she was advised to change to a regular diet; however, no change to her lipid profile value was noted. She was started with tablet Crestor (Rosuvastatin) 10 mg daily, and her TC value dropped tremendously. *Discussion:* Generally, many citizens practices ketogenic diets in terms of losing weight however the association between the ketogenic diet and dyslipidaemia were not publicised. Limited publications were available; similar findings of association with either high TC ± elevated LDL with ketogenic diets. The mechanism postulated for this occurrence is mediated through lower carbohydrate intake, inducing suppressed insulin production which inadvertently leads to increased LDL concentration.

CP20 Evaluation of transcutaneous bilirubinometer among neonatal jaundice in a tertiary health care provider

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Introduction: Emerging point of care modalities such as transcutaneous bilirubinometer (TcB) device is an alternative measure to assess neonatal hyperbilirubinaemia. TcB was found to improve patient management and care by reducing turnaround time and avoiding invasive blood sampling to measure total serum bilirubin (TSB). Indirectly, implementation of TcB devices may prevent known neurological sequela (kernicterus) caused by severe hyperbilirubinaemia by early initiation of treatment. *Materials and methods:* A prospective cross-sectional study was performed to determine the accuracy and reliability of TcB against TSB among neonatal jaundice in a tertiary health care provider. A total of 66 neonates at ≥ 35 weeks of gestation were recruited between March to June 2021. TcB measurements were taken using Drager JM 105 at both forehead and sternum and compared with TSB as gold standard. *Results:* This study found that TcB is an accurate and reliable device with a sensitivity of 96.2% and 92.5% for sternum and forehead measurements, respectively. Evidence shows low false negatives results, a good correlation (0.89<r>0.93), and moderate to substantial agreement of the device compared to TSB. However, TcB sternum measurement underestimated bilirubin level at high concentrations. *Discussion:* This study recommends the utilisation of TcB as a screening tool for jaundice detection and using TcB cut-off as previously suggested in local CPG for jaundice management. No specific cut-off value of TcB for reflex TSB testing was suggested as a low cut-off value at 150 µmol/L found in the study may heighten utilisation of TSB and indirectly burden healthcare costs.

CP21 Elevated serum B12 level in liver disease

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Introduction: Vitamin B12 is essential for DNA synthesis and for cellular energy production. The aetiology of hypercobalaminaemia includes excess vitamin B12 intake, inflammatory process, solid neoplasms, haematological malignancies and liver disease, thus a finding of hypercobalaminaemia should prompt an early and in-depth search for these entities. *Case report:* Mr. ZAJ, a 64-year-old Malay gentleman, a known case of diabetes mellitus and hypertension presented with

right sided abdominal pain, fever, nausea and vomiting. Upon examination, he was alert, not tachypneic and normotensive. Fever of 38°C was documented. Abdominal examination showed right upper quadrant tenderness but no guarding. Blood investigation upon admission was noted to have raised white blood count, deranged liver function test and very high serum B12 level (>1476 pmol/L). Ultrasound of the hepatobiliary system revealed inflammatory changes of liver parenchyma and CT TAP finding were suggestive of liver abscess. *Discussion:* Very high B12 in this case was possible due to an inflammatory process or underlying liver disease. As liver is the main storage organ for vitamin B12, direct damage may lead to release of vitamin B12 into the circulation. Reduced transcobalamin II production in liver disease leads to decreased uptake of vitamin B12 by peripheral tissues, causing hypercobalaminaemia. Elevation of serum B12 may encompass severe disease entity in which early diagnosis is crucial for prognosis. Further studies are needed to investigate whether serum vitamin B12 should be included in the work-up and assessment of all medical intensive care patients, particularly those with increased severity of illness.

HAEMATOLOGY AND TRANSFUSION MEDICINE

HM01 Red cell alloimmunisation related to clinical significance alloantibodies among a multi-transfused hepatobiliary patient at Hospital Selayang

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Introduction: Red cell transfusion is a frequent procedure for surgical patients such as hepatobiliary patients. Despite being a choice to increase hemoglobin level, it still exhibits significant risks. This multiple transfusion could risk the development of alloantibodies that lead to alloimmunisation. Unexpected formation of red cell alloantibodies could delay the transfusion due to the challenge to find a compatible blood for the patient. There is no research has been done in Malaysia, specifically on red cell alloimmunisation indices in hepatobiliary patient. Thus, this preliminary study aimed to determine the prevalence of red cell alloimmunisation related to clinically significant alloantibodies in hepatobiliary patients. *Materials & Methods:* A cross-sectional study was done from January 2021- June 2021which involved hepatobiliary patients in Hospital Selayang. Chi square analysis were carried out based on demographic data. *Results*: From the 132 patients, 89 (67.4%) were alloimmunised with (74.1%) clinically significant alloantibodies such as Anti-E (37.6%) followed by anti-c (12.8%) and kidd (11.2%). The prevalence of clinically significance alloantibodies was higher in female (75.7%) and mostly associated with age category 60-99 (80.5%). The occurrence of alloimmunisation was higher in individual who received more than seven transfusions and 80% were identified to developed clinical significance alloantibodies. Malays and others show higher occurrence of developing clinically significant alloantibodies which is (74.4%). *Conclusion*; The current findings show a trend of alloimmunisation development in multi-transfused individual which will be worth to be further investigated to provide a compatible blood product and supply according phenotype donor especially among hepatobiliary patients.

HM02 Metastatic carcinoma in bone marrow: a curious case of refractory hypercalcaemia

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Introduction: Hypercalcaemia is relatively common in patients with cancer and is most often associated with disseminated disease resulting in poor morbidity and mortality. Breast cancer, lung cancer, and myeloma are commonly affected, but it can also occur with other malignancies. As the clinical feature of hypercalcaemia is non-specific, detecting the primary cause can be challenging. *Case report:* We present a case of an 82-year-old Chinese gentleman who had lower back pain for 4 months with loss of appetite, loss of weight, lethargy, and reduced effort tolerance. Other than pallor, clinical examination was unremarkable. Initial blood examination revealed bicytopenia (low hemoglobin and platelet count) with impaired renal function and hypercalcaemia (3.0 mmol/l). Further investigation revealed low serum B12 level with normal folate and iron studies, normal thyroid function test with suppressed parathyroid hormone. A lumbosacral X-ray was taken which revealed an old compression fracture at L1 with degenerative spine alterations, and thus he was treated conservatively. Ultrasound KUB showed normal kidneys, bladder, and prostate. The patient's calcium level remained elevated despite treatment with intravenous hydration and IV Zoledronic acid. Bone marrow and trephine biopsy were then performed which revealed diffuse infiltration by poorly differentiated metastatic tumour of unknown origin, with possible prostate primary. *Discussion:* Hypercalcaemia from malignancy is usually rapidly progressive, thus if calcium is persistently elevated for an unknown cause and duration, the patient should be evaluated for the presence of malignancy.

HM03 Anti-PP1^{Pk} (Anti-Tja) in a pregnant lady: a case report

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Introduction: The Anti-PP1Pk is a naturally occurring antibody against P, P1, and Pk red cells antigen. Individuals with this antibody are known to have a p phenotype, in which these antigens are absent. This phenotype is extremely rare. Anti-PP1Pk is associated with severe haemolytic transfusion reactions and recurrent spontaneous miscarriages in the first half of the pregnancy. *Case report:* We report a case of a lady with two successful pregnancies. The patient was a 21-year-old Malay lady, G2P1 at 35 weeks gestation who presented to the hospital while in labour. She delivered a baby boy via assisted delivery for breech presentation, and it was an uneventful delivery with minimal blood loss. Her blood group is O RhD Positive. When the plasma was tested, the antibody screening was positive with pan reactive reaction (strength 3+). The Direct Coombs Test (DCT) and Auto-Control test were negative. Treatment with papain, showed an enhanced, panagglutinating reaction (strength 4+). When patient serum was tested for antibody identification, it showed complete haemolysis (glossy red appearance). Her phenotype are CDe/ce (R1r), Jk(a-b+), Fy(a+b-), kk, ss. The sample was sent to National Blood Center for confirmatory test and anti-PP1Pk was detected. *Discussion:* In our case, the patient has 2 successful pregnancies without requiring any transfusion. However, anti PP1Pk is a clinically significant antibody. Due to the rarity of this phenotype, securing packed cell supply for her can be challenging. Thus, family studies are recommended. It is paramount that the transfusion service is alerted as early as possible whenever the patient needed blood transfusion.

HM04 Spectrum of common deletional and non-deletional alpha-thalassaemia by molecular techniques in Kelantan

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Introduction: Alpha thalassaemia occurs due to the absence or reduction in the production of α- globin chains. It is common in Malaysia and other Asian countries. Many genetic forms of α- thalassaemia have been discovered, ranging from asymptomatic to lethal. Deletional α- thalassaemia is more commonly detected than non-deletional. The most common deletional mutations in Southeast Asia are $\alpha^{3.7}$, $\alpha^{4.2}$, α^{SEA}, α^{THAI}, α^{FIL}, α^{MED} and $\alpha^{20.5}$. Commonly detected non-deletional mutations are termination Codon, initiation Codon, Codon 30, Codon 35 and Codon 125 mutations. *Materials & Methods*: A cross-sectional study with 136 suspected α- thalassaemia patients were collected based on the haematological parameters. The DNA extracted from blood samples was subjected to the GAP-polymerase chain reaction, multiplex amplification refractory mutation system polymerase chain reaction, and duplex-polymerase chain reaction to detect common deletional and non-deletional α mutations, respectively. *Results*: Among 136 patients, 64 of them were detected to have α-thalassaemia (47 %). Thirty- six patients have deletional mutation (26.5 %) and 18 patients with a non-deletional mutations (13.2%). Compound heterozygous for either deletional or non-deletional mutation was detected in three (2.2 %) and one (0.7 %) patient, respectively. Six patients showed compound heterozygous for deletional and non-deletional mutations (4.4 %). *Discussion*: Alpha thalassaemia is commonly detected in our populations, either deletional or non-deletional mutation. In this study, deletional α-thalassaemia was found to be more common than non- deletional. Although non-deletional mutations are rare, they show significant effects on the production of α-globin chains. Hence, molecular analysis of both α-thalassaemia mutations is helpful to fully understand the genotypes.

HM05 Disseminated histoplasmosis with bone marrow involvement: a case report

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Introduction: Disseminated histoplasmosis is a disease caused by the haematogenous spread of Histoplasma capsulatum and bone marrow involvement is uncommon. *Case report:* We present a case of a 42-year-old gentleman who was newly diagnosed with retroviral disease (RVD). He presented with a history of diarrhoea and productive cough for 1 month associated with 2 weeks history of fever. Physical examination revealed multiple right cervical lymph nodes swelling and hepatosplenomegaly. The initial blood test showed pancytopenia with deranged liver function test and coagulopathy. Blood cultures showed no evidence of bacterial or fungal growth. Similarly, sputum culture also yielded no growth. The patient then had bone marrow and trephine biopsy which showed a hypercellular marrow with the presence of numerous histiocytes and intracellular fungal organisms which were morphologically characteristic of histoplasmosis. *Discussion:* Disseminated histoplasmosis infections are uncommon in the bone marrow or peripheral blood and are almost always associated with immunosuppression, for example, HIV and extreme age. The most common signs and symptoms are fever, shivering, indisposition, weight loss, hepatomegaly, splenomegaly, lymphadenopathy, ulceration of oropharyngeal mucosa, bone marrow alterations (anemia, leukopenia, thrombocytopenia), and electrolyte abnormalities. This patient was diagnosed with chronic disseminated histoplasmosis based on histology and involvement of the liver and spleen. Isolation of organisms by

culture was unsuccessful but the histomorphological features were characteristic of the diagnosis. In such circumstances, bone marrow studies may aid in the diagnosis and help guide treatment.

HM06 A case of congenital leukaemia with extreme hyperleucocytosis

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Introduction: Congenital leukaemia is a very rare haematological malignancy and usually associated with congenital anomalies and chromosomal abnormalities. Here, we report a case of Congenital Acute lymphoblastic leukaemia (ALL) in a 22-day old non syndromic baby with extremely hyperleukocytosis to date, hepatosplenomegaly and leukaemia cutis. *Case report:* A 22-day old baby boy, presented with abdominal distension and generalised body rash. Physical examination revealed a pale looking baby with mild respiratory distress. No dysmorphism noted. There was generalised "blueberry muffin rash", and hepatosplenomegaly.. Full blood count showed striking hyperleukocytosis, white blood cells (WBCs) of 1860 x 10^9/L, severe anaemia and thrombocytopenia. Serology studies for TORCH syndrome and blood culture were negative. Peripheral blood smear showed 78% circulating blasts in which consistent with diagnosis of B-ALL by immunophenotyping. Molecular study revealed presence of translocation (11:19) (q23.3:p13.3) (KMT2A-MLLT1). *Discussion:* Congenital leukaemia diagnosis is fulfilled: presentation in the first month of life, proliferation of lymphoblasts, presence of leukaemic cutis in the absence of sepsis and other illness. Hyperleucocytosis is reported to be common in ALL, and also in congenital leukaemia. ALL in neonates are associated with higher tumour load at diagnosis, immature B cell expression and rearrangement in the MLL gene. In our case, the baby had neither congenital syndromes nor maternal exposure to teratogens, environmental toxins, radiation and viral infections. He carried translocation (11:19) (KMT2A-MLLT1) in which the re-arrangement may occur in utero with short latency of development of leukaemia. ALL with this translocation is known to have poor prognosis and unfavourable outcome.

HM07 Follicular lymphoma with paraneoplastic pemphigus: a case report

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Introduction: Paraneoplastic pemphigus (PNP) is a rare entity described as an autoimmune blistering disease commonly associated with underlying malignancy. *Case report:* We present a case of a 22-year-old gentleman with no known premorbid, presented with a history of recurrent multiple ulcers over the mouth and genital area. He was initially admitted to a private hospital and was treated for severe mucocutaneous ulcer and erosion with bilateral uveitis and was suspected to have Bechet's disease. Later, he presented again with severe oral ulcers involving the mouth and tongue with erosion on the upper and lower lips. There were also multiple skin ulcers involving both eyelids, both finger pulps, penile area, umbilicus, and dorsum of the foot and generalised inflammatory pigmentation over the chest. Buccal biopsy was unremarkable. Initial count showed presence of lymphocytosis (WBC 18.96 x10^9, absolute lymphocyte count of 14.4 x10^9), anemia, and thrombocytosis. Blood smear revealed the presence of numerous abnormal lymphoid cells that are small to moderate in size with scanty cytoplasm and clumped chromatin, some exhibit clefted nuclei. Further examination found axillary lymph node swelling which was biopsied and reported as follicular lymphoma - grade 3A. Subsequent bone marrow and trephine biopsy showed evidence of marrow infiltration by underlying follicular lymphoma. *Discussion:* Paraneoplastic pemphigus associated with follicular lymphoma is relatively rare. Despite being an indolent B cell lymphoma, manifestation as paraneoplastic pemphigus can be severe, resulting in dreadful outcomes. The mechanism incorporating paraneoplastic pemphigus is not clear. But published studies found a close association with the primary tumour with the symptom improving after chemotherapy for the primary tumour.

HM08 Determination of HbA2 and HbF levels using the CAPILLARYS 3 OCTA among healthy local population

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Introduction: Thalassaemias are among the most common monogenic disorders worldwide and highly prevalent with the current estimation of 6.8% Malaysians as carriers. Population control including carrier detection is one of the programs in preventing birth of the homozygous state. The reference range and cut-off value of HbA2 particularly is important for β-thalassaemia carrier screening. We acquired a relatively new technology of capillary electrophoresis (CE); The CAPILLARYS 3 OCTA which is one of the recent Sebia automated CE system used for thalassaemia diagnosis. This study aims to determine the reference range of HbA2 and HbF levels using this new system among the local population. *Methods:* A population-based screening among healthy adults in Universiti Putra Malaysia, Serdang was conducted after obtaining ethical approval. Venous blood was drawn from consented volunteers and subjected for full blood count, blood film, serum ferritin and haemoglobin analysis by CE. *Results:* A total of 185 respondents were involved. We excluded forty-six individuals who were identified to have iron deficiency anaemia, thalassaemia and/or haemoglobinopathies. The reference interval for HbA2 and HbF

using the CAPILLARYS 3 OCTA in overall normal individuals was 2.2%–3.0%, and 0–0.2% respectively. *Discussion and Conclusion:* The levels of HbA2 by this newer CE system in a normal population were conferred with previously measured levels which were lower range than that of HPLC. The obtained results demonstrate the excellent performances of the Sebia Capillary instruments for HbA2 quantification using CE technique in the screening of thalassaemia and haemoglobinopathies.

HM09 Clinical outcome of POEMS syndrome

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Introduction: POEMS syndrome (Polyneuropathy, Organomegaly, Endocrinopathy, Monoclonal protein, Skin changes) is a rare paraneoplastic syndrome secondary to a clonal plasma cell disorder. *Case report:* Case (1) A 65-year-old lady presented with 2-day-history of inability to walk, progressive worsening of bilateral lower limb muscle weakness and numbness. She had generalised sensorimotor demyelinating polyneuropathy, hepatosplenomegaly, skin changes, polycythaemia and thrombocytosis. She was diagnosed as POEMS syndrome based on two mandatory major criteria, one major criterion and minor criteria. She was non-transplant eligible and treated with melphalan+prednisolone. She was able to ambulate with a walking frame. The best response she achieved was complete haematologic response and complete response by PET/CT (Positron Emission Tomography/Computed Tomography). Case (2) A 34-year-old lady presented with 3-week-history of difficulty to walk needing assistance by wheelchair for ambulation, progressive worsening of bilateral lower limb muscle weakness, numbness and bilateral foot drop. She had sensorimotor demyelinating polyneuropathy, skin lesions and thrombocytosis. She was diagnosed as POEMS syndrome based on two mandatory major criteria and minor criteria. She was transplant-eligible and treated with cyclophosphamide+dexamethasone followed by lenalidomide+dexamethasone. She was able to ambulate. She achieved complete haematologic response. As a consolidative therapy, she had high-dose melphalan therapy followed by autologous haematopoietic cell transplantation (auto-HCT). *Discussion:* In younger transplant-eligible POEMS syndrome with bone marrow involvement, lenalidomide-based therapy followed by high-dose melphalan therapy plus auto-HCT is a promising therapy. In non-transplant eligible POEMS syndrome with bone marrow involvement, melphalan-based therapy is an effective therapy. Attainment of complete haematologic response leads to good long-term clinical outcome in POEMS syndrome.

HM10 Seroprevalence of transfusion-transmissible infections among blood donors in a private hospital in Kuching, Sarawak, Malaysia

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Introduction: Blood transfusion, an essential part of established medical practice, can save lives and improve health. However, it is not without risk as transfusion-transmissible infections (TTIs) remain a significant public health problem worldwide. Monitoring of TTI rates in blood donors and awareness of the changing trends are major safety initiatives. This study aimed to determine the seroprevalence and trends of TTIs among blood donors in Normah Medical Specialist Centre (NMSC), Kuching, Sarawak. *Materials and Methods:* This was a 10-year retrospective study utilising blood donation records and data on donation testing for TTIs from January 2010 to December 2019. *Results & Discussion:* A total of 16,085 blood units were collected from 7329 blood donors (year 2010 to 2019). There were 353 donors tested reactive for TTIs, giving a seroprevalence of 4.81%. Majority of the reactive donors were male (87.3%), Malays (62.6%) and first time (73.9%) donors. HCV (2.69%) recorded the highest seroprevalence, followed by HBV (1.41%), HIV (0.42%) and syphilis (0.39%). Over the 10-year period, HBV and HCV showed decreasing trends of seroprevalence, whereas prevalence of HIV and syphilis appeared to be constantly low. Only 4.0% of reactive donors responded to the notification of their TTI positivity, and seroconversion rate of repeat donors was 36.9%. There was no significant difference of seroprevalence and response rate between first time and repeat donors. *Conclusions:* The overall prevalence of TTIs among blood donors in NMSC was relatively low, however, it is still substantial. The response rate of reactive donors towards notification was very poor.

HM11 District Transfusion Information System (DTIS): digitalisation of blood banking in district laboratory setting

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Introduction: Blood transfusion is an important service in healthcare system. The process of supplying safe blood needs to be done carefully to avoid unwanted complications to the patients. The manual work processes and documentation are time consuming, causing inaccuracies of data, confidentiality of patient records and output of test results conducted in blood bank laboratories are not in accordance with standard requirements. *Materials & Methods:* DTIS is an internal database system that uses Visual Basic for Application Microsoft Excel software where the documentation of blood stock, blood requests, patient transfusion records is done. The DTIS project was developed to streamline the blood supply process and ensuring safe methods practiced by each staff. This system can only be accessed by the laboratory staff in charge and secured from external access to ensure patient confidentiality is maintained. *Results:* DTIS is fully operated from the request registration process until the blood supply is completed. The blood supply process becomes more organised, tracking of

previous patient records and stock updates are accelerated, test results are produced more systematically and monthly quality indicators reports can be generated faster and accurate. *Discussion:* The services carried out in the blood bank laboratory of the Pathology Unit of Hospital Jasin since the implementation of DTIS has become more systematic, thus helping in the efficient treatment of patients.

HM12 Compound heterozygous of HbE/ $\beta^{Khon\ Kaen}$ with coinheritance deletional HbH disease leading to an ameliorated clinical phenotype: a case report

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Introduction: Co-inheritance of HbE with β-thalassaemia is a common scenario amongst the Malay population with various clinical phenotype ranging from mild to severe manifestation. Apart from the type of beta-thalassaemia mutation, co-inheritance of alpha-thalassaemia is a known genetic modifier that influence the severity of this disease. *Case report:* Here we report a 2 years old girl, presented as cascade screening. The index case is her half-sister who has compound heterozygous β^{Fil}/ $\beta^{Khon\ Kaen}$ with heterozygous -$\alpha^{3.7}$ which requires monthly transfusion. Currently, our patient is asymptomatic of anaemia and had never received any blood transfusion. Her haemoglobin level was 9.5g/dL and peripheral blood film showed numerous target cells with few schistocytes and spherocytes. Quantitation of haemoglobin using high performance liquid chromatography (HPLC) revealed raised Hb A2 (89%) and capillary electrophoresis (CE) showed raised Hb E (81.1%) with no Hb A seen. DNA analysis showed compound heterozygous HbE and Hb Khon Kaen with coinheritance deletional HbH disease. *Discussion:* Haemoglobin (Hb) Khon Kaen is a beta haemoglobin variant that resulted to the synthesis of a shorter β-globin chain consist of 135 amino acids. Compound heterozygous of Hb Khon Kaen and Hb E typically presents with severe thalassaemia phenotype where it was first discovered in a 3-years-old Thai male in 1991. Reduced number of α globin chains in patients with Hb E/β-thalassaemia who co-inherits deletional α-thalassaemia would be expected to have a more balanced globin chain synthesis and an ameliorated phenotype, as seen in our patient.

HM13 Analysis of genetic variants in acute myeloid leukaemia-normal karyotype using a 75-gene next-generation sequencing panel

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Introduction: Genomic characterisation of acute myeloid leukaemia- normal karyotype (AML-NK) is paramount in understanding the pathogenesis and heterogeneity of this disorder. In this study, we performed targeted DNA sequencing on 16 samples (eight tumour DNA, eight paired-germline DNA) to ascertain clinically significant variants in AML-NK. *Materials & Methods:* Paired tumour and germline DNA were studied by utilising Archer® HGC VariantPlex® Myeloid panel that covered 75 hotspot genes (73 single nucleotide variants (SNVs)/indels, 22 copy number variants (CNVs) and two internal tandem duplications (ITDs). Samples were sequenced on Novaseq (Illumina) with a 150bp paired-end sequencing depth of 3-30 million reads per sample. Data analysis were performed using ArcherDX suite, and significant pathogenic variants were discovered using variant effect prediction tools. *Results:* A total of 37 types of variants involving 22 genes were discovered, comprising 24 single nucleotide polymorphism (SNP), seven insertions, two deletions, four multiple nucleotide polymorphisms (MNP). These variants involved genes with function in transcription (11), methylation (8), chromatin-cohesin(3), signalling(3), splicing(3), NPM1(2) and others (7). Of these 37 variants, ten were recurrently seen. Potential variant effect prediction classified 13 variants as pathogenic, ten benign and 14 as of unknown significance (VUS). Among the pathogenic variants, three were novel, and two other variants were classified as Tier 1 mutations based on ACMG guidelines. The pathogenic variants were seen in CBL, IDH1, NPM1, ASXL1, FLT3, GATA2, IDH2, NOTCH1, RUNX1 and U2AF2 genes. *Discussion:* In this study, we detected putative variants that are clinically significant in providing greater diagnostic yield and more efficient risk stratification in AML-NK patients.

HM14 Detection of minimal residual disease in acute myeloid leukaemia-normal karyotype using a 75-gene next-generation sequencing panel

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Introduction: Minimal residual disease (MRD) monitoring in acute myeloid leukaemia, particularly in normal karyotype (AML-NK) patients, has been limited by variable assay methodologies and a relative paucity of specific MRD markers. In this study, the genetic heterogeneity of AML-NK patients during diagnosis and after attainment of complete remission following completion of induction and consolidation therapy were elucidated using a targeted next-generation sequencing (NGS) myeloid malignancy gene panel in eight patients. *Materials & Methods:* The patient's DNAs were collected at diagnosis and post-consolidation therapy completion. Archer® HGC VariantPlex® Myeloid panel that covered 75 hotspot genes was utilised in this study. Samples were sequenced on Novaseq (Illumina) with a 150bp paired-end sequencing depth of 3 million reads per sample for diagnostic DNA and 30 million reads per sample for remission DNA. Paired diagnostic and remission DNA analyses were performed to classify detectable variants during diagnosis, cleared variants and persistent

after consolidation therapy. *Results:* A total of 37 types of variants involving 22 genes were identified in the diagnostic DNA. We found that 25 variants were cleared post-consolidation therapy (10 pathogenic, six benign, 9 VUS) while twelve variants (3 pathogenic, four benign, 5 VUS) were persistent post-consolidation therapy, including an age-related clonal haematopoiesis DTA mutation in ASXL1 NM_015338.5:c.1934dup;p.Gly646Trpfs*12. The most recurrent variant that was cleared post-therapy was NPM1 NM_002520.6:c.860_863dup; p.Trp288CysfsTer12, seen in 50% of the patients in this study. *Discussion:* In conclusion, this study discovered detectable variants during diagnosis and cleared during post-consolidation therapy, potentially useful in MRD monitoring patients with AML-NK.

HM15 Preliminary extended lymphocyte subsets reference ranges using 3 different flow cytometry methods

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Introduction: The necessity to develop our extended lymphocyte subsets since the values might vary from one population to another depending upon the age, sex, and race even the instruments or methods use to perform the tests. The reference ranges are essential for diagnostic measures and disease monitoring. The aim of this study was to determine the precision of reference ranges of extended lymphocyte subsets using 3 different flow cytometry methods. *Materials & Methods:* A total of 30 healthy adults, 15 males and 15 females were involved. 20 ml of blood were collected into (EDTA) and Lithium heparin bottles. The blood samples were subjected to 3 different flowcytometry methods: lyse wash, lyse no wash and peripheral blood mononuclear cells (PBMC). The samples were processed by flow cytometry using the extended lymphocyte subsets cluster of differentiation (CD) markers. *Results*: The precision between the 3 methods and reference ranges for the extended lymphocyte subsets were calculated. It showed all 3 methods were precise and correlated when compared between them with all parameters of CDs of extended lymphocyte subsets. There was no statistically difference between the percentage's values of 3 methods($p > 0.05$) and the PBMC method was found to be more precise (11.5%) than other methods. *Discussion:* There was no difference in reference ranges between three different flow cytometry methods. All methods can be used interchangeable within a study depending on samples availability as it might be brought to the laboratory late in the day, being processed the same day is often not feasible.

HM16 Preanalytical effect on coagulation test (PT and APTT): a case discussion

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Introduction: Pre-analytical variables can influence PT/APTT, in which can affect patient's care either from diagnostic errors or inappropriate care. In these instances, the test results will not accurately reflect the clinical status of the patient being investigated but rather reflect the status of sample. The consequences of incorrect test results might lead to several unwanted clinical outcomes. In this paper, we presented a case with challenging PT/APTT test monitoring due to difficult blood taking and preanalytical issues. *Case presentation:* A 4-year-old boy, underlying Down syndrome with complex congenital heart disease, admitted for bronchopneumonia, blocked Blalock-Taussig (BT) shunt and pulmonary embolism. He was started on heparin infusion but adjustment of heparin doses was challenging due to preanalytical issues: polycythaemic blood sample secondary to underlying heart disease and haemolysed sample due to difficulty in blood taking. In this case, prolongation of PT/APTT occurred in sample sent without anticoagulant adjustment, while shortened in haemolysed sample. *Discussion:* APTT result monitoring is critical for patients treated with heparin infusion. 4 hourly monitoring is necessary for therapeutic dose adjustment to prevent thrombosis or bleeding. Adjustment of sodium citrate in sampling tube is needed for polycythemic blood sample. High haematocrit sample has reduced plasma volume in which the normal anticoagulant ratio is altered, thus lead to spurious prolongation of PT/APTT. Haemolysed sample cause shortening of PT/APTT due to clotting factor activation. Patient's factors contributing to preanalytical errors are impossible to prevent but recognising these factors will avoid interpretation error and treatment related complications.

HM17 Impact of ABO incompatibility on transplant outcome in allogeneic haematopoietic cell transplantation

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Introduction: Outcomes after allogeneic haematopoietic cell transplantation(allo-HCT) depend on the underlying haematological disorder, patient's comorbidities, timing of transplant and the choice of donor. *Materials & Methods:* In this observational study, retrospective analysis was performed for patients with haematological disorders who had allo-HCT at Pusat Terapi Sel(PTS), HCTM UKM, between 1999 and 2019. Patients receiving haematopoietic cell transplantation (HCT) twice and HLA-haploidentical HCT were excluded. *Results:* Data of 150 patients who had allo-HCT were analysed. There were

149(99.3%) matched sibling donors and 1(0.7%) matched unrelated donor. All patients(n=150,100%) received peripheral blood haematopoietic stem cells as the graft source. There were 50(33.3%) ABO incompatibility which comprised 24(16%) major, 17(11.3%) minor, and 9(6%) bidirectional ABO-mismatched grafts. The median age at the time of HCT was 28(range 12-63) years. Indications for allo-HCT were mainly acute myeloid leukaemia (AML) (n=57,38%) and acute lymphoblastic leukaemia (ALL) (n=36,24%). Day+100 transplant-related mortality was 12%(n=12) and 14%(n=7) for ABO-identical and ABO-incompatible groups. Two-year-progression-free survival rates were 77%; 67%, 87%, 89% for ABO-identical; major, minor, bidirectional ABO-incompatible groups(p=0.495). Two-year-overall survival rates were 64% and 66% for ABO-identical and ABO-incompatible groups. *Discussion:* There was no statistically significant difference in transplant-related mortality (TRM), relapse rate, progression-free survival (PFS) or overall survival (OS) between ABO-identical and ABO-incompatible groups. In the sub-analysis among population with acute leukaemia (AML, ALL, mixed phenotype acute leukaemia) (n=94), there was no statistically significant difference in TRM, relapse rate, PFS or OS between ABO-identical and ABO-incompatible groups. In conclusion, our study showed that there was no significant adverse impact of ABO incompatibility on transplant outcome in allogeneic haematopoietic cell transplantation.

HM18 ABO discrepancy due to A1 subgroup B in a patient: a case report

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Introduction: ABO discrepancies occur when unexpected reactions are obtained in the cell and/or serum grouping. ABO discrepancy due to subgroup B is extremely rare and much less common than subgroup A. *Case report:* Here we report a case of A1 subgroup B at a university hospital. Patient was a 50-year-old Indian man with history of diabetes mellitus. He presented with symptomatic anaemia (Hb: 7.7 g/dL) and foot ulcer. A blood sample was sent to blood bank to request a pint of packed cells for transfusion. ABO grouping was done using gel card method in the analyser. The results of cell grouping showed Anti-A 3+, anti-B 3+ mixed field (MF) while the result of serum grouping showed A cells 0, B cells 0. The antibody screening with three O cells was negative and patient denied recent history of blood transfusion. Repeat ABO grouping by technologist using gel card revealed the same discrepancy. We tried to resolve the discrepancy using different commercial monoclonal anti-B and enhancement techniques such as cold incubation at 4°C and enzyme treatment but failed. Fortunately, the cell grouping using polyclonal anti-B plasma from group O individual agglutinated his red cells with 4+ reaction. All the findings were suggestive of A1 subgroup B, probably A1B3. Further family study and genotyping were required to confirm his subgroup. Crossmatched with AB packed cells was compatible and he completed the transfusion uneventfully. *Discussion:* It is crucial to determine the ABO blood group of patients correctly before transfusion. Any ABO discrepancy should be investigated thoroughly to preclude ABO mismatch transfusion from happening.

HM19 Case report of rare subgroup-A: its identification methods and clinical significance

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Introduction: Blood Group-A is mainly categorised as A1 and A2 and other less prevalent subgroups of A_3, A_{end}, A_x, A_y, A_{el}, differs on antigen number and chemical structure. Around 80% of group-A individuals are A1 while 20% are A2 or weaker subgroup. Here, a case report of rare Subgroup-A is highlighted. *Case report:* This 43-year-old lady presented with severe anaemia due to menorrhagia requests packed-cell. Her forward-grouping showed mixed-field with anti-A and negative with anti-B while reverse-grouping showed negative with A-cell and 4+ with B-cell. Repeat testing at room-temperature with prolonged incubation at room temperature and at 4°C gave the same result. Patients denied any transfusion or transplantation. Test with anti-A1 lectin, *Dolichos biflorus* showed negative reaction while with anti-H lectin gave 3+ reaction. Reverse grouping tested with A1-cells and A2-cells were negative. All these tests suggested Subgroup-A. *Discussion:* To differentiate the A1 from the subgroup, anti-A1 lectin is used which specifically reacts with A1-RBCs. Abundant H-antigen present in subgroup-A RBCs gives stronger reaction with anti-H. Saliva test and adsorption-elution can be done to detect A-antigen. Subgroup-A individual may develop anti-A1, usually naturally occurring, but occasionally reacts at 37°C and can cause haemolysis if transfused with group-A1 packed cells. If patient develops clinically significant anti-A1, they need to be transfused with compatible subgroup-A blood or with O blood. Awareness on subgroups and its identification and clinical significance is necessary for clinician and blood bank staff. Better techniques such as genotyping could be an alternative to the current serology-based technology to identify rare blood group and improve patient management.

HM20 Clinico-pathologic features of newly diagnosed paediatric chronic myeloid leukaemia (CML) at Hospital Tunku Azizah (HTA), Kuala Lumpur

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Introduction CML is characterised by the presence of Philadelphia chromosome which results from a balanced translocation between chromosome 9 and 22, generating *BCR-ABL1* fusion-gene. Paediatric CML is rare; it accounts to 3-5% of newly diagnosed paediatric leukaemia with annual incidence of 0.6-1.2 per million/children. We present clinic-pathological features of paediatric CML cases diagnosed at Pathology Department, HTA. *Case report* 6 cases of paediatric CML were diagnosed at our centre from January 2019 until December 2021. Diagnosis was established with karyotyping and/or FISH analysis and molecular PCR. This nested multiplex qualitative PCR detects 14 *BCR-ABL1* breakpoints. 5 patients presented with massive splenomegaly (9-27cm below the costal margin). Full Blood Count revealed anaemia, hyperleukocytosis (median WBC: $328.4x10^9$/L) with thrombocytosis. All patients presented in chronic phase. The peripheral blood film and bone marrow showed 2-9% blast. Molecular analysis detects Major *BCR-ABL1*, e14a2 (b3a2) breakpoint in all patients. *Discussion* Compared to adult, paediatric CML tend to present with more aggressive features with higher white blood cell count (median of 250×10^9/L), higher proportion exhibiting splenomegaly with larger spleen size in proportion to body size and higher frequency of advanced disease. Majority of paediatric CML expressed Major *BCR-ABL1* transcript; 36% expressed e14a2 (b3a2), 38% expressed e13a2 (b2a2) while 26% expressed both e14a2 and e13a2. Variant *BCR-ABL1* transcript occurs in <5% of CML, the most commonly reported includes e19a2, e8a2, e6a2, e1a2, e13a3, and e14a3. The information of fusion transcript expressed is mandatory in monitoring of CML patients on Tyrosine Kinase Inhibitor (TKI) treatment.

HM21 Study on practice of massive transfusion protocol activation in Hospital Universiti Sains Malaysia

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Introduction: Massive transfusion protocol (MTP) was designed to improve the outcome of patients at risk of massive haemorrhage. This study focused on the prevalence, indications, associated factors toward the indication of MTP cases and 24-hour mortality among who received MTP in Hospital USM. *Materials & Method:* A retrospective cross-sectional study was performed on 110 patients for whom MTP was activated in Hospital USM. Data were extracted from the medical records and blood bank system (MyTransfusi). Simple and multiple logistic analysis was used for statistical analysis, and a p-value of < 0.05 was considered significant. *Result:* A total of 273,087 patients were admitted to Hospital USM and 193 patients required MTP activation during the study period. The prevalence of MTP activation was only 0.07%. This study consisted of 62 (56.3%) trauma and 48 (43.7%) non-trauma patients. The mean age of total patients were 40.0 years old, and majority were male (66.4%). The two most common MTP indications were motor vehicle accidents (n = 58) and gastrointestinal bleeding (n = 24). Female (adjusted OR = 20.08, $p < 0.001$) and presence of comorbidity (adjusted OR = 13.66, $p<0.001$) significantly associated with MTP indication. Meanwhile, no emergency procedure (adjusted OR = 12.77, $p < 0.001$) and non-compliance to MTP (adjusted OR = 4.30, $p = 0.024$) were significantly associated with high mortality within 24-hour post MTP activation. *Discussion:* The prevalence of MTP was low. Our result suggested that early emergency procedures to control the haemorrhage source should be done, and compliance towards MTP needs to be improved for better patient outcomes.

HM22 Combined early bone marrow (BM) and central nervous system (CNS) relapse in a paediatric acute myeloid leukaemia (AML)

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Introduction: Paediatric AML is a rare disease with an incidence of 7 cases/million children younger than 15 years. Approximately 30% of all paediatric AML will experience relapse. Bone marrow is the most common site of relapse with 9.4% has CNS relapsed. We present a case of early combined CNS and bone marrow relapse. *Case report*: This 3-year-old boy was diagnosed as AML high risk in October 2021. BM aspirate showed FAB M5 morphology. CSF cytospin showed no evidence of CNS infiltration by blast. Cytogenetic analysis showed complex karyotype. KMT2A-MLLT3 gene rearrangement was detected by molecular PCR. No FLT3-ITD, FLT3-D835 or NPM1 mutation was detected. Chemotherapy was started. Repeat marrow after chemotherapy in November 2021 did not show excess blast. However, repeat CSF cytospin after 3 months showed presence of numerous blasts and immunophenotyping revealed 97% myeloblast expressing cyMPO (dim to neg), CD117 (heterogeneous), CD33 (bright), HLA-DR and CD64. BM direct smear showed 8% myeloblast. Diagnosis of early combined BM and CNS relapse was confirmed. *Discussion:* CNS involvement in AML is less common than in ALL. Risk factors for CNS relapse in paediatric AML are younger age, males, those with higher WBC at relapse, FAB M5 morphology and MLL gene rearrangement. This boy presented with M5 morphology and MLL gene rearrangement therefore belong to high-risk group of CNS involvement. Interestingly, the relapse was first detected in CSF and then bone marrow with no circulating blast detected. This highlights the importance of CSF examination in the diagnosis of relapse AML.

HM23 A rare case of compound heterozygous Southeast Asian double α-globin gene deletion and Haemoglobin Quong Sze in a Malay child

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Introduction: Haemoglobin (Hb) Quong Sze is a non-deletional alpha-thalassaemia, detected in Southeast Asia. It is due to the missense mutation at codon 125 of the α2-globin gene, leading to an extremely unstable chain and degrading rapidly. Interaction of Hb Quong Sze with Southeast Asian double α-globin gene deletion results in non-deletional Hb H disease, which is usually more severe than deletional Hb H disease. *Case report*: A one-year-old boy was referred at day 52 of life for neonatal anaemia. Both parents were suspected of having alpha- thalassaemia carrier. Physical examination showed pallor with mild hepatomegaly. Full blood count revealed severe hypochromic microcytic anaemia (haemoglobin 6.8g/dL). The full blood picture showed anisopoikilocytosis with the presence of polychromatic red blood cells (RBC), nucleated RBC, teardrop cells, and target cells. There are abundant Hb H inclusion bodies in the RBC. High performance liquid chromatography showed reduced HbA2 level with presence of pre run peak. Capillary electrophoresis showed presence of Hb H and Hb Barts. Molecular studies were carried out using the multiplex polymerase chain reaction method, and the common a^0-thalassaemia ($--^{SEA}$) was detected in one allele and mutation in codon 125 in the other allele. *Discussion*: Non-deletional Hb H disease due to a combination of deletional and non-deletional mutations will present with more severe clinical manifestations than those with deletion mutations. Detection of Hb H- Hb Quong Sze is even rarer in the Malay population, making the diagnosis difficult. Therefore, molecular study is essential for accurate diagnosis.

HM24 Angioimmunoblastic T-cell lymphoma presenting with a neutrophilic leukemoid reaction: a diagnostic challenge

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Introduction: Angioimmunoblastic T-cell lymphoma (AITL) accounts for 1-2% of all non- Hodgkins lymphoma. Patients present with lymphadenopathy, hepatosplenomegaly, polyclonal hypergammaglobulinaemia and skin lesions. The presence of rash and neutrophilia with the absence of circulating abnormal lymphoid cells in the peripheral blood film leads to a misdiagnosis. Bone marrow examination without a lymph node biopsy would misdiagnose. *Case report:* A 33-year-old presented with bilateral cervical lymph node enlargement 1 week post vaccination and treated as an infection with oral antibiotics with no improvement. Subsequently, noted to have high white cell count of 104.9 g/dl, generalised maculopapular rash, loss of weight and appetite associated with B symptoms. His peripheral blood film revealed hyperleukocytosis with left shift and occasional blast cells. Initial differential diagnoses were either neutrophilic leukemoid reaction secondary to an underlying infection, malignancy or Chronic myeloid leukaemia. Neutrophil alkaline phosphatase NAP score was high ruling out CML. Bone marrow aspirate was suggestive of neutrophilic leukemoid reaction. Trephine biopsy supported the marrow aspirate with features of granulocytic hyperplasia with no lymphoid aggregates. This lead to a preliminary diagnosis of Myeloproliferative neoplasm. A lymph node biopsy was done later and was consistent with Angioimmunoblastic T cell lymphoma. *Discussion:* This case illustrates the rare presentation of Angioimmunoblastic T cell lymphoma (AITL) with a neutrophilic leukemoid reaction. The rare presentation of hyperleukocytosis with neutrophilia in the absence of anaemia, eosinophilia and abnormal lymphoid cells made diagnosis difficult. In the absence of a lymph node biopsy, the diagnosis would have deterred towards Myeloproliferative neoplasm.

HM25 A rare entity and diagnostic challenge of aggressive NK-cell leukaemia

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Introduction: Aggressive natural killer cell leukaemia (ANKL) is a rare mature natural killer (NK) cells neoplasm. It is prevalent among young Asians and often associated with Epstein-Barr virus (EBV) infection. ANKL has an aggressive clinical course and dismal prognosis with a median survival of up to 2 months. *Case report:* A 65-year-old gentleman presented with septic shock secondary to groin ulcer and generalised scaly skin rashes. No organomegaly, lymphadenopathy, or bleeding tendency. Laboratory examination revealed renal and liver failure, hyperleukocytosis, coagulopathy, and a markedly elevated lactate dehydrogenase level. Peripheral blood film showed 74% of blasts, which are large, minimal cytoplasmic granules, atypical nuclei with irregular and bilobed nuclei that gave rise to the differential diagnosis of hypogranular acute promyelocytic leukaemia. However, based on flow cytometry and immunohistochemistry, revealed 65% of abnormal lymphoid cells, immunophenotypically suggestive of ANKL; positive for HLA-DR, CD2, CD8, CD16, CD56, CD99, and negative for CD45, the lineage for immature cells, myeloid, B-lymphoid cells, T-cell receptor (TCR) α/β and TCR γ/δ. No sample was sent for Epstein-Barr encoding region (EBER) in situ hybridization. *Discussion:* ANKL is difficult to diagnose due to overlap in morphologic and phenotypic with acute leukaemia, other mature NK-cell neoplasms, the lack of chromosomal aberrations,

and a clonality marker in NK-cells. It should be suspected based on the aggressive clinical history, high EBV DNA levels, abnormal morphology, phenotype, and cytogenetics from peripheral blood, bone marrow biopsy and flow cytometric analysis. Thus, accurate diagnostic classification is crucial due to differing treatment and prognoses.

HM26 The correlation of neutrophil-lymphocyte ratio (NLR) and neutrophil-monocyte ratio (NMR) with the disease severity in COVID-19 patients

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Introduction: Inflammation has an important role in the progression of various infections, including in coronavirus disease 2019 (COVID-19). Circulating biomarkers such as neutrophil-lymphocyte ratio (NLR) and neutrophil-monocyte ratio (NMR) are potentially useful in predicting the disease severity in COVID-19 patients. This study aims to determine the role of NLR and NMR in predicting disease severity in COVID-19 patients at initial presentation. *Materials & Methods:* This cross-sectional, retrospective study was performed on patients diagnosed with COVID-19 by PCR admitted to Hospital Selayang from January 2020 to June 2021. 257 patients were included and categorised into four clinical severity; mild, moderate, severe, and critically ill. The demographic data, clinical condition, and laboratory parameters of the patients were retrieved from the hospital information system and laboratory information system. NLR and NMR were compared between different groups of disease severity. *Results:* From a total number of 257 patients, 63% of the patients with comorbidities (n = 163) were in severe to critically ill groups. Statistically significant differences were observed for NLR ($p < 0.001$) and NMR ($p < 0.001$) in different groups of severity. The median for NLR and NMR in the severe and critically ill group were calculated as significantly higher compared to mild and moderate groups. The median for NLR and NMR in the severe group is 4.56 and 12.37 while in the critically ill group is 7.18 and 14.28, respectively. *Discussion:* NLR and NMR values were significantly higher in severe and critically ill COVID-19 patients upon admission. These markers can potentially be used as a biomarker in predicting the disease severity of COVID-19 patients.

HM27 Haemostatic, inflammatory and haematological parameters in prolonged immobilisation patients following lower limb fracture and risk of venous thromboembolism

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Introduction: Trauma and prolonged immobilisation induce a hypercoagulable state with thrombotic potential. In this study, we aim to evaluate the changes of hypercoagulable markers (haemostatic, inflammatory and haematological parameters) in prolonged immobilised trauma patients and their association with VTE development. *Materials and Methods:* This prospective cohort study was conducted at Hospital USM from August 2020 to March 2022. A total of 54 patients with lower limb/s fracture with age ranged from 12 to 50 years old, who required immobilisation for up to 5 days and not on anticoagulant were involved. The laboratory tests included PT, aPTT, D-dimer, Fibrinogen, ESR, and platelet count were serially measured on day 1 and day 5 of immobilisation. The biomarkers were analysed by using paired t-test, with a p-value <0.05 as a significant result. *Results:* Among the blood parameter studied, fibrinogen, ESR and platelet count gave a significant mean difference between day 1 and day 5 of immobilisation. The means for fibrinogen, ESR and platelet count were increased on day 5 of immobilisation by 0.66 ($p<0.001$, 95% CI of mean difference: -1.04, -0.27), 17.98 ($p<0.001$, 95% CI of mean difference: -24.69, -11.27) and 128.59 ($p<0.001$, 95% CI of mean difference -166.55, -90.64) respectively. *Discussion/Conclusions:* In conclusion, fibrinogen, ESR and platelet count showed significant changes after day 5 of immobilisation. Although no VTE event was documented, these biomarkers have been showed to be a prothrombic parameters that produce as a response toward tissue injury following trauma. Thus, probably helpful in assessing the risk of VTE and could support prophylaxis indications against VTE in high-risk patients.

HM28 A rare case of bone marrow involvement in sarcoidosis

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Introduction: Sarcoidosis is a multisystem inflammatory disease that manifests as noncaseating granulomas, especially in the lungs and intrathoracic lymph nodes. Association with bone marrow manifestation is a rare occurrence. *Case report:* A 72-year-old Indian lady presented with palpable cervical lymphadenopathy. She has concomitant diabetes mellitus and

osteoporosis, but she denied smoking. She worked in a quarry site previously. Lymph node biopsy showed granuloma, and serum angiotensin converting enzyme (ACE) was elevated. Sputum for AFB and culture was negative, but her CT scan showed enlarged mediastinal lymphadenopathies and normal lung parenchyma. Bone marrow aspirate showed no excess of blast cells and was negative for lymphoma infiltration. Bone marrow trephine biopsy demonstrated the presence of dense, non-caseating granuloma composed of multinucleated giant cells, epithelioid cells, lymphocytes, and asteroid bodies. Immunophenotyping indicated non-specific T-cell reactivity. *Discussion:* Sarcoidosis incidence ranged between 35 to 80 per 100,000 among African Americans. In Asia, the incidence is 1 to 2 per 100,000 (Japan). The diagnosis depended on clinical presentation, discovering non-necrotising granulomatous inflammation in one or more tissues and excluding alternative causes of granulomatous disease. The incidence of granulomas in bone marrow biopsies is low (0.3–2.2%), and sarcoidosis may account for up to 21% of these cases. The most common haematologic abnormality is anaemia and haemolysis. The challenge in diagnosis is that sarcoidosis can mimic other pathology. Therefore, a high index of suspicion and discovering granuloma formation in tissues is vital. Appropriate treatment following correct diagnosis would yield a good prognosis and outcome.

HM29 A commoner among two rarely inherited bleeding disorders: case report

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Introduction: May-Hegglin anomaly (MHA) and Von Willebrand disease(vWD) are autosomal dominant disorders. MHA characterised by thrombocytopenia with giant platelet and Döhle bodies-like inclusion within granulocytes, whereas vWD Type 1 is due to partial deficiency of the von Willebrand factor (vWF). The treatment differ as MHA may require platelet transfusion whereas desmopressin is a treatment of choice in vWD Type 1. *Case Report:* We report of 4-year-old boy with multiple admission due to viral fever and thrombocytopenia. Patient had several episodes of spontaneous bleeding from left shin and epistaxis. There is no hearing loss or cataract. The patient's serial full blood count revealed Platelet (plt) count ranging 49-172x10^9/L with blood smear showing macrothrombocytopenia and Döhle body in the neutrophils with highly suspicious of MHA without confirmation test performed. Patient's blood group is O positive. Patient has mildly prolonged APTT result. Patient's mixing APTT is corrected and FVIII level was borderline low (47.5%). vWD workout confirmed patient has vWD Type 1. *Discussion:* These 2 different disease entities have a different management; thus, the commoner disease should be considered rather than a rare disease with limitation of diagnostic confirmation. A clinical history with adequate and correct laboratory investigations is a mandatory for a definite diagnosis and appropriate management of patient.

HM30 A diagnostic challenge: mild haemophilia A with low von Willebrand factor (VWF) activity

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Introduction: Mild haemophilia and von Willebrand disease (VWD) may share similar clinical presentation and initial laboratory findings. In both conditions, haemorrhagic symptoms are variable and usually provoked by significant trauma. *Case report:* We herein report, an interesting case of possible diagnosis of mild haemophilia A with low von Willebrand factor (VWF) activity in a 16-year-old boy with multiple comorbidities and unusual laboratory findings. He presented with history of painless frank haematuria for 3 days without any trauma. His medical history includes young hypertension complicated with left ventricular hypertrophy, retinopathy and mild renal impairment. He was on several antihypertensive drugs, lipid-lowering agent and antiplatelet (clopidogrel). He was also on oral traditional medicine for about 10 days prior to bleeding episodes. Haemostasis tests showed an isolated prolonged activated partial thromboplastin time (aPTT), corrected at immediate mixing but not corrected after 2 hours incubation. Factor VIII level was reduced (4.5-5%) and Factor IX level was normal. Interestingly, no inhibitor to factor VIII was detected by Bethesda method. Screening for lupus anticoagulant was also negative. Further investigation disclosed that his VWF:RCo activity were low to borderline normal (36-49%). All the investigations were repeated in two months and revealed the same results. Finally, the case was concluded as mild haemophilia A. *Discussion:* The purpose of this observation was to highlight that the patient's underlying medical condition may lead to atypical laboratory findings. Repeated tests with fresh sample followed by vigilant correlation of test results with clinical history were crucial in achieving definitive diagnosis.

HM31 Secondary haemophagocytic lymphohistiocytosis (HLH) in a patient with acquired immunodeficiency syndrome, dengue fever and disseminated histoplasmosis: a case report

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Introduction: Haemophagocytic Lymphohistiocytosis (HLH) is a rare life-threatening condition due to severe uncontrolled hyperinflammatory reaction and hypercytokinaemia[1]. Here we present a case of HLH in a patient with Acquired Immunodeficiency Syndrome (AIDS), Dengue Fever and Disseminated Histoplasmosis. *Case report:* 29-year-old male initially admitted to

ward for dengue fever with warning signs. Patient presented with fever and diarrhoea, but the fever persisted beyond seven days with no improvement with intravenous broad-spectrum antibiotics. Clinically, patient had multiple cervical, axillary, and inguinal lymphadenopathies with hepatosplenomegaly. Full blood count showed pancytopenia. The dengue Ig M and Ig G antibodies were positive. The patient was newly diagnosed as HIV-positive during this admission. Bone marrow aspirate (BMA) performed due to persistent fever and pancytopenia. BMA showed florid histiocytes and hemophagocytic activity with presence of fungal bodies in the histiocytes. Right cervical lymph node biopsy showed numerous histiocytes harbouring many intracytoplasmic fungal spores which were highlighted by PAS stain. *Histoplasma capsulatum* was isolated from the BMA and blood for fungal culture, matured for identification after 35 days incubation. Typical whitish cottony colonies and tuberculate macroconidia seen with lactophenol blue stain. Patient responded well to the specific antifungal treatment. *Discussion:* Infections are the most common triggers of HLH[1]. Patient fulfilled five HLH-2004 diagnostic criteria which were fever, cytopenia, hypertriglyceridaemia, high ferritin level and haemophagocytosis in bone marrow[1,2]. Early suspicion of HLH is important to reduce the mortality rate among immunocompromised patients.

HM32 A rare case of mixed-phenotype blast phase in chronic myeloid leukaemia (CML)

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Introduction: Chronic myeloid leukaemia (CML) progresses to blast phase within 3-5 years after diagnosis and frequently the blast lineage is myeloid[1]. Here we present a rare case of mixed-phenotype blast phase in CML. *Case report:* 39-year-old male, an active intravenous drug user with underlying Hepatitis C infection presented with fever, abdominal discomfort and swelling over the neck in January 2021. Clinically, patient had multiple cervical, axillary, and inguinal lymphadenopathies and hepatosplenomegaly. Full blood picture, bone marrow aspirate and trephine biopsy were suggestive of CML in Chronic Phase. BCR-ABL1 (Major, p210) fusion transcript detected by molecular study. The cytogenetic study showed variant translocation between chromosome 9, 16 and 22. Patient was started on oral hydroxyurea and referred to Methadone replacement therapy. Subsequently, patient presented with failure symptoms in June 2021. Full blood picture, bone marrow aspirate and trephine biopsy were suggestive of CML in Blast Phase. The peripheral blood flowcytometry analysis shows presence of T-lymphoblast and myeloblast populations, thus in favour of mixed phenotype (T/Myeloid) blast phase in CML. The cytogenetic study showed clonal evolution with addition on 2q and 3q from the initial finding. Unfortunately, patient succumbed to COVID19 infection during the admission. *Discussion:* Blast transformation of CML with mixed phenotype especially the T/myeloid phenotype is a rare entity and associated with poor prognosis[1]. The immunophenotyping and immunohistochemistry of blast cells are important in identifying specific phenotypes and play a crucial role in treatment and prognosis of CML patients.

HM33 Autoimmune lymphoproliferative disease (ALPS): a rare cause of lymphadenopathy and immune cytopenia

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Introduction: Autoimmune lymphoproliferative disease (ALPS) is a rare disorder characterised by generalised non-malignant lymphadenopathy, hepatosplenomegaly, autoimmune cytopenia, polyclonal hypergammaglobulinaemia with increased susceptibility to develop lymphoma.[1-3]. Here we describe a case of probable ALPS in Hospital Sultanah Nur Zahirah, Kuala Terengganu. *Case report:* Patient was a 6-year-old boy with underlying hypothyroidism and bronchial asthma. In 2018, the patient presented to the Outpatient department with generalised petechial rashes over the face and body. Physical examination revealed multiple shotty cervical and inguinal lymphadenopathy with hepatosplenomegaly. Full blood count (FBC) showed mild monocytosis and thrombocytopenia. Patient was initially diagnosed with immune thrombocytopenia (ITP). After 9 months, patient was admitted for bronchopneumonia and during this admission, noted that he had progressive lymphadenopathy and hepatosplenomegaly. The FBC showed anaemia and neutropenia. Bone marrow aspirate and trephine biopsy at this time showed no evidence of acute leukaemia, no hemophagocytic lymphohistiocytosis and no marrow infiltration. Immunophenotyping of peripheral blood showed 2.2 % of double negative T cells of total lymphocytes and 3.7 % double negative T (DNT) cells of T lymphocytes. Patient was diagnosed with probable ALPS based on clinical findings and elevated DNT cells. *Discussion:* ALPS seen in this patient is a rare disorder related to perturbed lymphocyte homeostasis. This is due to defect in apoptosis affecting the death receptor pathway (extrinsic pathway) of apoptosis hence causing failure of lymphocyte apoptosis leading to excessive accumulation of abnormal lymphocyte subsets. Diagnosis can be established utilising the revised diagnostic criteria for ALPS[3]. Steroid-sparing treatment and avoidance of unnecessary splenectomy are advocated for this group of patients.

HM34 Identification of low level *BCR-ABL1* kinase domain mutation in chronic myeloid leukaemia patients with treatment resistance using next generation sequencing

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Introduction: BCR-ABL1 kinase domain (KD) mutation status is an important element of clinical decision algorithms for Chronic Myeloid Leukaemia (CML) patients who do not achieve an optimal response to tyrosine kinase inhibitors (TKIs). Although Sanger sequencing (SS) is considered the gold standard for *BCR-ABL1* KD mutation screening, the use of next-generation sequencing (NGS) has recently been assessed. *Materials & Methods:* Our study aims to investigate the frequency of low level mutation of *BCR ABL1* KD mutation in these CML patients using NGS. A cohort of 60 CML patients with TKI resistance was enrolled in this study. RNA extraction was performed using QIAamp RNA Blood Mini Kit (QIAGEN, Germany) followed by nested reverse transcriptase PCR for *BCR-ABL* gene amplification. NGS and SS were used for the mutational analysis of *BCR ABL1* KD. *Results:* A total of 11 missense mutations in *BCR-ABL1* KD were observed in 16 patients with a frequency of 26.7%. The most frequent mutations identified were T315I (4 patients, 25%), Y253H (3 patients, 18.8 %), E255K (3 patients, 12.5%) and C305Y (3 patients, 18.8 %). One novel VUSs, c.1186C>A (p.H396N) was also identified. Out of 11 mutations detected using NGS, only 5 mutations were detected by SS in 9 patients (15%). Thus, mutations undetectable by SS but identified by NGS are mutations at low allele frequency. *Discussion:* Our study demonstrates the importance of identifying clinically relevant low level mutations using NGS for better patient management. Therefore, we suggest incorporation of NGS-based *BCR-ABL1* KD mutation screening results in the clinical decision algorithms.

HM35 A diagnostic difficulty of concurrent Hb H disease and heterozygous β-thalassaemia

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Introduction: Haemoglobin H disease is a clinical syndrome resulting from a greatly reduced rate of synthesis of α chain. The excess of β chain leads to formation of an abnormal β chain tetramers, referred as haemoglobin H (HbH). The presence of HbH fraction in Hb analysis is an expected finding in HbH disease. *Materials and Methods:* Retrospective analysis of a data from 2017 to 2021 with a genotype finding of HbH disease co-inheritance with beta thalassaemia were done. We found only five cases fit in the category. Molecular analysis were done by α- and β- Multiplex ARMS, and α-GAP PCR. Some of the cases required β-gene sequencing following negative results from initial investigation. *Results:* We described five cases of HbH disease co-inheritance with heterozygous β-thalassaemia. All the cases presented with mild to moderate anaemia, Hb range of (8.5 to 11.7g/dL) and marked microcytosis (MCV < 60fl) and hypochromia (MCH < 17pg). Interestingly, all the cases do not have H peak in Hb analysis and HbH inclusion bodies. The HbA2 percentage was in a borderline thalassaemia trait in majority of the cases while HbF percentage is moderately raised (4.6-8.1%). The presumptive diagnosis of all the cases were either borderline HbA2 β-thalassaemia, β-thalassaemia with co-inheritance alpha or a classical β-thalassaemia trait. None of the cases were suspected to have HbH disease. *Conclusion:* This report highlights the diagnostic difficulty encountered in concurrent HbH disease and heterozygous β-thalassemia. Definitive diagnosis cannot be made from Hb analysis alone, but necessitates genotype analysis and family study.

HM36 Compound heterozygosity of Hb Adana and Hb Paksé in a Malay family

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Introduction: Thalassaemia is recognised as a public health problem in Malaysia. Being a multi-ethnic country, various forms of non-deletional alpha thalassaemia are seen in the population. These includes Haemoglobin Adana (Hb Adana) and Haemoglobin Paksé (Hb Pakse). Both Hb Adana and Hb Paksé carriers are generally asymptomatic. However, severe Haemoglobin H (Hb H) like conditions will arise if both Hb Adana and Hb Pakse are co-inherited. *Case Report:* A 7 year old Malay boy presented with anaemic symptoms subsequently requiring regular blood transfusion. Initial molecular testing revealed that the patient and his mother had Hb Adana, whereas his father did not have any common alpha thalassaemia deletion or mutation. In view of regular need for transfusion, further molecular testing was performed for this family. Results showed that this patient had Hb Adana and Hb Paksé which explained the severity of his clinical phenotype. Hb Pakse in this patient was inherited from his father. Her younger sister also had both Hb Adana and Hb Paksé. *Discussion:* Compound heterozygous non-deletional forms of alpha thalassemias, such as Hb Adana and Hb Paksé in this family may yield severe Hb H-like condition. Comprehensive molecular testing is required to confirm the diagnosis. Thus, close collaboration between clinician and laboratory professionals is essential for accurate diagnosis especially in populations that thalassemia prevails.

HM37 The peculiar case of acute myeloid leukaemia with aberrant CD 7 expression

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Introduction: Aberrant phenotypes in acute leukaemia are characterised by lymphoid-associated and other myeloid lineage markers expressed in myeloblasts or myeloid-associated markers expressed in lymphoblasts. The occurrence is rare; herein we describe a case with interesting findings of Acute Myeloid Leukaemia (AML) with aberrant CD7 expression. *Case report*: A 54-year-old woman presented with a prolonged fever associated with hepatomegaly and generalised lymphadenopathy. Her peripheral blood showed severe pancytopenia with a 15% blast count. The bone marrow aspiration revealed 80% pleomorphic blasts exhibiting an abundant vacuolated cytoplasm with an open chromatin pattern, inconspicuous nucleoli, and an absence of Auer rod. The PAS stain showed prominent block positivity. Therefore, the initial correlation of clinical findings and morphology was inclined towards Diffuse Large B Cell Lymphoma (DLBCL) or Burkitt Lymphoma. However, the immunophenotyping results confirmed the diagnosis of AML with aberrant CD7. The results of molecular leukaemia translocation tests and AML mutation study were negative while the cytogenetic results are still pending. *Conclusion*: CD7, a T-cell antigen, is expressed in a minority of patients with AML, and it is the most common aberrant marker found in AML. The morphology of the blasts can be arbitrary, so the diagnosis of leukaemia relies on the simultaneous application of morphology, cytochemistry, flowcytometry, cytogenetics, and molecular techniques. In previous studies, CD7 and CD56 expression in AML were considered to be poor prognostic factors for overall survival, and there is a significant association of CD7 co-existing with FLT3 in de novo AML cases.

HM38 Hb Koya Dora [α142, Term→Ser (TAA>TCA)] the resemblance with Hb Constant Spring; first reported case among Malay ethnicity

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Introduction: Hb Koya Dora is non-deletional alpha thalassaemia that results from the mutation in the termination codon of the alpha2 gene. While Hb Constant Spring is the most common non-deletional alpha-thalassaemia in Southeast Asia, Hb Koya Dora was reported to be more population-specific in India. *Case report:* We reported a case of an asymptomatic 18-year-old Malay boy who underwent a school Thalassaemia screening program. He has no medical illness and no family history of thalassaemia. Physical examination was unremarkable. The values of haemoglobin, RBC count, MCV, MCH, and RDW were 14.8g/dL, 6.22 x 10^12/L, 77.0fL, 23.8pg, and 14.8%, respectively. Haemoglobin analysis of the patient using capillary electrophoresis (CE) showed HbA 97.5% and HbA2 2.0%, with a small peak presence at zone 2 of 0.5% while high-performance liquid chromatography (HPLC) showed a small eluted peak at C-window with a retention time of 5.0 min. The initial molecular analysis of alpha Multiplex Amplification-Refractory Mutation System Polymerase Chain Reaction and alpha Multiplex Gap Polymerase Chain Reaction did not show any common mutations in the alpha-globin gene. Alpha gene sequencing was done that eventually found a mutation at termination codon 142 TAA>TCA of α2 gene consistent with Hb Koya Dora. *Conclusion:* In many ways, Hb Koya Dora mimics Hb Constant Spring, including its thalassaemia-like expression and initial laboratory investigation. Further molecular testing is necessary to differentiate between these two variants. This case illustrates the first case of non-deletional alpha thalassaemia of Hb Koya Dora among Malay ethnicity in our population.

HM39 A rare co-inheritance of HbE/beta-thalassaemia with mild intermedia phenotype: a case report

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Introduction: The clinical course of patients with HbE/ beta-thalassaemia varies from thalassaemia minor through thalassaemia intermedia to thalassaemia major. This study presents a pregnant lady with a mild phenotype of HbE/ beta-thalassaemia associated with a rare co-inheritance of HbE and 3'untranslated region (3'UTR) of the beta-globin gene (*HBB*). *Case report:* A 29-year-old Malay lady at 35 weeks of gestation presented with moderate anaemia and a haemoglobin level of 9.5g/dL. Her full blood count (FBC) showed hypochromic microcytic anaemia, with RBC, MCV, MCH, RDW were 3.97, 74 fL, 23.9 pg, 15.8, respectively. Physical examinations showed no hepatosplenomegaly, and no transfusion history was reported. Haemoglobin analysis by using capillary electrophoresis revealed HbA 56.0%, HbA_2 3.9%, HbE 37.7%, and HbF 2.4%. Direct sequencing of the *HBB* gene confirmed the presence of compound heterozygous state of HbE and 3'UTR+132C>T (*HBB*:c.*+132C>T). Molecular analysis for common alpha-thalassaemia mutation showed no mutation detected. *Discussion:* Point mutation 3'UTR+132C>T was first described in a Turkish family. Previous cases with heterozygous states of

3'UTR+132C>T showed normal Hb level, mild microcytic hypochromic, and borderline HbA_2. The same study showed that the co-inheritance of 3'UTR+132C>T and IVS1-1G>A (β°) was associated with beta-thalassaemia intermedia. Even though this mutation causes a silent or mild phenotype in the heterozygous state, co-inheritance with a significant pathogenic variant of beta mutations will result in a more severe phenotype. In conclusion, the availability of molecular analysis enabled the identification of underlying mutations and improved the understanding of the natural history of the marked clinical heterogeneity of HbE/beta-thalassaemia.

HM40 Prevalence of molecular genotyping of Hereditary Persistence of Foetal Haemoglobin and delta-beta thalassaemia in Malaysia

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Introduction: Hereditary Persistence of Foetal Haemoglobin (HPFH) or delta-beta (δβ) thalassaemia causes an increased production of the Hb F level and may worsen the condition if being co-inherited with β-thalassaemia mutation. This study aims to determine the prevalence for common large deletions of β-globin gene clusters associated with high Hb F value among the HPFH or (δβ)°-thalassaemia carriers in Malaysia. *Materials & Methods:* This retrospective study retrieved 541 cases of HPFH or (δβ) thalassaemia carriers diagnosed by Hb analysis from January 2017 until December 2019. Molecular analysis was performed using the multiplex Gap PCR method. *Results:* Among these 541 cases, 63.6% were females and 36.4% were males. For ethnicity, 93.3% were Malay followed by Chinese (5.5%), Indian (0.7%) and others. There were seven subtypes of HPFH and/or δβ-thalassaemia identified. The two most common types of deletion were $^{G}\gamma(^{A}\gamma\delta\beta)^{0}$-thalassaemia Siriraj ~118Kb and $(\delta\beta)^{0}$-thalassaemia THAI ~12.5Kb with a frequency of 29.9% each. HPFH-6 deletion was detected in 20% of the samples. This is followed by $^{G}\gamma(^{A}\gamma\delta\beta)^{0}$-thalassaemia Asian-Indian Inv/Del (14.2%), $^{G}\gamma(^{A}\gamma\delta\beta)^{0}$-thalassaemia Chinese ~100Kb (4.4%), HPFH-3 (0.9%) and $^{G}\gamma(^{A}\gamma\delta\beta)^{0}$- thalassaemia Asian ~49.3Kb (0.6%). *Discussion:* This study highlights the common HPFH or (δβ)°-thalassaemia in Malaysia. Identification of these molecular findings may facilitate the diagnostic approach of thalassaemia and haemoglobinopathies in this region.

HM41 Identification of uncharacterised ($^{A}\gamma\delta\beta$) deletion (~101.3Kb) by using multiplex ligation probe-dependent amplification in a Malay family

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Introduction: Hereditary persistence of foetal haemoglobin (HPFH) and delta-beta thalassaemia are heterogeneous conditions caused by a deletion in the beta-globin gene cluster. It is characterised by increased production of foetal haemoglobin (Hb F) levels in adulthood. Case *report:* A five-year-old Malay girl and her parents' samples were referred to Institute for Medical Research for beta thalassaemia genotyping. The haemoglobin value of the index patient was 12.9 g/dL with MCV and MCH values of 67.7fL and 21.9pg, respectively. Her Hb analysis findings revealed a normal Hb A_2 of 2.6% with an increased level of Hb F (24%) leading to a presumptive diagnosis of delta-beta thalassaemia or HPFH trait. Common beta-globin gene cluster deletions were ruled out using the Multiplex Gap method. Further investigation was done using Multiplex Ligation-dependent Probe Amplification (MLPA) assay. *Discussion:* No common deletion was found using the Multiplex Gap method. MLPA findings of the index patient and her father revealed a heterozygous state of the uncharacterised deletion spanning from upstream of *HBG1* until *OR51V1* gene (downstream of *HBB*). Based on the MLPA probe to probe distance, the estimated size of the deletion is about ~101.3Kb which involves *HBG1, HBD* and *HBB* genes while leaving the *HBG2* intact. This uncharacterised deletion leads to a new ($^{A}\gamma\delta\beta$) deletion being identified. However further investigation is essential to characterise the deletion breakpoint in order to determine the actual size and further understanding of the deletion. A combination of this uncharacterised deletion with other beta thalassaemia mutation/deletion may result in thalassaemia intermedia.

HM42 Acute lower limb ischemia presenting Acute Myeloid Leukaemia

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Introduction: Patients with underlying acute myeloid leukaemia (AML) may develop disorders of the coagulation system, leading to the more commonly seen haemorrhagic complications. Thrombosis in leukaemia occurs more commonly in veins and rarely in arteries. We report a case of a middle-aged lady who presented with an acute lower limb ischemia as

the initial manifestation of undiagnosed acute leukaemia. *Case Report:* A 57-year-old lady presented with sudden onset, unprovoked left lower limb pain. There was no preceding trauma or infection. She had mild, intermittent episodes of gum bleeding in the preceding three weeks. Posterior tibial and dorsalis pedis pulses of her lower limb were absent with ankle: brachial pressure index less than 0.5. Physical examination was unremarkable. A CT angiography showed presence of a long segment thrombosis involving the left common and external iliac arteries. 84% blast cells with leucoerythroblastic picture were seen on PBF. Bone marrow aspirate demonstrated 77% blasts which were positive for peroxidase, suggestive of AML. *Discussion:* Thrombotic events are less commonly seen in AML, due to thrombocytopenia accompanying coagulopathy in affected patients. Thrombosis usually occurs in small vessels; large artery thrombosis is rarely seen. This case illustrates one of the rare instances where a patient with acute myeloid leukaemia developed large lower limb artery thrombosis, leading to unilateral acute limb ischaemia. It is important to always keep in mind the possibility of haematological malignancies as a cause of acute limb ischaemia, albeit rare, so as to institute prompt and appropriate therapy for the patient.

MEDICAL MICROBIOLOGY

MM01 Community-Associated Methicillin-Resistant *Staphylococcus aureus* (CA-MRSA): antimicrobial susceptibility patterns versus *mecA* gene and Panton-Valentine Leukocidin (PVL) genes in clinical isolates from Hospital Tuanku Ja'afar, Seremban

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Introduction: The emergence of CA-MRSA is well recognised as a significant pathogen in the public and healthcare-associated settings. The aim of this study was to determine the prevalence of CA-MRSA carrying *mecA* (*SCCmecA)* and Panton-Valentine leukocidin (PVL) genes in clinical isolates from Hospital Tuanku Ja'afar. *Materials & Methods:* All non-duplicate clinical isolates tested for MRSA with antimicrobial susceptibility patterns showing a possibility of community-acquired MRSA, which was resistance only to cloxacillin and penicillin disks by the diffusion method were prospectively collected at Hospital Tuanku Ja'afar from July 2017 to June 2018. The isolates were sent to the Institute of Medical Research for genotyping of the *mecA* and PVL genes. *Results:* A total of 58 non-repeated isolates, which were phenotypically positive for CA-MRSA, were recovered. Among them, 40 isolates were subjected to *mecA* and PVL gene detection. All isolates were clindamycin susceptible. Of the 40 isolates, 22 (55%) carried staphylococcal cassette chromosome *mecA* (*SCCmecA)* and Panton-Valentine leukocidin (PVL) genes. 18 (45%) were detected with *mecA* but not with PVL. *Discussion:* Based on our study, we can conclude that the phenotypic characteristic of CA-MRSA can be used as a screening method as 55% of clinical isolate in our centre produce the PVL gene. Further study needs to be done, and this is the limitation of our research as we were unable to determine the sequence type (ST).

MM02 *Bordetella trematum* bacteremia in a leukaemic patient and review of previous cases

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Introduction: Bordetella trematum is a gram-negative coccobacilli and was first reported in 1996. It is a relatively rare organism causing infection rendering information on the pathogenesis, life cycle and virulence limited. There is also no standardised method and interpretive criteria for antimicrobial susceptibility testing for this organism. When reported, this organism is highly associated with immunocompromised and diabetic patients. *Case report:* This is a case of a newly diagnosed leukaemic patient which first presented with a history of unresolving respiratory infection despite receiving multiple courses of antibiotics. *Bordetella trematum* was isolated from blood culture with identification using VITEK 2 GN (Gram-negative bacilli). After a course of ceftriaxone followed by piperacillin-tazobactam, the patient improved clinically and was discharged well. *Discussion:* Majority of isolated *Bordetella trematum* were from tissue and swab samples of infected wounds with polymicrobial infection while isolation from blood have been infrequent. Although still rare, it is increasingly reported, as laboratories gain greater access to technologies for accurate and specific bacterial identification. As it may be an emerging microorganism, monitoring and reporting the isolation of this organism is essential to add knowledge on the clinical significance and antimicrobial susceptibility pattern.

MM03 Carbapenem heteroresistance in colistin non-susceptible *Enterobacter asburiae*: a case report

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Introduction: The emergence of colistin resistance in the *Enterobacter cloacae* complex, particularly *Enterobacter asburiae* is alarming, especially in carbapenem-resistant isolate. This case highlights the importance of laboratory detection of

heteroresistant isolates to aid clinicians in providing proper treatment to the patient and the emergence of colistin-resistance in *Enterobacter* subspecies in our hospital. *Case report:* A 66-year-old lady with multiple underlying comorbidities complicated with COVID-19 infection, presented with shortness of breath and poor oral intake for a one-week duration. Her condition deteriorated and required intubation on day four of admission. Blood culture and sensitivity on day 15 grew gram-negative bacilli, identified as *Enterobacter asburiae* DSM 17506T DSM with a score value of 2.20 by MALDI-ToF. The sensitivity test revealed possible AmpC plus porin loss. Micro-colonies within the zone of inhibition around the meropenem and imipenem disks were noticed on the antimicrobial sensitivity plate. Identification and sensitivity of the heteroresistant colonies revealed *Enterobacter asburiae* RV412_A1_2010_05 LBK with a score value of 2.23. The isolate was resistant to imipenem, meropenem, and ertapenem, with MIC value of >32 ug/mL. Further investigation revealed MIC colistin of >4.0 ug/mL (resistant). KPC gene was detected while MCR-1 gene was not detected. The patient succumbed on November 7th, 2021, with the cause of death of sepsis secondary to CRE *E. asburiae*. *Discussion:* Carbapenem and colistin antibiotics have been the last resort to treat multidrug-resistant gram-negative organisms. While this remains a challenge, misidentifying heteroresistant isolates as susceptible is an underappreciated phenomenon, which may cause inappropriate treatment leading to treatment failure.

MM04 Gallbladder empyema due to *Raoutella planticola*

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Introduction: Raoutella planticola is an emerging pathogen which may cause bacteraemia, pneumonia, intra-abdominal infections, conjuctivitis and urinary tract infection. We present a case of *R. planticola* infection of the gallbladder in a patient with no obvious risk factor. *Case report:* A 57-year-old gentleman with underlying hypertension and dyslipidaemia presented with symptoms of right hypochondriac pain associated with vomiting and reduced oral intake for 1 day duration. His vital signs were normal and physical examination revealed tenderness over the right hypochondriac region. Blood investigations showed an elevated white cell count of 19190/UL with neutrophilia and normal liver enzymes. An abdomen computed tomography showed enlarged gallbladder with prominent calculus and presence of perihepatic free fluid. He underwent operation for perforated gallbladder empyema with choledocholithiasis. Intraoperative findings revealed perforated gallbladder with presence of bile and pus at the subphrenic and subhepatic region. Bile culture grew mucoid, lactose fermenting colonies on culture media after 24 hours of incubation. The isolate was identified as *Raoutella planticola* by matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry. It was susceptible towards cefazolin, ampicillin-sulbactam, amoxicillin-clavulanate, piperacillin-tazobactam, cefuroxime, cefotaxime, meropenem and imipenem. Patient was treated with piperacillin-tazobactam for seven days duration and was discharged with oral Cefuroxime. *Discussion: Raoutella planticola* is an aerobic, gram-negative bacillus and was formerly known as *Klebsiella planticola.* Human infection is uncommon. Risk factors reported include immunocompromised state, seafood consumption and exposure to soil or aquatic contaminant. Our patient, however, had no history of attributable exposure risks and responded well to the treatment.

MM05 Double trouble: case of disseminated Penicillium marneffei and Rhodococcus hoagii coinfection in a HIV patient

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Introduction: Talaromyces marneffei is a dimorphic fungus endemic in Southeast Asia, India and China. It causes severe mycosis, especially in immunocompromised individuals, such as in patients with HIV infection. Concomitant talaromycosis with other opportunistic pathogens is possible as the majority of *T. marneffei* infections occur in patients with advanced HIV infection. *Rhodococcus hoagii*, a Gram-positive coccobacilli first isolated from foals with pneumonia in Sweden in 1923, is increasingly recognised as human pathogen, especially in immunocompromised patients. However despite its potential to cause adverse outcomes in vulnerable patient populations, it is frequently underreported and misdiagnosed due to its difficult identification by conventional techniques. *Case report:* We report a case of a 45-year-old Chinese gentleman who presented with symptomatic anaemia and constitutional symptoms who later screened positive for HIV. Both *T. marneffei* and *R. hoagii* were isolated from his blood and bone marrow specimens. Additionally, skin biopsy demonstrated PAS-positive yeast-like organisms within histiocytes- likely to be *T. marneffei*. He was successfully treated with antifungals and antibiotics and discharged well. *Discussion:* Coinfection of both *T. marneffei* and *R.hoagii* in the same site has yet to be reported in the literature, and poses a considerable diagnostic and therapeutic challenge. The current case report focuses on the microbiological characteristics and diagnostic challenges in identifying these organisms due to microbiological and clinical similarities with other pathogens, especially for *R. hoagii*. We also aim to emphasise the importance of vigilance to potential concomitant infections of *T. marneffei* and other opportunistic pathogens in immunosuppressed patients.

MM06 A case report on *Ascaris lumbricoides* infection in a postnatal patient; is it Loeffler's syndrome?

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Introduction: Ascaris lumbricoides infection occur worldwide as the commonest helminthic infection which immunocompromised patients are commonly affected. During the early larval migration stage, mostly patient is asymptomatic. However, heavy infections can cause intestinal obstruction and other complications include pneumonia and respiratory obstruction. *Case report:* Here we report a case of *Ascaris lumbricoides* infection in a postnatal patient who initially was diagnosed with community acquired pneumonia but subsequently her condition deteriorated and required for intubation. Chest x-ray demostrated bilateral pleural effusion with lung abnormality represent infections. Laboratory tests showed eosinophilia of $0.57x10^9$/L (differential eosinophil 12.2%), and anaemia with haemoglobin of 8.4 g/L. Full blood picture revealed normocytic normochromic anaemia with mild eosinophilia possibly secondary to parasitic infestation. During intensive care unit admission, *Ascaris lumbricoides* worm was found in the oral cavity while doing ETT suctioning. Macroscopic examination of the worm by microbiologist confirmed the diagnosis of *Ascaris lumbricoides*. Antihelminthic therapy (albendazole) was administered to the patient. Subsequently patient was extubated and transfer to general ward for continuation of treatment. *Discussion:* In this case, the pulmonary manifestations are believed to be caused by the hypersensitivity reaction towards Ascaris larvae. In the context of eosinophilia presenting with respiratory symptom, Loeffler's syndrome due to lung migration of the larval stages of soil-transmitted helminths must be considered.

MM07 Contamination- a nightmare in molecular laboratory Hospital Sultanah Nur Zahirah

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Introduction: Since the emergence of SARS-CoV-2 virus, molecular microbiology laboratory is witnessing an increased demand on the rRT-PCR test for Covid-19. Thus our laboratory is at risk to major challenge including contamination leading to serious outcome. We would like to share our experience in dealing with this problem. *Case report:* Real Time Reverse Transcriptase Polymerase Chain Reaction (rRT-PCR) test for SARS-CoV-2 diagnostic service provided by Hospital Sultanah Nur Zahirah (HSNZ) started in February 2020 with initial capacity of 150 then gradually increased to 500 samples daily. The problem started in April 2021, when several batches of test showed invalid Negative control (NTC) with numerous false positive results. This could be caused by laboratory consumable, equipment, personnel or environmental contamination. Decontamination was done immediately. Despite several weeks of cleaning, the problem persists and results in pending of thousand PCR test. Consequently, molecular lab service was held and all samples were outsourced. The equipment surfaces and environmental swab revealed global contamination. After 3 months of decontamination involving terminal cleaning, equipment cleansing, fumigation, replacement of consumable, renovation for proper lab setting and training in specimen handling, then in July 2021 we manage to resume our service. *Discussion:* Dealing with contamination cause exhaustion to the laboratory personnel, wastage of resources and cost increment. In our case, the biggest threats are improper lab setting and inappropriate specimen handling. The challenge in dealing with contamination is to identify the source and to curb it. In conclusion, proper lab setting and specimen handling is crucial to reduce the risk of PCR lab contamination.

MM08 Gene Xpert MTB/RIF Ultra: preliminary data on detection of *Mycobacterium tuberculosis* and rifampicin susceptibility for relocation establishment of surveillance data from diagnostic microbiology laboratory

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Introduction: The Medical Microbiology & Parasitology diagnostic laboratory, HUiTM was relocated to Puncak Alam Campus in July 2021. In order to sustain the national and surveillance data collection on certain organisms and antimicrobial profile, this preliminary project related to tuberculosis (TB) was conducted as the Gene Xpert MTB/RIF Ultra service offered since June 2021. The aim is to investigate the TB detection rate and rifampicin susceptibility using GeneXpert MTB/RIF Ultra with the interest to relate it with acid-fast bacilli (AFB) stain. *Materials & Methods:* It is a retrospective study that encompasses results compilation of Gene Xpert MTB/RIF Ultra on etiology, rifampicin (RIF) susceptibility testing and AFB stain from June 2021 to February 2022. *Results:* There were 95 requests altogether with 100% of the specimens originating from the respiratory tract. Of 95 requests, 16.8% (n=16) of specimens detected *Mycobacterium tuberculosis* (MTB), with 18.8% (3) of detected MTB had positive AFB stain. The remaining 81.2% (13) were AFB negative. Among 16 detected MTB, 25% (4) were rifampicin resistant (RR), 56.0% (9) rifampicin susceptible (RS) and 19.0% (3) had rifampicin indeterminate susceptibility (RI). Of 25% RR, 50% had AFB positive and negative respectively. While for 56.0% of RS, 89% of MTB had no detected AFB on staining. The remaining RI had all negative AFB stains with only trace MTBC detected. *Discussion:* The Gene Xpert MTB/RIF Ultra analysis is a rapid and practical diagnostic tool which is crucial in facilitating the physician in the TB and infection control unit to strategise the surveillance activity in the new relocated institution.

MM09 Molecular detection of virulence genes of *Pseudomonas aeruginosa* causing an outbreak in a tertiary hospital

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Introduction: There were two outbreaks between 2016 to 2017 caused by sensitive strain *Pseudomonas aeruginosa* in a tertiary hospital among 17 patients. The outbreak investigation conducted by pulsed field gel electrophoresis revealed seven clonally related *P. aeruginosa* strains from A to G. The objective of this study is to determine the virulence factors acquired by *P. aeruginosa* isolates involved in the outbreak and to describe the clinical outcome. *Materials & Methods:* A total of ten out of 17 clinical isolates, were able to revive. They were represented by clone A, B, C, D, F and G. Six virulence genes were determined by polymerase chain reaction namely *ToxA, ExoS, LasI, LasB, OprI,* and *OprL* genes which encodes for exotoxin A, exoenzyme S, quorum sensing system, alginate, and the last two genes are for peptidoglycan related outer membranes. *Results:* Results showed that *ToxA* gene was detected in six isolates which belonged to clone A (one isolate) and clone C (five isolates). While *ExoS, LasI, LasB, OprI,* and *OprL* were detected in all isolates. The isolate from clone A caused pneumonia while isolates from clone C caused surgical site infections and complications such as disseminated infections and death. *Discussion:* The preservation and the presence of multiple virulence genes among these *P. aeruginosa* isolates were possible contributing factors to the invasiveness, persistence, and severity of the infection. Further investigations of the virulence genes involving a larger number of isolates and different types of infection may provide a better correlation with their clinical outcomes.

MM10 Reducing sputum sample leakage for tuberculosis culture during transportation using CT-Trans sputum container

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Introduction: Johor Bahru Public Health Laboratory (JBPHL) receives samples for tuberculosis (TB) diagnostic from various health clinics in Johor state. The rejection rate of the samples showed that, leaking is among the criteria highest since 2018. This will be leading to a delay in the diagnostics besides can have caused harm to the health care workers who handle samples during transportation and processing the samples. Leaking can be caused by various factors, including the position of the samples during transportation, whereby, the uprights position during the transportation may secure the samples. *Materials & Methods:* Data were retrieved from the Tibi/Leprosy Laboratory database between 2016 and 2021. Leaking of the sputum for TB culture during transportation has contributed 1.5% to 5.0%. Several improvement initiatives have been implemented from 2019 to 2021, including the development of CT-Trans sputum collection in early 2021. CT-Trans sputum collection was distributed to selected health clinics in 2021, and the data for the rejection rate were collected and analysed. *Results:* Data from 2018 was used as a pre-remedial measure, and it revealed that 5.0% of TB cultures were rejected due to leaking. However, in 2021, the sample rejection rate due to sample leaking was reduced from 5.0% in 2018 to 0.7% (2021). *Discussion:* CT-Trans sputum container has contributed to a decrease in the rejection rate of leaking sputum samples during transportation to JBPHL. The usage of CT-Trans sputum containers for Tuberculosis culture analysis will be expanded to all Johor state health clinics.

MM11 *Edwardsiella tarda* bacteremia secondary to urosepsis - a case report

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Introduction: Urosepsis with bacteraemia caused by *Edwardsiella tarda* is uncommon. Most reported cases were cellulitis, myonecrosis, as well as hepatobiliary infection and meningitis following exposure to water. Immunocompromised patients and those with underlying comorbidities are predisposed to septicaemia, resulting in high mortality. We report a case of a patient with multiple comorbidities who presented with fulminant *E. tarda* urosepsis. *Case report*: A 47-year-old woman with underlying diabetes mellitus, hypertension, and dyslipidaemia presented to our hospital in septic shock, required intubation with intensive care unit support. Blood investigations revealed hyperglycaemia with ketoacidosis and acute kidney injury. Insulin and empirical antibiotics were initiated. Her blood and urine cultures grew *Edwardsiella tarda*, identified via VITEK®2 and MALDI TOF. The isolate was sensitive to all antibiotics tested. The patient had an uneventful recovery and was discharged well. *Discussion*: *Edwardsiella tarda* human infections are rare, and predominantly presents as gastroenteritis. Reports on urosepsis caused by *E. tarda* are limited. Furthermore, extraintestinal and systemic manifestations carry a high risk of mortality among individuals with risk factors. Our patient had poor sugar control upon admission, and developed fulminant urosepsis which required mechanical ventilation. Our case highlights the importance of recognising *E. tarda* as a potential cause of urosepsis, especially given the favourable outcome. A thorough history and examination, together with relevant imaging should be performed to look for any skin and muscle infections, as well as intraabdominal pathology. Cultures must also be taken prior to empiric therapy for prompt isolation of *E. tarda*.

MM12 A Retrospective study of Carbapenmase - Producing Carbapenem-resistant Enterobacterales (CP-CRE) infection by modified Carbapenem inactivation method (mCIM) in Hospital Melaka from September 2021 to February 2022

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Introduction: Carbapenemase-Producing Enterobacterales (CPE) are carbapenem-resistant Enterobacterales (CRE) contain enzymes called carbapenemases. Modified Carbapenem Inactivation Method (mCIM) is a simple phenotypic test that detects carbapenemase producing Enterobacterales (CPE). This study aimed to evaluate the performance between modified carbapenem inactivation method (mCIM) with carbapenemase gene detection by PCR. *Materials & Methods:* A total of 61 isolates of carbapenem-resistant Enterobacterales were collected from different types of clinical samples. This retrospective study done for 6 months from September 2021 to February 2022 among all the departments. All isolates positive by phenotypic test (mCIM) were sent to National Institutes of Health (NIH), Malaysia for carbapenemase gene detection. *Results:* Prevalence for carbapenem-resistant Enterobacterales (CRE) in Hospital Melaka is 0.17%. Urine and blood samples were among the highest with CRE of which 26(42.6%) and 13(21.3%) respectively. Departments that had the most CRE were from Medical 19(31.1%), followed by Anaesth 14 (23.0%). *Klebsiella pneumoniae*, was the most common organism with CRE, accounts about 56 isolates (91.8%). From total 61 isolates positive for CRE,59 were positive for mCIM (CP-CRE) and showed presences of carbapenemase gene detection by PCR with NDM-1 gene 57(96.7%) and OXA-48 gene 2(3.3%). The sensitivity and specificity for mCIM test is 100% respectively. *Discussion:* The prevalence of CRE in Malaysia varied between 0.3% and 5.74% across different centres. The majority of the carbapenemase were the New Delhi metallo-β-lactamase 1(NDM-1) and OXA-48 genes. Presence of CRE in blood sample and *Klebsiella pneumoniae* being the common organism may indicate treatment. Carbapenemase gene detection by pcr may delay patients management. Therefore (mCIM)hotline for Italian phenotypic test is a reliable screening tool for early detection of carbapenemases in CRE.

MM13 Disseminated Sporothrichosis with extra cutaneous manifestation in a newly diagnosed advanced retroviral disease patient

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Introduction: Sporotrichosis, is a chronic infection of the skin and subcutaneous tissue, caused by *Sporothrix schenckii*, a dimorphic fungus. Human may acquire this infection through traumatic penetration by splinters, plant matter or soil that contained the fungal spores. Zoonotic infection may occur from infected animals to their animal handlers. In this case, we described a case of disseminated cutaneous sporotrichosis in an advanced RVD patient with extra cutaneous manifestations. *Case Report:* A 24-year-old gentleman presented with persistent epistaxis associated with fever, multiple large ulcers over the face, bilateral lower and upper limbs, multiple joint pain and significant weight loss. There was no history of trauma or animal handling. Laryngoscopy showed multiple nodular lesion over the larynx and pharynx. Chest X ray revealed bilateral lower zone haziness. He is a newly diagnosed advanced RVD patient with a low CD4 count of 26U/L, and a viral load of 25744 Copies/ml, log 4.41. *Sporothrix schenckii* was isolated from blood and skin fungal culture. Histopathological examination of skin biopsy and pharynx biopsy revealed granulomatous inflammation with areas of caseating necrosis with numerous fungal bodies seen. Patient was treated successfully with Amphotericin B and itracanazole. Antiretroviral therapy was also initiated. *Discussion:* The presentation of sporotrichosis varies according to location of infection and immune status of the host. In this case, our patient was presented with disseminated sporotrichosis as HIV presenting illness involving blood stream, larynx, pharynx, skin and possible lung and joint. Inhalation of conidia could be the source of infection.

MM14 A rare case of bacteraemic pneumonia due to *Eubacterium callanderi*

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Introduction: Eubacterium is an anaerobic gram-positive bacillus and an uncommon cause of clinically significant infection in humans. *Case Report:* A 76-year-old lady with multiple comorbidities, bed-bound and recent history of admission presented to our medical centre with a 1-week history of non-productive cough, reduced oral intake and lethargy. Upon presentation, she was afebrile, but respiratory examination revealed coarse crepitation at the left lower zone. Her chest radiograph showed pneumonic changes. A provisional diagnosis of hospital-acquired pneumonia was made, and she was treated with intravenous ceftriaxone. Her blood culture grew pure colonies of anaerobic, gram-positive bacilli, initially identified by API 20A as *Eubacterium limosum* but later confirmed to be *Eubacterium callanderi* through 16S rRNA partial gene sequencing. The organism was resistant to penicillin, but sensitive to ampicillin/sulbactam, ceftriaxone, ertapenem and metronidazole. She improved clinically with ceftriaxone and was discharged home. *Discussion: Eubacterium* is a rare human pathogen that resides in the human oral cavity and is among the highest constituents of gastrointestinal commensals. We believe the focus of infection leading to bacteraemia was the lower respiratory tract, given that no apparent focus of

infection other than pneumonia was present. Despite the absence of dysphagic symptoms, possible aspiration of gut contents as a stroke-related complication may have introduced this organism into her respiratory tract. Limited published data on *E. callanderi* demonstrates a similar antimicrobial susceptibility profile to our isolate. *E. callanderi* may not be a commonly isolated pathogen but is capable of causing significant infection in humans.

MM15 Rare *Lodderomyces elongisporus* fungaemia in a SARS-CoV-2 patient

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Introduction: The Coronavirus Disease 2019 (COVID-19) pandemic has recorded an increased number of invasive mycoses owing to the reduced immunity caused by severe sepsis and its immunosuppressive treatments. The most common fungal culprits co-infecting with COVID-19 are *Aspergillus* and *Candida*. *Lodderomyces elongisporus* is the latest, and the least frequently isolated member of the *Candida parapsilosis* complex. We report a case of *L. elongisporus* fungaemia in a patient with diabetic ketoacidosis secondary to COVID-19 category 5 infection. *Case report:* A 52-year-old diabetic and hypertensive lady was brought in by ambulance for fever, cough, anorexia and lethargy for 4 days, associated with sudden onset dyspnoea. Upon arrival, she was febrile, tachycardic and tachypnoeic with low oxygen saturation. She was noted to be hyperglycaemic and ketonaemic. Her lung auscultation was clear. Naso-oropharyngeal swab and blood culture were taken in the emergency department. SARS-CoV-2 RNA was detected via real-time polymerase chain reaction (RT-PCR), with cycle threshold (CT) values of more than 24 in E, N and RdRP genes. Her blood culture grew *Lodderomyces elongisporus.* She was treated with intravenous fluconazole and amphotericin B for 4 days following the culture result. However, she succumbed on the 6th day of admission. *Discussion:* Malaysia has had three cases of *L. elongisporus*, making this case its fourth case reported. However, co-infections with COVID-19 have never been recorded worldwide. We highlight the first case of *L. elongisporus* isolation known to co-exist with SARS-CoV-2 infection during this current pandemic.

MM16 Thermotolerant *Cronobacter sakazakii* isolate in an 8 months old infant: case report

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Introduction: Cronobacter sakazakii, previously known as *Enterobacter sakazakii* is a gram-negative bacillus. It is considered as an opportunistic pathogen associated with cases of diarrhea, meningitis, necrotising enterocolitis with life threatening complication in infant. We present an infant with diarrhoea featuring *Cronobacter Sakazakii* isolate in stool culture and sensitivity (C&S). *Case Report:* D is an 8-month-old infant, born term with history of G6PD deficiency presented with four days history of diarrhoea with 6-7 episodes of blood stain stool. Otherwise, child is active with no sign of meningism and not in sepsis. The child has been taking infant formula milk of the same brand since birth with breastfeeding in between. The storage, preparation and serving is regarded hygienic. Stool C&S sent revealed *Cronobacter Sakazakii* isolate via (MALDI TOF) MS. Child was observed in ward for 5 days and was discharge well. *Discussion: Cronobacter Sakazakii* had been reported as thermotolerant bacteria. It is also found that thermal resistance of this organism increased in rehydrated processed infant formula and its ability to form biofilms and to resist environmental stress leads to its pathogenic potential. The identification of *Cronobacter Sakazakii* in infant presented with diarrhoea, dysentery, meningitis or a critically ill child is crucial. Thus, this organism shall be included in the list of stool pathogen to be isolated among infants.

MM17 COVID-19 in the post-vaccination period in a hospital in Selangor: positive rate and demography

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Introduction: COVID-19 pandemic has grappled Malaysia with its devastating effect. Massive vaccine development effort has since taken place worldwide and in Malaysia, vaccine roll out for adult population began in March 2021. By December 2021, more than 80% of adult population in Selangor had been fully vaccinated. This preliminary study aims to examine the positive rate of COVID-19 and its demographic picture in a hospital in Selangor in the post- vaccination period. *Material and method*: Data of samples that were sent for SARS-CoV-2 detection using a commercial real-time PCR assay from December 2021 until February 2022 were examined. Data were then analysed using SPSS. *Result*: There were 1408 samples sent for SARS-CoV-2 detection. Out of these, 100 (7%) was positive for SARS-CoV-2. Fifty-six (56%) of the positive cases were female. Majority 89 (89%) were in the age group 18-50, with 1 (1%) in the age group <5 years. Eleven (11%) positive cases among those screened before admission to hospital for reasons unrelated with COVID-19. *Discussion*: Positive rate of COVID 19 was high at 7%. This is in line with high positive cases throughout the country from December 2021 to February 2022. A small number among the unvaccinated population (< 5years old), many more probably remain undetected as they are usually asymptomatic. Small but significant number, 11% of incidental COVID-19 detected, and they weigh on the already stressed healthcare system.

MM18 Newly diagnosed systemic lupus erythematosus in COVID-19 positive patient: a case report

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Introduction: Systemic lupus erythematosus (SLE) has been associated with variable morbidity and mortality. It is very important to recognise the effects of novel coronavirus SARS-CoV-2 infection causing COVID-19 pneumonia on SLE patients. *Case report*: A 56-year-old Malay lady with underlying diabetes mellitus type 2, hypertension and dyslipidaemia was tested positive for COVID-19 after having respiratory symptoms. She presented to COVID-19 Assessment Centre with fluid overload symptoms, uncontrolled hypertension and worsening renal function. The patient was then referred to a tertiary hospital with a working diagnosis of COVID-19 stage 2A with fluid overload secondary to hypertensive cardiomyopathy in failure with anaemia and hypoalbuminaemia. She was transfused with packed cells and managed accordingly. However, her condition deteriorated several days later requiring mechanical ventilation and dialysis following worsening kidney function. Further investigations revealed positive antinuclear antibodies (1:320) and dsDNA. Her diagnosis was revised to SLE with possible lupus nephritis. Despite the best efforts, the patient passed away after 22 days of admission. *Discussion*: Known for their defective immune system, patients with SLE have increased risks for infections including COVID-19. They also have higher mortality risks when being infected with COVID-19 compared to the general population. Respiratory infections are significant causes of morbidity, especially in elderly SLE patients. COVID-19 infection is known to cause activation of cytokines and chemokines, leading to the development of acute respiratory syndrome and multi-organ failure. COVID-19 infection could worsen the prognosis of SLE patients with disease flare. More studies are needed to elucidate the effects of COVID-19 on SLE.

MM19 A rare case of infectious keratitis due to *Nocardia puris*

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Introduction: Nocardia species are environmental bacteria that can cause traumatic keratitis. However, its diagnosis is often missed or delayed due to difficulty in isolation and identification. We report a rare case of traumatic keratitis caused by *Nocardia puris*. *Case report:* A 41-year-old gentleman presented to the Ophthalmology clinic with a two-day history of left eye pain, redness and excessive tearing after sustaining a left eye injury while welding steel at his workplace. The examination of the left eye showed a corneal foreign body measuring <1mm at the centre of the visual axis with infiltrates over the margins. His left eye visual acuity was 6/30. Right eye examinations were unremarkable. The foreign body was removed. Corneal scraping was done and sent for stain, culture and sensitivity. We observed numerous Gram-positive branching, filamentous bacilli with beaded appearance. Meanwhile KOH testing showed fine hyphae-like structure which were initially thought to be fungal filaments. After 48 hours of incubation period, multiple dry, chalky white small colonies grew on blood and chocolate agar, which was identified as *Nocardia puris* using MALDI-TOF. The patient was treated successfully with topical levofloxacin. *Discussion:* Clinical suspicion of *Nocardia* is difficult because the organism is rarely encountered and frequently mimics fungal keratitis. Although the gold standard of screening is by Gram stain and KOH recent modalities such as proteomics analyser can aid in the recognition of the species. *Conclusion: Nocardia sp* is a rare cause of keratitis. Prompt diagnosis and treatment are crucial to reducing visual complications.

MM20 First report of prosthetic joint infection due to *Cyberlindnera fabianii*

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Introduction: Invasive fungal infections caused by *Cyberlindnera fabianii* have recently increased despite its low virulence potential. To our knowledge, we report the first case of prosthetic joint infection (PJI) due to *C. fabianii*. *Case report:* 85 years old Chinese lady with history of total right knee replacement in 2015 presented with painful right knee swelling for 3 months associated with pus discharge. On examination, right knee appeared swollen, tender with sinus tract. Radiology examination revealed radiolucency over distal femur and proximal tibia. She was treated as right knee PJI with intravenous clindamycin and ciprofloxacin for 5 days. She underwent removal of implant, arthrotomy washout with insertion of antibiotic cement spacer and intraoperative finding was suggestive of osteomyelitis changes. The microscopic smear from synovial fluid specimen showed yeast cells. The organisms appeared as cream-coloured smooth, glabrous, yeast-like colonies. The organism was identified as *Candida utilis* by Vitek YST Card system. However, a final microbiology report of synovial fluid and bone marrow revealed a growth of *Cyberlindnera fabianii* identified by MALDI-TOF MS and confirmed using molecular assays. It was susceptible to amphotericin B, fluconazole and voriconazole. She completed intravenous cefuroxime and fluconazole for 2 weeks. She was discharge with oral fluconazole and oral ampicillin-sulbactam planned for a total of 12 weeks and 10 weeks respectively. *Discussion: C. fabianii* are one of a non-albicans *Candida* that rarely cause invasive human infection. It has been reported to cause pneumonia, endocarditis, prostatitis, fungaemia and catheter-related infections. The clinical spectrum, diagnosis, and optimal therapy of *C. fabianii* infections remain to be determined.

MM21 Apolipoproteins enhance dengue virus serotype 2 (DENV2) infectivity on human hepatoma cell line (Huh-7)

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Introduction: Dengue virus (DENV) causes a wide spectrum of diseases from fever to dengue with warning signs and severe dengue. Internalisation process is a key step in dengue infection in target cells. Previous studies have revealed a direct correlation between dengue severity of all serotypes, including DENV2, and changes of lipid components in plasma, though the mechanisms are not well understood. Therefore, the aim of this study is to compare DENV2 internalization in human hepatoma (Huh-7) cell line between the presence of apolipoprotein A1 (apoA1), B (apoB), and E (apoE). *Materials & Methods:* Cytotoxicity of apolipoproteins on Huh-7 was assessed using tetrazolium reduction assays, incorporating varying concentrations of apolipoproteins (0.25-2.00µg/ml). About 1.0×10^5 cell/well Huh-7 were seeded in 24-well plates and incubated at 37°C, 5% CO_2 overnight. Subsequently, DENV2 at MOI of 1 with 2µg/ml apoA1, apoB, and apoE respectively were introduced into the confluent Huh-7 cells and incubated for an hour at 37°C, 5% CO_2. The cells were washed once with PBS, lysed with buffer, and subjected to qPCR for viral load determination. *Results:* ApoA1, apoB and apoE concentrations of up to 2.00µg/ml gave >85% cell viability respectively. DENV2 RNA copy number per µl increased in each apolipoprotein [apoA1=$6.6x10^3$,(21%), apoB=$1.5x10^4$,(47%), apoE=$4.3x10^3$,(14%)] compared to the non-treated control. ApoB exhibited a significant and highest increment compared to apoA1 and apoE ($p=0.022$ vs $p=0.323$ and $p=0.878$ respectively). *Discussion:* Human apolipoproteins, particularly apoB, enhance initial attachment of DENV2 to cell surface, suggesting their role in DENV internalisation and infectivity. This could potentially translate to its utility in dengue risk assessment and stratification.

MM22 Perianal tuberculosis in an undiagnosed HIV patient; the importance of microbiology investigations - a case report

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Introduction: Perianal tuberculosis that manifests as an abscess is not easily distinguishable from the usual pyogenic abscess and is least expected unless in the immunodeficiency population. We presented a case of perianal tuberculosis presented with an acute perianal abscess in an undiagnosed HIV patient and highlighted the importance of microbiological investigations, especially acid-fast bacilli (AFB) direct smear. *Case Report:* 53-year-old gentleman, underlying hypertensive, presented with intermittent fever, pain, and swelling at the perianal region for two weeks duration. Examination revealed an abscess at the left perianal region. Laboratory assessment showed no other abnormalities except for anaemia and inflammatory response with neutrophilia (ANC $10.09x10^9$/L), CRP of 77mg/ml, and ESR of 84 mm/hr. Intraoperatively, 10 ml of greenish pus drained without fistula formation. The microbiological investigation; AFB direct smear revealed acid-fast bacilli of 3+. The routine bacterial culture showed no growth. Mycobacterial culture isolated *Mycobacterium tuberculosis* complex with line probe assay showed no gene mutation towards rifampin and isoniazid. Further investigation done showed the patient had concomitant pulmonary tuberculosis (CXR changes and scanty AFB in the gastric aspirate direct smear). He was also tested positive for HIV and HCV viral infection. *Discussion:* During the initial presentation of the perianal abscess, it is crucial to exclude tuberculosis, as the risk of persistent/recurrent lesion observed in patient who was not started on antituberculosis medication within 6 weeks postoperative. Thus, pus from the anorectal region should be routinely sent for AFB direct smear apart from standard culture and gram stain irrespective of the immune status.

MM23 *Vibrio vulnificus*; a not uncommon aggressive pathogen - a case report

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Introduction: *Vibrio vulnificus* is part of foodborne pathogen causing fatal septicaemia, severe wound infection and gastroenteritis. It is not uncommon in Malaysia. We report a case of *Vibrio vulnificus* septicaemia and wound infection in a patient with a background of chronic skin disease. *Case Report*: A 64-year-old gentleman with recent history of seafood consumption, presented with septic shock to us within 24 hours of sudden onset of left hand pain and swelling concomitant with fever and gastroenteritis symptoms. Area of skin ulceration, multiple haemorrhagic bullous formations with haemoserous

discharge over dorsum part of the left hand, cellulitis changes of whole of left forearm and no crepitation/ insect bite's punctum observed. Laboratory findings showed features of sepsis; raised C-reactive protein, acute renal impairment and metabolic acidosis, normal total white cells count with neutrophilia and normal albumin. He was treated as cellulitis and IV ampicillin-sulbactam commenced. Blood culture was positive after one day of incubation revealed gram negative curved rods and antibiotics escalated to piperacillin-tazobactam. The culture grew non-haemolytic big greyish colonies on blood agar and greenish colonies on thiosulfate citrate bile salts sucrose (TCBS) agar. Isolate identified as *Vibrio vulnificus* by VITEK and susceptible towards ceftazidime, doxycycline and meropenem. The bullous fluid culture was no growth. IV ceftadime, doxycycline and wound management commenced and patient's condition improved. *Discussion:* Triad of rapid progression of cellulitis, septicaemia and gastroenteritis symptoms with history of seafood consumption should warrant suspicion of an aggressive fatal pathogen such as *Vibrio vulnificus* and appropriate empiric antibiotic selection.

MM24 A case report of malaria recurrence by Plasmodium Falciparum

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Introduction: Malaysia is susceptible to malaria importation due to geographical proximity and high influx of foreign workers and students. Here we present a case report of imported malaria from a patient with travel history from Africa. *Case report:* A Malay male presented to the A&E Department complaining of fever for four days associated with myalgia, arthralgia, and headache. He worked as a lorry driver in Papua for eight years and in Africa for two years. He had a history of multiple malaria infections in Africa. He was unsure of the antimalarial drug given upon hospitalisation. His physical examination was unremarkable. His lab investigation showed eosinophilia (19.1%) and basophilia (12.0%). His renal profile revealed mild hypokalemia (K 3.3 mmol/L). Liver function test showed raised ALP (186 U/L) and ALT (65 U/L). His Blood Film for Malaria Parasites (BFMP) was positive for Plasmodium falciparum with asexual count 3560 parasites/uL blood and sexual count is 40 parasites/uL blood). He was diagnosed with relapse malaria/treatment failure. He was administered with Tab Riamet for four days and given supportive care. He responded well to treatment as his BFMP showed improving trend. Eventually, upon discharge, his BFMP showed no malaria parasites seen. *Discussion*: Imported malaria infections should be addressed seriously as they posed the threat of reintroducing malaria into areas that have eliminated the disease. Travel history should be highlighted in the management of febrile illness. Malaria should remain included in the working investigations for febrile illness patients with recent travel history to high-burden countries.

MM25 Pregnancy loss caused By *Listeria Monocytogenes*: a case report

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Introduction: Listeriosis is a rare infection, but is about 20 times more common in pregnant women than in the general population.[1] Pregnant women account for 27% of all Listerial infections,[2] which can cause mild illness in mothers, but can be devastating to the fetus, in some cases leading to severe disease or fetal death. *Case report*: We presented a case of primigravida at 18 weeks came to primary care clinic with one day history of fever and recurrent vomiting. She was hypotensive and tachycardia. Transabdominal scan noted intraabdominal wall ascites, pleural effusion, and features of hydrops fetalis and no fetal heart seen. The fetus was delivered after induced with cervagem. Blood and Placenta culture and sensitivity grew Listeria monocytogenes identified by MALDI-TOF. Sensitivity test was done using MIC trimethoprim-sulfamethoxazole (0.23mg/mL), MIC Penicillin (0.19mg/mL), Ampicillin (0.19mg/mL), Meropenem (0.19 mg/mL). *Discussion*: *Listeria monocytogenes* was able to cross the placental barrier leads to 2nd trimester loss as proved by this case with positive culture by placenta swab and pregnancy loss due to the infection. Therefore, it is important to suspect listeriosis in maternal patient with infection symptoms.

MM26 Misidentification of *Burkholderia pseudomallei* in a high endemicity country – is it possible?

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Introduction: Melioidosis caused by *Burkholderia pseudomallei* is endemic in tropic regions including Malaysia. Differentiation with *Burkholderia cepacia* complex is crucial as the treatment and prognosis significantly differs. *Case report:* A 58-year-old lady with underlying diabetes mellitus presented with right foot pain, redness and swelling for one week, not preceded by trauma. MRI suggested calcaneal osteomyelitis. The peripheral blood, right ankle aspirate and intraoperative specimen cultures grew *Burkholderia cepacia* identified by API 20NE (98.8%) separately, sensitive to trimethoprim/sulfamethoxazole, ceftazidime and amoxycillin/clavulanate. The second intraoperative specimen cultures one week later grew *Burkholderia pseudomallei* identified by API 20NE (99.9%), with the same sensitivity patterns. She was treated as melioidosis with intravenous ceftazidime for six weeks and was discharged well with oral amoxycillin/clavulanate for 24 weeks. *Discussion:* Two distinct organisms that were excellently identified by API 20NE for both initial and latter sterile cultures have excluded contamination. This case however favours *Burkholderia pseudomallei* over *Burkholderia cepacia* due to the patient's

clinical presentation; osteomyelitis with significant comorbid factor as opposed to the latter which is an opportunistic human pathogen that is mostly seen in cystic fibrosis patients. The similar sensitivity patterns suggested similar causative agent of this infection, and sensitivity towards amoxycillin/clavulanate may has excluded *Burkholderia cepacia* of which is intrinsically resistant to, hence the possibility of misidentification of *Burkholderia pseudomallei* as *Burkholderia cepacia*. Misidentification by API due to poor biochemical profile database representation has been acknowledged. *Conclusion:* Clinical suspicion and antimicrobial susceptibility patterns are important during organism identification as misidentification of *Burkholderia pseudomallei* is possible.

MM27 Salmonella mycotic aneurysm – rare, but fatal!

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Introduction: "Mycotic aneurysm" is a rare condition with high mortality. Timely diagnosis and treatment are crucial. *Case report:* A 66-year-old gentleman with diabetes mellitus presented to us with progressive back pain for one month after four clinic visits. He was febrile with white cell count of 31.5 x 10^9/L. Abdominal examination noted a 3 cm x 4 cm pulsatile mass and computed tomography angiography revealed mycotic abdominal saccular aneurysm, with largest diameter of 4.7 cm with extensive air pockets at periaortic region. He was empirically started with ceftazidime and metronidazole as well as vancomycin to cover for MRSA. His condition suddenly deteriorated and emergency aortic ligation with bilateral axillo-femoral bypass revealed ruptured infrarenal mycotic aneurysm, calcified vessels and sloughy necrotic tissue that grew *Salmonella* species identified by Vitek GN (99%), sensitive to ceftriaxone hence antibiotics was adjusted accordingly. Blood cultures were otherwise negative. He succumbed to death one week later due to organ failure and disseminated intravascular coagulation. *Discussion: Salmonella* species, a Gram-negative organism has become the most common pathogen often affecting abdominal aorta contrary to the pre-antibiotic era; that predominantly Gram-positive organisms affecting ascending aorta and arch. It is more virulent, prone to cause arterial rupture and subsequently death. Intensive antibiotic therapy should be started as early as possible pre-operatively despite negative blood cultures due to its sensitivity limitation, with ceftriaxone as the preferred agent. Intraoperative tissue cultures remain gold standard. *Conclusion:* Prompt diagnosis, early antibiotic commencement and timely surgical intervention are crucial to avoid disease-associated morbidity and mortality.

MM28 Blunted Covid-19 antibody response in amyloid light-chain amyloidosis: a case report

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Introduction: Primary amyloidosis is a plasma cell neoplasm producing amyloidogenic lambda light chain (AL) with immunosuppression and high mortality. Thus, vaccination against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) remains the best strategy in preventing severe COVID-19 disease. We report here a case of an attenuated antibody response following anti-SARS-CoV-2 vaccine in a patient with an AL amyloidosis. *Case report:* A 46-year-old gentleman with a background history of AL amyloidosis was scheduled for his COVID-19 (BNT162b2) vaccination (two doses at three weeks interval). His treatment (cyclophosphamide, bortezomib and dexamethasone) was continued at a two-weekly basis, but Daratumumab (CD38 monoclonal antibody) was stopped three weeks prior to his first dose vaccination. Daratumumab was re-introduced three weeks after completing his second dose together with the other therapies. The first serological evaluation (anti-SARS-CoV-2 spike protein antibody test; Abbott Architect 1000SR CMIA method) performed 3 weeks (W3) after the first dose of BNT162b2 was negative, whereas a low positive response was observed in the second evaluation (W6) (86.3817 AU/ml). A negative response was seen in the third evaluation (W16). *Discussion:* Data on humoral responses to vaccination against COVID-19 among patients with AL amyloidosis is scarce. A study published in 2021 demonstrated that proteasome inhibitor was not associated with the antibody response rate; however, exposure to Daratumumab resulted in a lower rate of positive serological result. This case highlights the possible factors affecting the seroconversion rate in an AL amyloidosis patient and supports the need for a booster dose to ensure a clinically meaningful seroconversion.