BERITA ANESTESIOLOGI

VOLUME 37 • ISSUE 1 • MARCH 2024

MALAYSIAN SOCIETY OF ANESTHESIOLOGISTS

COLLEGE OF ANAESTHESIOLOGISTS AMM

Joy!

Anaesthestic Support for Mechanical Thrombectomy Service in Sarawak General Hospital

by Dr Then Siaw Ling
Sarawak General Hospital
Sarawak, Malaysia

Co-author
Dr Samuel Tsan Ern Hung
Universiti Malaysia Sarawak
Sarawak, Malaysia

Acute stroke is reported as the third leading cause of death in Malaysia.[2] Out of 47,911 incidents reported in 2019, 19,928 deaths were recorded with 512,726 disability-adjusted life years (DALYs) lost due to stroke.[3] Previously, the only option for reperfusion was intravenous (IV) thrombolysis. However, only 10% to 40% of these patients had a good clinical outcome post-IV thrombolysis as many with anterior circulation stroke had large vessel occlusions.[1] Overall, the proportion of IV thrombolysis among ischaemic stroke patients in Malaysia is deficient. A previous survey from the National Stroke Registry in 2016 showed an IV thrombolysis rate of 0.65% among ischaemic stroke patients admitted in the whole country.[3] Out of this number, most of the thrombolysis were performed in urban areas. IV thrombolysis is inadequate for stroke with large vessel occlusion and studies have shown that only half had good outcomes with IV thrombolysis alone.[3] As a result, IV thrombolysis followed by mechanical endovascular clot retrieval is the new standard of care in developed countries. In Malaysia however, mechanical thrombectomy (MT) is not commonly done due to high cost, limited facilities, and lack of expertise.

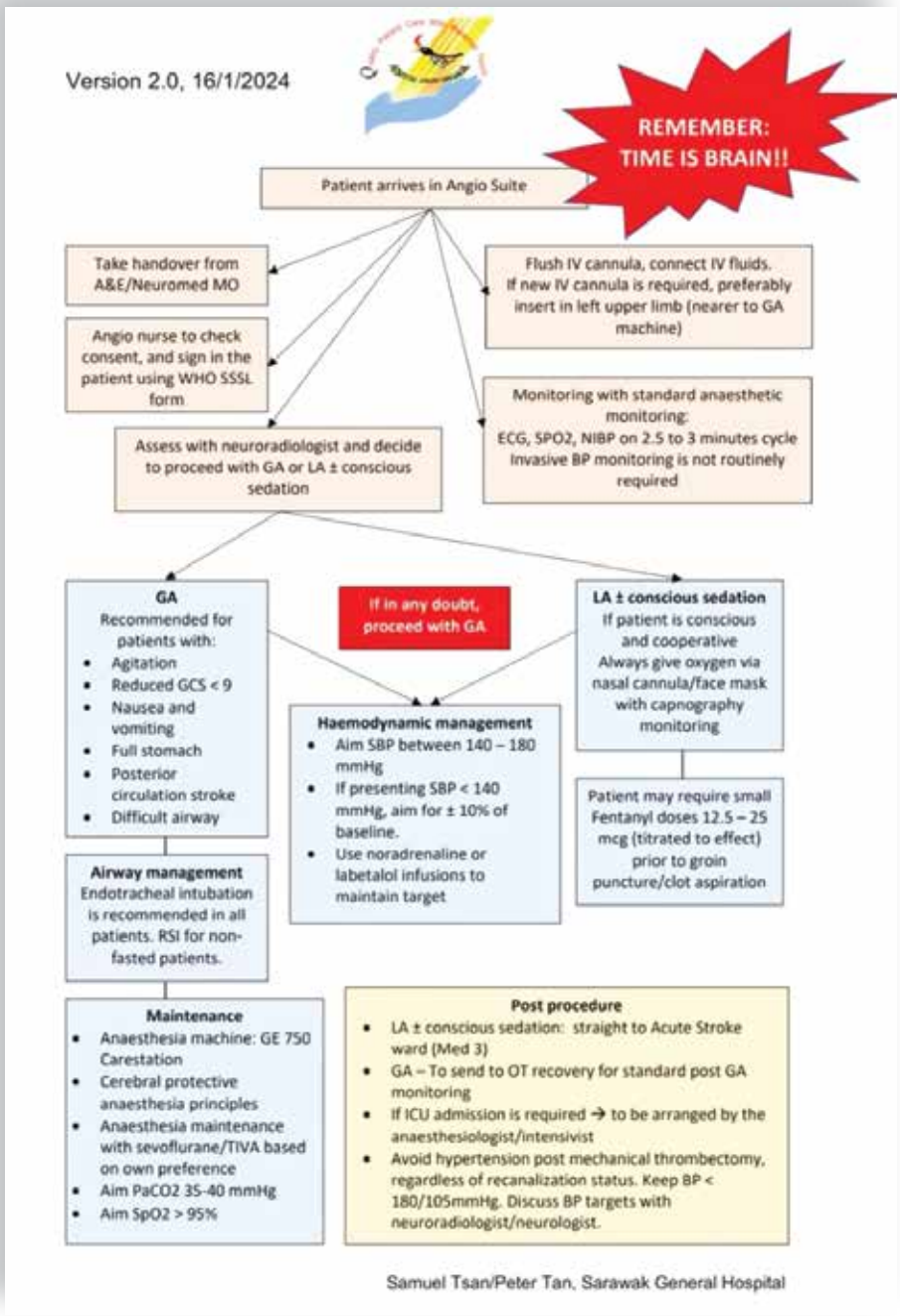

Figure 1: Anaesthetic workflow for thrombectomy call

Initiation of anaesthesia service in MT in SGH

Multiple studies have shown strong evidence supporting the efficacy of MT in ischaemic stroke. Knowing the catastrophic consequences of ischemic stroke and considering the positive outcomes following endovascular thrombectomy, the Neuroanaesthesia Unit in Sarawak General Hospital (SGH) initiated a new service to support the thrombectomy service offered by the new neurointerventional radiologist in SGH, starting from November 2023. Figure 1 is the guideline for the mechanical thrombectomy service in SGH.

Case reports of MT done in SGH

We report two successful cases that were done in SGH. The first MT was done under GA. Patient A was a 66-year-old lady who presented with left hemiplegia power 0/5, altered GCS (E3VIM6), and a NIHSS score of 19. She was given IV thrombolysis over 1 hour, however, the subsequent diagnostic CT angiogram showed persistent occlusion of blood flow in the basilar artery. A decision for MT under GA was made, and the clot was successfully aspirated, with restored perfusion of mTICI 3 (Figure 2A). CT brain post-MT showed no intracranial bleed. The patient was extubated well post-procedure in the fluoroscopy suite and discharged to the acute stroke ward for further care after observation in PACU. After receiving MT, her GCS recovered to E4V5M6 and her NIHSS score reduced to 5. She was subsequently discharged home well with dual anticoagulants and a rehabilitation appointment.

Patient B was a 62-year-old, ASA 2 lady with underlying hypertension and dyslipidemia, who presented to the emergency department with left-sided body weakness (power 0), left-sided facial asymmetry, and headache. Otherwise, her GCS was full (E4V5M6), and her NIHSS score was 20. She was diagnosed as having a right middle cerebral artery (MCA) infarction and given IV thrombolysis. Post thrombolysis, the decision for MT was made following a CT angiogram which showed proximal right MCA occlusion. The procedure was done under local anaesthesia (LA) and monitored sedation with TCI propofol. The clot was successfully aspirated, and complete recanalization of right MCA circulation with mTICI score 2b was seen post-MT (Figure 2B). The patient was subsequently discharged well to the acute stroke ward. Post MT, her NHISS score reduced to 3 and her left-sided weakness recovered (Power 4/5) prior to discharge.

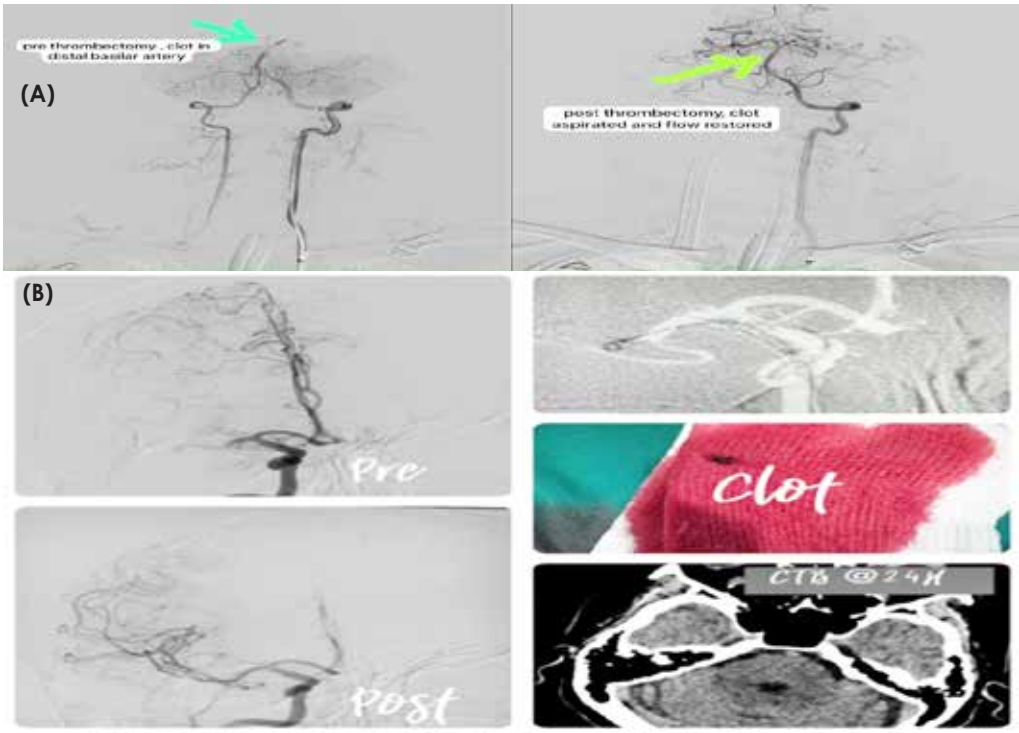

Figure 2: (A) The pre- and post- thrombectomy CTA of Patient A. (B) Patient B: The following collage showing pre- and post-thrombectomy CTA; The clots retrieved is seen on the gauze; A 24-hour post MT CT brain showing no intracranial bleed

Limitations

The following limitations were identified from the cases done in SGH:

- Time constraints for anaesthetic preparation upon activation
- Possible difficult airway or high-risk cases with poorly controlled comorbidities in which early preoperative optimisation is not feasible in view of the urgency of thrombectomy
- Inadequate fasting time
- Inadequate manpower
- Higher risk of peri-procedural complications in cases done under MAC due to moving patients

Anaesthetic management in MT

The choice of optimal anaesthesia in MT remains controversial. There are both advantages and disadvantages for both techniques. Henceforth, choices of anaesthetic management should be tailored to individual patients and different clinical conditions. Nonetheless, the decision needs to be made quickly, often at the same time as taking the referral from the primary team while preparing the GA machine, diluting the drugs, transferring the patient, and putting on the monitoring. Irrespective of anaesthetic technique, priorities include minimising time delay and good haemodynamic control. Other recommended physiologic control includes oxygen saturation of

>94%, PaCO2 between 30 to 35mmhg, normoglycemia (7.8-10 mmol/l) as well as normothermia.[6]

Local anaesthesia (LA) and conscious sedation

If the patient is conscious and cooperative, LA +/- monitored sedation can be considered. Groin puncture, contrast injection and clot retrieval can be painful. Therefore, analgesia such as fentanyl boluses, remifentanil infusion as well as paracetamol can be given on top of the titratable sedation. Potential communication difficulties, combined with the likelihood of further deterioration in neurology and limited access to the patient warrant extra precautions during monitored sedation. Short-acting agents are preferred. End tidal capnograph monitoring can be used to monitor for apnoea, enabling the titration of the anaesthetic agents to be done safely. Approximately 1 in 10 patients may require intraprocedural conversion to GA which may be associated with a worse outcome.[5] Often, the failure of thrombectomy under LA and monitored sedation is due to anxious and uncooperative patients.[6]

General Anaesthesia (GA)

GA is recommended for patients with:[4]

- Agitation
- Reduced GCS <9
- Nausea and vomiting
- Full stomach (Rapid sequence induction in non-fasted patient)
- Posterior circulation stroke
- Difficult airway

Currently, there is no evidence suggesting any extra benefits for any particular drugs. Both inhalational or intravenous drugs can be used. When there is doubt over the patient's fasting status, GA with rapid sequence induction is preferable.

In summary, endovascular therapy has been shown to be one of the most significant medical discoveries in recent times and has been adapted as the standard of care in acute stroke in developed countries. With SGH starting to provide MT service, we are looking forward to producing better outcomes for stroke patients in Sarawak. Nonetheless, the first 6 hours from the stroke onset are golden hours and hence, public awareness on early visitation to hospital upon stroke symptoms is equally crucial to allow for early interventions. Finally, although the best choice on mode of anaesthesia remains debatable, the anaesthesiologist must tailor the anaesthetic management to the individual patient and the circumstances.

Table 1: Advantages and disadvantages of general anaesthesia versus conscious sedation for MT. (Adapted from Dinsmore and Tan 2022)[5]

ANAESTHETIC TECHNIQUE	ADVANTAGES	DISADVANTAGES
GA	- Reduce aspiration risk - Immobile patient: reduce the risk of complications and shorter time to recanalisation - Continuous monitoring and ability to manipulate physiological parameters	- Longer door-to-groin puncture time: delay - Greater potential for hypotension - Inability to assess changes in patient neurology - Greater manpower requirements - Greater potential for post-op delirium
Conscious Sedation	- Shorter door-to-groin time - Less haemodynamic instability - Ability to continuously assess neurology	- Patient discomfort - Patient movement: potential to increase procedural complications - Risk of aspiration, hypoxia, airway obstruction with sedation

References

1. GBD 2019 Stroke Collaborators Global, regional, and national burden of stroke and its risk factors, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet Neurol*. 2021Oct;**20**(10): 795-820
2. Department of Statistics Malaysia. Available from: http://www.dosm.gov.my (accessed January 18, 2024)
3. Tan KS, Venketasubramanian N. Stroke Burden in Malaysia. *Cerebrovasc Dis Extra*. 2022;**12**(2):58-62. doi:10.1159/000524271. Epub 2022 Mar 24. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9149343/ (assessed January 20, 2024)
4. J. Dinsmore, M. Elwishi, P. Kailainathan. Anaesthesia for endovascular thrombectomy. BJA Education 2018.07.001. Available from: https://www.bjaed.org/article/S2058-5349(18)30085-4/fulltext (Assessed january 21, 2024)
5. J. E. Dinsmore, A. Tan. Anaesthesia for mechanical thrombectomy: a narrative Review. Anaesthesia 2022,77(Suppl. 1),59-68
6. Axelle M, Francois E, Thomas R et al. General Anesthesia versus Sedation, Both with Hemodynamic Control, during Intraarterial Treatment for Stroke: The GASS Randomized Trial. *Anesthesiology* 2022;**136**:567-76

eISSN 3009-1926