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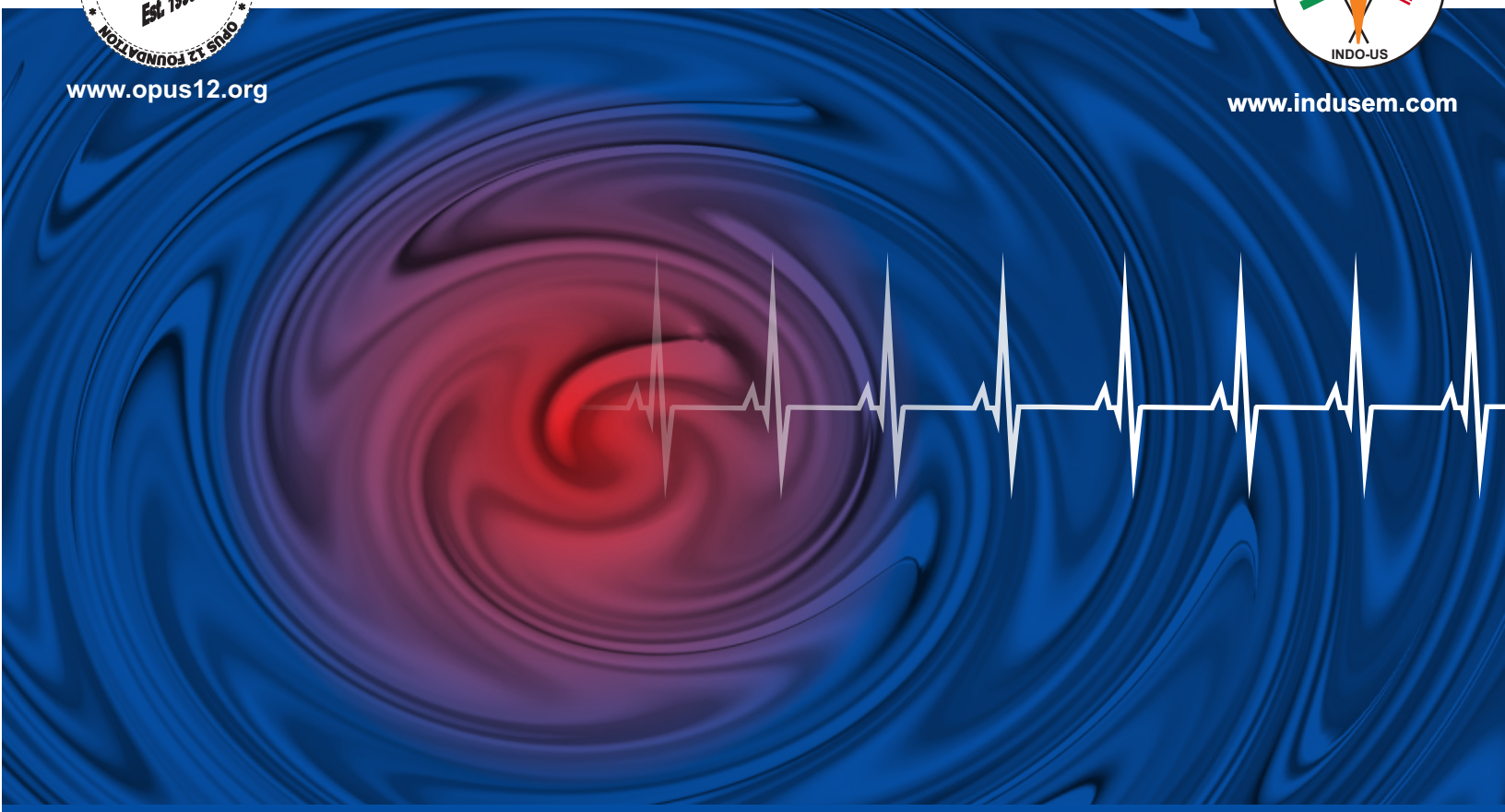

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Editorial

What's New in Emergencies, Trauma, and Shock? Pragmatic possibilities of predicting post-STEMI complications using TIMI scores and leukocyte counts

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Undoubtedly, the adage "time lost equals to myocardium lost" holds true in ST-elevation myocardial infarction (STEMI) as it has been demonstrated that every minute of delay to primary coronary angioplasty affects its 1-year mortality.[1] Accordingly therefore, efforts must be made to minimize the delay for primary angioplasty. Unfortunately this challenge proves to be a formidable task particularly in centers without catheterization facilities. Referring every case of STEMI for primary angioplasty is not only costly, but it is impractical and unnecessary. In many of the cases presented less than three hours from the onset of symptoms, administering thrombolytics on-site would be just as effective as primary angioplasty;[2] while in other cases such as those that are complicated with cardiogenic shock, a strategy for early revascularization is recommended.[3] As such, a risk stratification protocol using inexpensive, sensitive tools is very much needed particularly in centers without catheterization facilities and in those places where resources are scarce. This would allow those patients with high risk of developing cardiogenic shock and in-hospital mortality to be transferred, while those with low risk can be planned for shorter stay after medical stabilization.

High total leukocyte count on admission has been shown to be associated with increased risk of developing heart failure and in-hospital mortality in acute coronary syndrome. High neutrophil count is shown to be associated with infarct expansion, whereas neutrophil depletion is associated with a reduction in infarct size. Although the mechanism by which neutrophils produce this damage is unclear, it is possible that the reperfusion following prolonged ischemia may paradoxically lead to progressive leukocyte capillary plugging and the "no reflow" phenomenon.[4]

In the multinational, observational Global Registry of Acute Coronary Events (GRACE) study, high admission leukocyte count was found to be an important independent predictor of in-hospital mortality and the development of heart failure for the entire spectrum of acute coronary syndrome (ACS).[5]

In this journal issue, a study is published where the authors looked into the possibility of combining both Thrombolysis in Myocardial Infarction (TIMI) risk score[6] and admission leukocyte count as an even better predictive tool for the adverse events of cardiac failure and in-hospital mortality among patients with STEMI. Echocardiogram was performed on all patients prior to discharge to determine the ejection fraction. Seventy patients were enrolled. High TIMI score is defined as a score of ≥4 and high leukocyte count is defined as a count of ≥10,000/ml. Heart failure is defined as an ejection fraction of <50%.

In terms of heart failure, the authors found that TIMI score alone has a sensitivity of 80% and a specificity of 95% of identifying those with such complication, whereas leukocytosis (>10,000/ml) has a sensitivity of 82% and specificity of 85%. However, when combined together, it yields a sensitivity of 86% and specificity of 95% of identifying heart failure.

Similarly, in terms of in-hospital mortality, TIMI score alone has a sensitivity of 80% and a specificity of 72% of identifying those with a risk for in-hospital mortality. On the other hand, leukocytosis alone yields a sensitivity of 60% and a specificity of 58%. But when combined together, a sensitivity of 100% and a specificity of 73% were achieved.

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Although this study involved only 70 patients and encompassing only STEMI cases, I believe that the results from this study do appear promising. After all, in an economic downturn situation, high-end technology and sophisticated equipments may not be the answer we are looking for; and even if it does, it may not be affordable. On the other hand, simple, cost-effective blood tests like the total leukocyte counts may just be what we need as a screening tool to prognosticate our patients.

Nonetheless, before one should consider using the combination of TIMI score and leukocyte counts as a routine prognostication tool, several questions should be addressed. As elucidated by the authors, this study did not take into consideration a serial leukocyte count nor did it analyze the association of different leukocyte counts with their relative risk of developing adverse outcomes. It would be useful to know whether an incremental value of admission leukocyte count is associated with an incremental risk of developing such adverse outcomes. Perhaps a more extensive study with a larger sample size and one which encompasses the entire spectrum of ACS, *viz.*, unstable angina, non-STEMI, and STEMI, could be carried out to look into the prospect of using admission leukocyte count with TIMI as a combined set of predictive tool for adverse outcomes following ACS. Perhaps, in the near future, a modified TIMI risk score with the inclusion of admission leukocyte count as one of their parameters could be developed as an even better predictive tool. In any case, such tool would definitely be beneficial in centers without catheterization facilities and early echocardiograhic assessment.

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