Time Is Myocardium: The Focus Is Ischemic Time!

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Halabi et al. [1] and Karkabi et al. [2], in their original articles, have initiated both an administrative and professional intervention aimed at decreasing door-to-balloon time (DTBT) in patients presenting to the emergency department (ED) with ST-elevation myocardial infarction (STEMI). By improving logistics, increasing awareness, and incorporating theoretical and practical training of the medical staff, each team managed to decrease the proportion of patients with DTBT > 90 minutes from 24% before intervention to 17%. Additional findings, such as delayed diagnosis in women and in elderly patients, do not come as a surprise since these populations are known for atypical presentation and less invasive interventions. The authors and medical staff of the ED at Carmel Medical Center should be congratulated for following the trial protocol in a very stressful environment. Their high level of skill, dedication, and professionalism made it possible to identify, monitor, and start medical therapy at the early stages of STEMI presentation.

The major treatment approach in STEMI patients relies on the fundamental idea of "time is myocardium." Numerous observational studies have found strong correlations between early reperfusion approach and reduced mortality [3-5]. The timeframe for percutaneous coronary intervention (PCI) was defined as DTBT < 90 min. As the authors noted, this timeframe was incorporated into the ACC/AHA guidelines [6] and is currently part of a quality assessment in treating STEMI patients.

However, several trials [5,6] conducted in the last decade have questioned the prognostic influence of further reduction of DTBT. Ho et al. [9] concluded that DTBT < 90 min did not provide significant benefit in reducing 30 day mortality in STEMI patients undergoing primary PCI. Prasad and colleagues [10] found DTBT to be less of a predictive prognostic factor than symptoms onset to balloon time (SBT), whereas Menees and co-authors [11] examined annual trends of 96,738 STEMI admissions and concluded that, despite major improvement in DTBT, in-hospital mortality remained unchanged.

Current European Society of Cardiology (ESC) guidelines [12] do not use the term DTBT, rather emphasizing the time interval from first medical contact to wire crossing, which ideally should be < 90 minutes. This definition requires early transfer of STEMI patients by mobile intensive care units with direct admission to the coronary care unit (CCU) and cardiac catheterization labs and avoiding admission to a general ED. An ED bypass to a mobile CCU is associated with a shorter time to revascularization and, consequently, improved prognosis [13]. Another definition mentioned in the guidelines is the total ischemic time, which incorporates a patient's delay in seeking medical treatment. Unfortunately, national Israeli surveys on patients with acute coronary syndromes (ACSIS) have shown lack of improvement in the time interval between symptom onset and first medical contact, remaining at approximately 160 minutes [14]. To further improve prognosis in STEMI, total ischemic time rather than DTBT should be the focus.

Current data shows major improvement in managing STEMI patients where more and more medical centers have a 24/7 availability of cath labs to enable facilities to reach the goal set by the AHA of DTBT < 90 min. However, DTBT, as stated by Menees et al. [11], is only one component in the total ischemic time.

In the study by Halabi and co-authors [1], one-quarter of STEMI patients reached the ED by means of a mobile intensive care unit. These patients might benefit from shorter ischemic interval by arriving directly to the cath lab or CCU [13]. In a study by Bagai and colleagues [15] on 12,581 STEMI patients, 10.5% bypassed the ED and arrived directly to the cath lab. ED bypass was associated with significant reduction in reperfusion time. Similar results have been published by Fordyce et al. [16] who showed a major reduction in the time from the first medical contact to reperfusion due to transport directly to the cath lab and bypassing the ED. In a smaller study by Lubovich and co-workers [17], including 1522 STEMI patients based on the ACSIS registry, 30% arrived directly to the cath lab/CCU. Bypassing the ED was associated with shorter DTBT (59 vs. 97 min, $P = 0.001$), although the shorter time was not associated with better clinical outcomes

CONCLUSIONS

Due to major advancements in the invasive management of patients with STEMI, their prognosis has improved significantly over the last decade. To further improve outcomes in these patients, the pendulum has to be shifted from DTBT to ischemic time. More resources should be devoted to increase symptom awareness and to establish a direct mobilization of patients to the catheterization laboratory.

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Capsule

Association of high anti-cyclic citrullinated peptide seropositivity and lean mass index with low bone mineral density in rheumatoid arthritis

Osteoporotic fractures are associated with high morbidity and mortality. Individuals with rheumatoid arthritis (RA) have twice the risk of osteoporosis-related fracture than age-matched controls, the causes for which remain unknown. **Wysham** and colleagues investigated contributions of RA characteristics, medication use, and body composition to low bone mineral density (BMD) in patients with RA. Data were from the Arthritis, Body Composition, and Disability Study (n=138; 82 women, 56 men). Demographic, clinical, laboratory, and functional variables were collected at study visits. Body composition (fat, lean muscle, and BMD) was measured by dual X-ray absorptiometry. Linear regression analyses evaluated the association between predictors and femoral neck BMD. Average disease duration was 19 years, 70% of patients were rheumatoid factor positive, and 55% were high-positive anti-cyclic citrullinated peptide (anti-CCP). Age and high anti-CCP positivity were negatively associated with BMD after controlling for other variables (β = -0.003 and -0.055, respectively, $P < 0.05$). Appendicular lean mass index (ALMI) was positively associated with BMD (β = 0.053, $P < 0.0001$). In high anti-CCP positivity participants, increasing anti-CCP levels were associated with a negative linear trend in BMD (β = –0.011, P = 0.026). High anti-CCP positivity and ALMI were strongly associated with BMD in patients with RA. The linear relationship of anti-CCP levels with lower BMD supports the hypothesis that processes specific to RA negatively impact BMD. In contrast, ALMI was positively associated with BMD, emphasizing the importance of this potentially modifiable risk factor.

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Eitan Israeli

"An education isn't how much you have committed to memory, or even how much you know. It's being able to differentiate between what you do know and what you don't"

Anatole France, (1844–1924), French author