



Mechanical complications of ST segment elevation myocardial infarction: are they tangible?

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ST segment elevation myocardial infarction (STEMI) is a life-threatening clinical condition which requires urgent medical attention (1). Recent technological advancement of drug eluting stents (DES) enabled STEMI patients with improved overall survival (2,3). However, despite these improvements, the mortality rate is relatively high even with bettered accessibility of coronary intervention which is currently available to patients all around the world (4). Many interventional cardiologists have wandered around the idea of reducing the mortality of STEMI patients. Even after successful primary coronary intervention (PCI) with complete revascularization of coronary arteries, patients still suffer from devastating consequences (5-7). Most common phenomenon regarding mortality after successful PCI is mechanical complication after revascularization. Mechanical complication comprises left ventricular free-wall rupture, ventricular septal defect (VSD), papillary muscle rupture, pseudo-aneurysm, true aneurysm, and post-myocardial infarction pericarditis (8-10). Throughout the years many researchers have investigated the prognosticators regarding STEMI.

Thrombolysis in myocardial infarction (TIMI) risk scoring system was devised to validate clinical parameters related to mortality (11). Myocardial infarct size and left ventricular ejection fraction was also in direct relation with mortality (12,13). However, causative investigation regarding mortality after successful PCI is relatively sparse with matters pertaining to mechanical complications.

Xu *et al.* (14) focused on cardiac rupture (CR) which was specified as free wall rupture, ventricular septal rupture, and papillary muscle rupture. They were able to collect more than 20,000 patients' clinical data and divided them into two groups (CR group and control group). Their study was able to demonstrate that CR group, compared to control group, had longer total chest pain time, more prevalent refractory acute chest pain and lower left ventricular ejection fraction which obviously translates to larger infarct size [i.e., elevated creatine kinase (CK), CK-MB levels]. These findings are in concordance with previous and recent investigations regarding mechanical complications of STEMI (15,16). Furthermore, they were able to successfully isolate, via Cox regression model, electrocardiogram (ECG) depicting lateral infarction as a predisposing factor of CR.

Many studies stemming way back from the 1980s to as early as 2020s have contributed enormously to enhancing survival of STEMI patients. However, although the success rate of revascularization, whether it being PCI or CABG, have improved drastically throughout the years, the mortality rate due to catastrophic mechanical complication still lingers with unmitigated prevalence (17,18). It is definitely an area which needs further attention because if CR is predictable from index presentation at the emergency room (ER) then the attending cardiologist can utilize these clinical information while treating them.

This current study is commendable in many aspects. Firstly, the study result is clinically and logically coherent

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with current consensus (12,19,20). It is clear that clinical symptoms, infarction size is proportionate to incidences of CR. Secondly, identifying prognosticators of CR is a worthy result with significant clinical benefit. However, I do have some apprehensions when it comes to study design. The initial allocation of study population bares too big of a size discrepancy (196 vs. 21,820) and the study protocol does not draw attention to the average reader.

Mechanical complication is a poor prognosticator of STEMI. By extension, CR which is a severe form of mechanical complication, explicitly leads to increased cardiovascular mortality. If the identification is delayed, the patient will be in a catastrophic state. Therefore, it is crucial for physicians to be attentive whilst treating STEMI patients. Even after successful revascularization, the risk of CR remains. If the patients show clinical signs of CR, appropriate diagnostic measurements and treatment should be applied without delay. If concrete risk factors predicting these mechanical complications were to be identified, then physicians can have more clinical information for treatment options. That is why further studies regarding mechanical complications of STEMI is warranted for it will clearly help improve the survival of STEMI patients.

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