EDITORIAL

Should coronary patients be afraid of weekends?

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RELATED ARTICLE

by Stępień et al, see p. 942

Most of the catheterization laboratories work differently on weekdays, weekends, and public holidays. On weekends and holidays, usually, the staff is less numerous and elective procedures are not carried out. Doctors on duty may be less experienced, and interventionists do not stay on board. Thus, invasive treatment is less readily undertaken. However, should a patient with heart attack that happened over the weekend be more worried than the one treated during a working day (WD)? Many doctors will answer "yes," and we can find a similar conclusion in the paper by Stępień et al[1] published in this issue of *Polish Archives of Internal Medicine* (*Pol Arch Intern Med*).

The authors presented a retrospective analysis of 865 patients with acute myocardial infarction (AMI), treated with percutaneous coronary intervention (PCI), of whom 223 (25.8%) were admitted on a nonworking day (NWD). Patients with ST-segment elevation myocardial infarction (STEMI) constituted 33.5% of the total population. The most important observation was that patients admitted on NWDs were in a worse general condition compared to those treated on WDs. They were more likely to have a more extensive MI with ST-segment elevation, higher levels of necrotic markers, and more severe lesions in their coronaries. Consequently, the outcome of PCI, as assessed by the Thrombolysis In Myocardial Infarction (TIMI) flow scale, was significantly worse. Although in-hospital mortality was similar in both groups (2.7% vs 3%; $P = 0.84$), long-term all-cause mortality was significantly higher in patients treated on NWDs (36.3% vs 28.4%; log-rank $P = 0.037$).

The question that should now be asked is to what extent the fact of having AMI during an NWD is responsible for worse clinical outcomes. Unfortunately, the answer will not be easy, since the study lacked important information on the time delays, in particular the symptom-onset-to-balloon time. It is a well-known fact that shortening the time to intervention is one of the most important factors improving the prognosis of patients with STEMI.[2] Such a relationship has also been demonstrated for high-risk patients with non–ST-segment elevation myocardial infarction (NSTEMI).[3,4] In the study by Stępień et al,[1] we can only speculate on that; since patients treated on NWDs had higher levels of baseline necrotic markers, the time delay might have been greater as compared with patients treated on WDs. One of the reasons may be a patient-related delay. On weekends, patients are less likely to call an ambulance or go to the hospital if the symptoms are not very severe. The other reason for the treatment delay may lie with the medical staff. Due to the presence of less experienced staff on weekends, invasive treatment is less readily undertaken.[5] This was not the case in the current study, since operators' volume was similar on WDs and NWDs.

On the other hand, during weekends and holidays, the pre-hospital and in-hospital delays may be shorter due to better ambulance accessibility, lower traffic, and no catheterization laboratories overload with elective procedures. Recently, a study comparing clinical outcomes of the day- and nighttime admissions of patients with AMI has been published.[6] Its main finding was that PCI for AMI was associated with increased 30-day mortality among patients treated during the night hours compared with those managed during the day hours. The authors also reported that the pain-to-balloon time was longer in patients treated during the working hours, except that the difference was significant only in patients with NSTEMI. Such observation may be explained that only high-risk NSTEMI patients were treated during the night. In contrast, all STEMI patients were immediately sent to the catheterization laboratory regardless of the time of presentation.

In their paper, Stępień et al[1] cite several studies supporting their hypothesis of worse prognosis of patients with AMI treated on weekends.

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The reasons for my concern with those studies are as follows: Firstly, most of the observations were performed in completely different medical systems, especially regarding the acute care of patients with AMI. In most of them, both interventional and thrombolytic therapies were applied, with interventional cardiologists staying on-call, not on-board, as in our country. Secondly, many of them were retrospective, and concerned patients treated many, many years ago. Finally, only few of them separate patients with STEMI from those with NSTEMI and provide reliable data on the pain-to-balloon time.

Meanwhile, a couple of recent studies did not show any significant difference in the outcomes of AMI patients treated on weekends, compared to those treated on weekdays. Fiorentino et al[5] published an analysis of data from the 2011 to 2015 Portuguese National Diagnostic-Related-Group databases. They employed multivariable logistic regressions to determine the association between weekend admission and in-hospital mortality. They found that patients admitted on weekends had lower probabilities of undergoing invasive treatment within the day after admission, but this delay was not associated with higher in-hospital mortality.[5] Vallabhajosyula et al[7] analyzed over 9 million AMI admissions in the United States, of which more than 2.4 million occurred on weekends, using the National (Nationwide) Inpatient Sample (2000–2016). After excluding interhospital transfers, they found that over those 17 years, there was a steady increase in the number of patients treated with PCI. Compared with weekday admissions, weekend admissions received comparable PCI treatment, but fewer patients were treated early, at hospital day 0. Nevertheless, weekend admission did not influence in-hospital mortality. Finally, another recent study, not mentioned by Stepien et al,[1] shows that in a contemporary, well-organized STEMI network, patients admitted in a high-volume PCI centre during on--hours or off-hours had similar management and 1-year outcomes.[8] The improvement of acute care in patients with AMI has also been confirmed in a recent meta-analysis of 18 observational studies, in which the authors report that timing of admission after 2005 had minimal influence on the treatment outcomes.[9]

The recent data I have referred to indicate that if a weekend AMI has a worse prognosis, the main reason will be the delay in proper treatment. In modern, well-functioning systems, such as in our country, this will mainly apply to patients with NSTEMI, since all STEMI cases are always sent to early intervention. This hypothesis is confirmed by the Dutch data, which showed that in patients with STEMI, there were no differences in 1-year mortality rates between admission on weekdays or weekends. In patients with NSTEMI, 1-year mortality was higher in those admitted during weekends. Interestingly, only NSTEMI, not STEMI patients admitted during weekends were less often treated with PCI.[10]

My remarks should not undermine the value of the study by Stepien et al.[1] Perhaps, one of the most critical learnings that come from the study is that we should carefully evaluate all patients with NSTEMI and do not postpone intervention in high- or moderate-risk cases.

ARTICLE INFORMATION

DISCLAIMER The opinions expressed by the author are not necessarily those of the journal editors, Polish Society of Internal Medicine, or publisher.

CONFLICT OF INTEREST None declared.

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