

# The weekend blues

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## RELATED ARTICLE

by Stepien et al,  
see p. 942

Worse outcomes in patients presenting to the hospital at weekends as compared to weekdays, the so-called “weekend effect,” is a well-described phenomenon. It has been described in a variety of clinical conditions including acute myocardial infarction (AMI),<sup>1</sup> congestive heart failure, stroke,<sup>2</sup> acute pulmonary embolism<sup>3</sup>; and in different healthcare settings from across the world.<sup>3,4</sup> The weekend effect on management and outcomes of AMI has been of particular interest to practicing cardiologists.<sup>5</sup> A meta-analysis of 48 studies enrolling 1 896 859 patients revealed that AMI presenting during off-hours (nights and weekends) had slightly higher mortality (odds ratio [OR], 1.06; 95% CI, 1.04–1.09) and longer door-to-balloon times (14.8 minutes; 95% CI, 10.7–19.0) for the cohort with ST-segment elevation myocardial infarction (STEMI).<sup>6</sup> A more recent meta-analysis by our group consisting of over 14 million acute coronary syndrome patients revealed that there remained a slightly increased risk of early mortality (OR, 1.06; 95% CI, 1.03–1.09) for weekend presentations and this weekend effect has persisted over time, and was observed in both STEMI and non-ST-segment elevation myocardial infarction (NSTEMI).<sup>1</sup>

The current study by Stepien et al<sup>7</sup> investigated the long-term prognosis of 865 patients with AMI treated on weekends or public holidays (NWDs) versus working days (WDs) at a university hospital in Poland between 2012 and 2017. Patients admitted on NWDs had higher percentage of STEMI (41.3% vs 30.8%;  $P = 0.005$ ) and larger area of myocardium involved (median [interquartile range, IQR] isoenzyme MB of creatine kinase; 24 [16–61] IU/l vs 21 [14–19] IU/l;  $P = 0.003$ ) with the left anterior descending artery as the infarct-related artery (38.1% vs 30.2%;  $P = 0.031$ ). Even though majority (66.3%) of percutaneous coronary interventions (PCIs) were performed by high-volume operators (>100 PCIs/year) on NWDs, the incidence of inadequate epicardial reperfusion (Thrombolysis In Myocardial Infarction scale [TIMI] 0/1) was higher on NWDs compared with WDs (6.8% vs 1.6%;  $P < 0.001$ ). The authors

reported no differences between patients admitted on NWDs as compared with WDs in terms of length of hospitalization (median [IQR], 5 [4–8] days vs 6 [3–8] days;  $P = 0.66$ ) and in-hospital (2.7% vs 3.0%;  $P = 0.84$ ) and 1-year (13.5% vs 11.5%;  $P = 0.46$ ) mortality.

The study suffers from a number of limitations, and the findings should be interpreted with caution. The analysis does not capture the time from symptom to presentation or door-to-balloon times which have been previously shown to be longer on NWDs, which may account for the larger infarct sizes seen in the analysis. The small sample size precludes subgroup analysis of NSTEMI and STEMI to determine whether the worse longer-term outcomes observed are homogenous across both populations, or restricted to 1 group.

One of the most interesting observations of the current study is the finding of a divergence of survival curves beyond 1 year, with all-cause long-term mortality being higher in the NWD group compared with the WD group (36.3% vs 28.4%;  $P = 0.037$ ). The long-term outcome data constitutes a major strength of current study since most prior studies have focused on early or in-hospital mortality,<sup>1,5,6</sup> and represents one of the first analyses to study this phenomenon in Poland. The reasons for a “delayed” increase in mortality in the NWD group are unclear but could relate to a number of factors. Patients in the NWD group had larger infarcts and so it remains possible that the differences in death in the longer-term relate to heart failure deaths, or lack of regular follow-up, particularly for those patients discharged during weekends and public holidays.

Stepien et al<sup>7</sup> have further strengthened their analysis by elaborating on the myocardial infarction with nonobstructive coronary artery disease (MINOCA) subset of patients with AMI. MINOCA is a complex disease entity encompassing coronary vasospasm, microvascular dysfunction, coronary thrombosis, and spontaneous coronary artery dissection<sup>8</sup> with previous studies also reporting a similar circadian and circaseptan pattern to its incidence.<sup>9</sup> MINOCA was

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more frequently diagnosed on WDs compared with NWDs. However, there were no differences in baseline characteristics, comorbidities, or all-cause mortality at long-term follow-up between WD and NWD groups, although the sample size of 67 patients means that the study is grossly underpowered to detect meaningful differences, particularly given that the weekend effect size was small in the whole cohort (HR, 1.027; 95% CI, 1.022–1.032).

Despite improvements in medical access and standardization of AMI protocols in most developed countries in the world, the persistence of the weekend effect among patients with AMI is a matter of concern. It has been suggested that differences in staff-related issues in delivery of care in hospitals on weekends may account for the disparity of outcomes amongst weekend admissions.<sup>1</sup> Furthermore, the absence of more senior doctors, the loss of continuity of care, and less supervision of junior staff are likely to compound problems further.<sup>1</sup> From a healthcare standpoint, management of patients with AMI should be consistent irrespective of the time of presentation. Prior studies have reported lower utilization of coronary angiography and PCI in patients with AMI treated on weekends, which was associated with a higher incidence of mortality and complications compared to their weekday counterparts.<sup>10</sup> A study by Glaser et al<sup>11</sup> of STEMI patients undergoing PCI between 1997 and 2006 reported a higher incidence of coronary dissection and less frequent use of intracoronary imaging in patients treated "off-hours." One of the issues consistently identified in analyses around the weekend effect is that patients that present on NWDs tend to present later from the onset of their symptoms and therefore sicker. Whilst public health education initiatives have been implemented in many healthcare systems for patients to recognize the importance of early presentation to emergency services during episodes of chest pain, these disparities persist.<sup>1</sup> Such public health initiatives are of particular relevance during the COVID-19 pandemic where admissions for AMI have decreased<sup>12</sup> and with patients presenting later<sup>13</sup> that may compound any potential weekend effect.

Whilst Bob Geldof and The Boom Town Rats sang "I don't like Mondays," the current analysis and a large body of previous literature suggest that the weekend effect remains very real and gives patients with AMI good reason to not like weekends too.

## 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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