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"The Weekend Effect": Weekday versus Weekend comparison of patients admitted with NSTEMI in terms of length of hospital stay, door to balloon time and left ventricular function

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BACKGROUND

- Coronary artery disease (CAD) is a major cardiovascular disease burden in the United States. Acute coronary syndrome (ACS) is a medical emergency. While our institution has an established door to balloon time of 90 minutes for ST-segment elevation myocardial infarction (STEMI) there is no such timing protocol in terms of percutaneous coronary intervention (PCI) for non-ST-segment elevation myocardial infarction (NSTEMI). It has also been noticed that given the paucity of evidence regarding the optimal timing of PCI for NSTEMI, a wide difference of management is present for a patient presenting on weekdays as compared to weekend admissions. Patients presenting with NSTEMI on weekdays go to the cardiac catheterization lab on the same or very next day but patients presenting on weekends wait until a weekday for a coronary angiogram. A systematic review of the literature reveals no studies to support or refute this practice. Published data is limited and current practice is solely based on expert consensus.

OBJECTIVE

The primary objective of our study was to determine the difference in the outcome, if any, between patients presenting with NSTEMI on weekends versus weekdays. We also looked for the difference in clinical outcomes between these two groups of patients.

METHODS

This was a retrospective observational chart review of patients admitted to Abington Hospital – Jefferson Health from January 2014 - October 2016 with a primary diagnosis of non-ST-segment elevation myocardial infarction (NSTEMI). The study population was divided into weekday and weekend groups. We primarily focused on studying the left ventricular function at the time of discharge, peak troponins before any type of coronary intervention, door to balloon time, the length of hospital stay, and 30 day major adverse cardiac events (MACE) in these two groups. We also studied the presence or absence of major risk factors including diabetes mellitus (DM), hypertension (HTN), age and sex among these two groups presenting with the index diagnosis.

RESULTS

Inclusion Criteria		
•All patients above the age of 18 admitted with the diagnosis of NSTEMI		
•Weekend group (Friday 17:00 to Sunday 00:00)		
•Weekday group (Sunday 00:00 to Friday 17:00)		
Exclusion Criteria		
•Misdiagnosis		
•Patients who were transferred to another acute care hospital		
•Patients who left against medical advice on index admission		
•Readmission for elective PCI and CABG		
Variable	Weekday	Weekend
	N (%)	N (%)
Male	40/47 (85)	35/49 (71)
Risk factors		
HTN	44 (88)	41 (82)
DM	24 (48)	27 (54)

Variable	Weekday (N = 50) Mean ± SD (95% CI)	Weekend (N = 50) Mean ±SD (95% CI)	P value
Age*	68.64 ± 10.04 (65.78-71.50)	62.32 ± 11.15 (59.15 - 65.49)	0.004
Peak Troponin*	4.19 ± 2.60 (3.45-4.93)	9.71 ± 5.23 (8.22 – 11.20)	0.0000
LV function*	53.80 ± 6.74 (51.88 – 55.72)	48.10 ± 8.50 (45.68 – 50.52)	0.0000
Length of stay*	2.32 ±0.47 (2.19-2.45)	3.86±0.90 (3.60-4.12)	0.000
Door to Balloon Time (N)**			
< 12 hrs	46	0	
12-24 hrs.	4	39	0.0000
>24 hrs	0	11	
30-day MACE (N)***			
Weekday		Weekend	
Ventricular arrhythmia	0	1	
CHF	0	5	
Prior MI			
Weekday	0	Weekend	0
MACE			
Weekday	0	Weekend	0

DISCUSSION

- The results of this study reveal that admission on weekends has an adverse influence on clinical outcomes in patients with NSTEMI. Weekend admissions were associated with a higher prevalence of left ventricular dysfunction, increase door to balloon time, increase length of stay, and increase in cardiac biomarkers. The increase in 30day MACE was slightly more in the weekend group but the event rate was very low. It might be because of low sample size and strict exclusion criterion. There have been extensive studies which looked at patients admitted to hospitals over weekends and the results showed increased mortality among patients admitted over the weekends⁴ or even off hours⁵. In our study, the patients in the weekend group had higher cardiac markers than those in the weekday group because of prolonging door to balloon time. O’Neill et al⁶ reported that patients who were admitted during the weekend were older and had higher in-hospital mortality. In our study, patients admitted over the weekdays were older. This study has several limitations. The main limitation of this study is the relatively small sample size and the inclusion of a single study center during a 2-year period. One advantage to a single center during a relatively short period was avoiding inter-institutional differences in the detailed technique of PCI.

CONCLUSION

In conclusion, patients with NSTEMI admitted during the weekends have increased left ventricular dysfunction, an increase in cardiac biomarkers, delay in the door to balloon time and finally prolonged length of hospital stay, ultimately increased morbidity. A significant delay in the door to balloon time is likely playing a key role in these outcomes. The risk of major adverse cardiac events was minimal in both groups indicating that as long as an intervention is being done within 48 hours patients do not have decreased short-term mortality.

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