JACC VOL. 66, NO. 5, 2015
AUGUST 4, 2015:592–7

is a major limitation of this analysis. There is a need throughout the paper to distinguish between STEMI and NSTEMI. The different approaches to manage STEMI (90 min door-to-balloon) and NSTEMI (early invasive in first 48 h or conservative management are recommended options) may have an impact on mortality. The more conservative approach for NSTEMI management allows for deferring more invasive interventions to next working day, and imaginably increases the risk of in-hospital mortality; however, this is not the case for STEMI.

We have widely explored the possible existence of a "weekend effect" and confirmed an increased risk of death for other acute cardiovascular diseases as well (2,3). Our findings using the same dataset showed higher mortality among NSTEMI patients only (3). Moreover, another study showed that although there were fewer patients with acute coronary syndrome (ACS) admitted than expected on nights and weekends, the proportion of patients with ACS presenting with STEMI was almost 65% higher on weekends (4). Could the authors provide this information?

The increased mortality rate reported by Kumar et al. (1) among weekend admitted patients for AMI may denote real excess deaths. But more substantial arguments are needed to rule out a mere selection bias. Also it must be noted that without precise information regarding the type of AMI and information on other cardiac interventions, the timing of cardiac catheterization cannot be viewed as a reliable indicator of the quality of care in patients with AMI.

Mahdi Khoshchehreh, MD, MS
Nasim Mirnateghi, PhD
***Shaista Malik, MD, PhD**

*Division of Cardiology, Department of Medicine
University of California Irvine Medical Center
333 City Boulevard West
Suite 400
Orange, California 92868-3298
E-mail: smalik@uci.edu

http://dx.doi.org/10.1016/j.jacc.2015.01.069

Please note: The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

REFERENCES

1. Kumar G, Deshmukh A, Sakhuja A, et al. Acute myocardial infarction, a national analysis of the weekend effect over time. J Am Coll Cardiol 2015;65:217–8.

2. Groves E, Khoshchehreh M, Le C, Malik S. Effects of weekend admission on the outcomes and management of ruptured aortic aneurysms. J Vasc Surg 2014;60:318–24.

3. Khoshchehreh M, Groves E, Tehrani DM, Malik S. Weekend versus weekday admission and mortality from acute coronary syndrome (abstr). Circulation 2014;130:A14962.

4. LaBounty T, Eagle KA, Manfredini R, et al. The impact of time and day on the presentation of acute coronary syndromes. Clin Cardiol 2006;29:542–6.

REPLY: The Weekend Effect

Does the Type of Myocardial Infarction Impact Management and Outcomes?

We thank Dr. Khoshchehreh and colleagues for their interest in our paper. As pointed out and addressed in our paper, we cannot completely exclude selection bias as a partial explanation of our findings. However, unmeasured differences in severity of illness are less likely to be an explanation of our findings because of 2 reasons. First, mortality differences were no longer apparent after adjusting for the differential utilization of revascularization procedures during weekdays. Second, differences in mortality persisted when we adjusted for severity of illness using surrogate markers such as shock and receipt of mechanical ventilation (1).

We agree that it is important to distinguish between ST-segment elevation myocardial infarction (STEMI) and non-ST-segment elevation myocardial infarction (NSTEMI) when performing such analyses. We therefore used International Classification of Diseases (ICD)-9-CM codes 410.x1, which denotes STEMI and initial episode of care. We excluded patients if they had an ICD-9-CM code denoting subendocardial myocardial infarction or NSTEMI (410.7). Using codes for STEMI, we found that 26.1% were admitted on weekends.

Moreover, the fact that we restricted our attention to STEMI, which is an exceedingly time-sensitive condition, makes it less likely that our findings merely reflect patients delaying care on the weekend, as suggested by Dr. Khoshchehreh and colleagues. Delay in care for STEMI would arguably bias our results toward finding no difference in mortality on weekdays and weekends, as receipt of cardiac catheterization in persons presenting late is unlikely to affect their outcomes. Further, during the years 2006 to 2008, weekend admissions still represented 26% of all admission; however, utilization of revascularization procedures rose and weekend-weekday mortality differences dissipated. These phenomena argue against selection bias as the sole explanation of our findings.

We believe that our method of inclusion using ICD-9-CM codes represents patients experiencing STEMI

and that timing of cardiac catheterization remains an important measure of quality of care (2).

*Rahul Nanchal, MD
Gagan Kumar, MD
*Division of Pulmonary and Critical Care
Department of Medicine
Medical College of Wisconsin
9200 West Wisconsin Avenue
Milwaukee, Wisconsin 53226
E-mail: rnanchal@mcw.edu

http://dx.doi.org/10.1016/j.jacc.2015.05.060

Please note: The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

REFERENCES

1. Kumar G, Deshmukh A, Sakhuja A, et al. Acute myocardial infarction, a national analysis of the weekend effect over time. J Am Coll Cardiol 2015;65:217–8.

2. O'Gara PT, Kushner FG, Ascheim DD, et al. 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction: executive summary: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Circulation 2013;127:529–55.

High Flow Velocity and Low Systolic Pressure

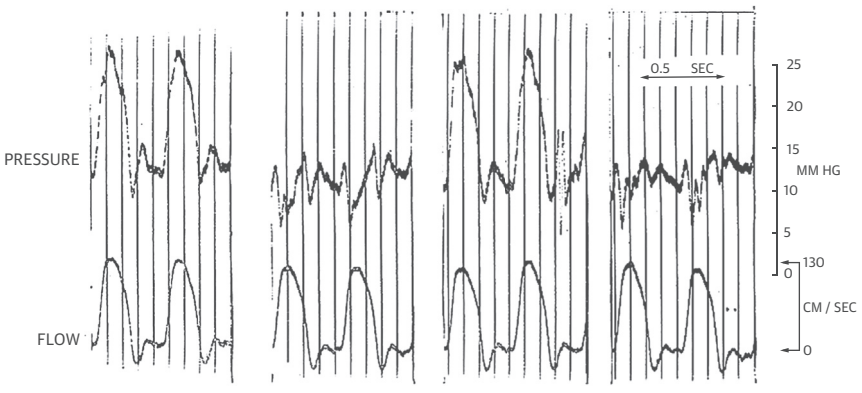
Compliance of the Aortic Wall or Venturi Effect Within

On the basis of hemodynamic studies before and after transcatheter aortic valve replacement (TAVR), Yotti et al. (1) report that the aorta in calcific aortic stenosis is abnormally stiffened, with such stiffening inapparent before valve replacement but exposed after TAVR. The authors base their conclusions on comprehensive measures of aortic elasticity, compliance (using a Windkessel model), wave intensity analysis (with or without Windkessel model), and aortic input impedance utilizing a transmission line model.

This study is very important because it bears on the difficulty in managing such patients during and after TAVR, despite successful ability to normalize the gradient across the aortic valve.

There is, however, another issue, and a precedent (2,3) (**Figure 1**) where a high velocity jet in an artery causes relative reduction in lateral pressure, resulting in the interpretation (with flow volume similar during ejection), that any change in systolic and pulse pressure must be due to altered compliance/distensibility of the artery beyond the source of the jet. In the precedent case (2), low pulse pressure in the distal pulmonary artery beyond an encircling flow meter cuff was reported to reduce compliance of the pulmonary circulation, but can be explained as a Venturi effect, when flow velocity approached or exceeded 90 cm/s (4,5). In the present case (1) flow velocity in the aorta beyond the stenotic valve approached or exceeded 200 cm/s and focus was on distensibility alone, with this considered to be normal before and abnormally high after TAVR. It is not surprising that multiple indices of distensibility were low pre-TAVR,

FIGURE 1 Pressure and Flow in the Main Pulmonary Artery of a Dog



Relationship between pressure **(above)** and flow **(below)** in the main pulmonary artery, with pressure recorded distal to a tight electromagnetic flow cuff through a needle whose bevel is first directed toward the direction of flow, then at 90° to the direction of flow, then again toward and then again at 90° to the direction of flow. Amplitude of the flow wave was similar and ~130 cm/s for all recordings. A normal pressure wave of some 15 mm Hg was recorded when the bevel faced the direction of flow but was reduced to virtually zero when twisted to face across the direction of flow (and so to be reduced through presence of a high velocity, turbulent jet).