

Cause of 30-Day Mortality Following Percutaneous Coronary Intervention in STEMI

Farhad Khaleghi, MD¹, Aditya Mangla, DO, FSCAI^{1,2}, Suresh Jain, MD, FSCAI^{1,2}, Zoran Lasic, MD, FSCAI^{1,2}

¹ Department of Internal Medicine, Jamaica Hospital Medical Center, Jamaica, NY

² Department of Interventional Cardiology, Lenox Hill Hospital, Northwell Health, New York, NY



Background

In the era of reperfusion great advancements were made in the survival of patients with STEMI. Primary percutaneous coronary intervention (PPCI) has been well established as the gold standard method of revascularization because of its superior outcomes over fibrinolysis. However, public reporting of mortality in patients undergoing PPCI during STEMI suggests that most deaths are related to procedural complications by linking patient's death to the hospital and interventional cardiologist who performed the procedure. Relationship between cause of death and primary PCI in STEMI remains unknown.

Methods

We evaluated all patients undergoing primary PCI for STEMI at our single center from 2008 to 2016. There were 80 deaths within 30 days among a total of 1250 patients undergoing PPCI for STEMI. By using a standardized data collection form, two interventional cardiologists determined the cause and circumstance of death by reviewing medical records, angiograms and New York State reported data. Specific attention was paid to whether the cause of death was related to the procedure itself or not.

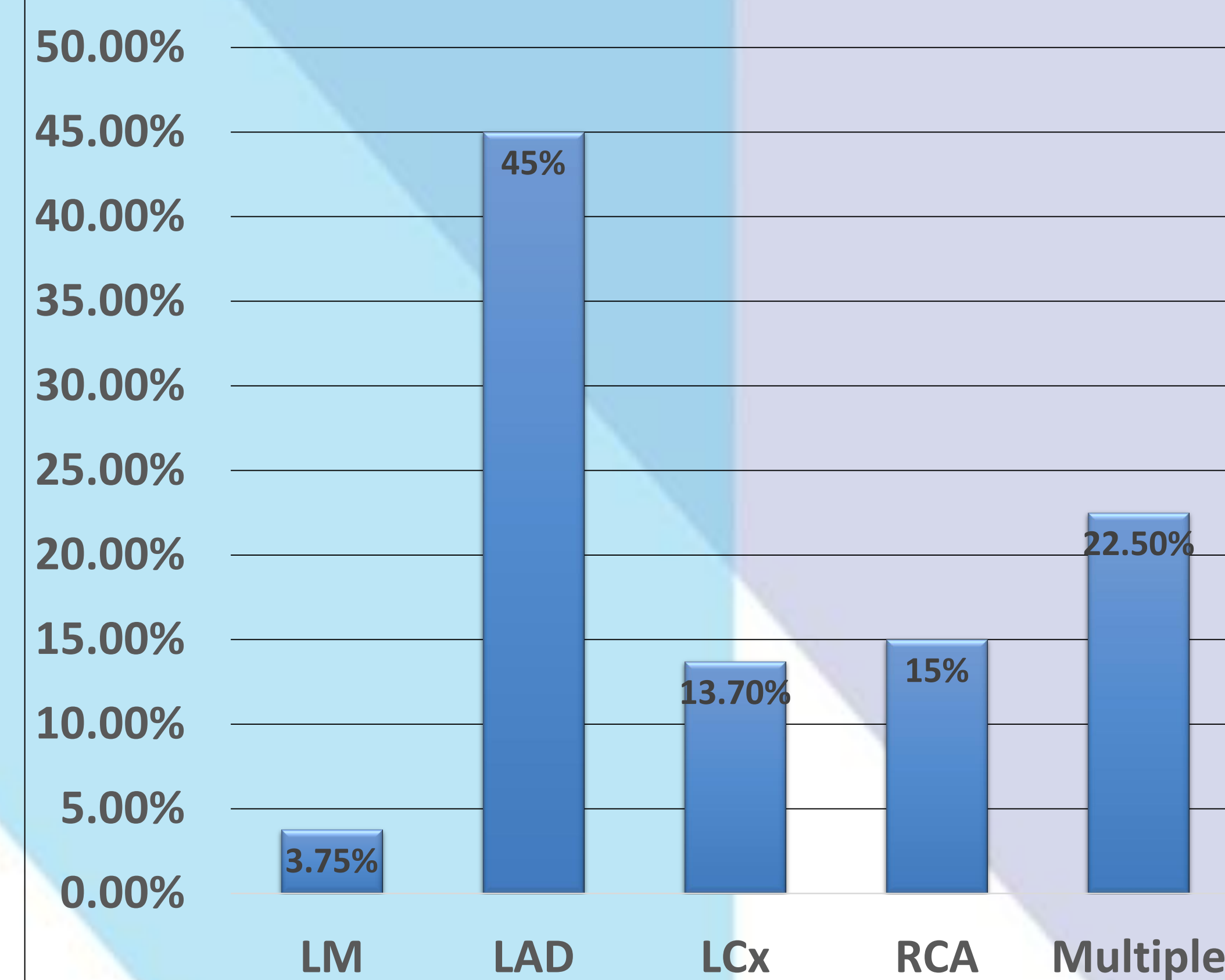
Results

Majority of patients who expired did so during the hospital admission (88.7%, n=71). Refractory cardiogenic shock on admission was the most common cause of death (67.5%, n=54), followed by post procedure left ventricular failure (26%, n=21) - primarily in patients with culprit lesion in left main or ostial/proximal LAD. Anoxic brain injury was the attributable cause of death in 2 (2.5%) patients. Procedural complications [including vessel dissection (n=2) and vessel perforation (n=1)], composed a small fraction (3.75%). Reviewers determined 96% of deaths to be mostly or entirely unpreventable. The procedural related deaths comprised approximately 0.24% of the total number of STEMI patients intervened upon (n = 1250)

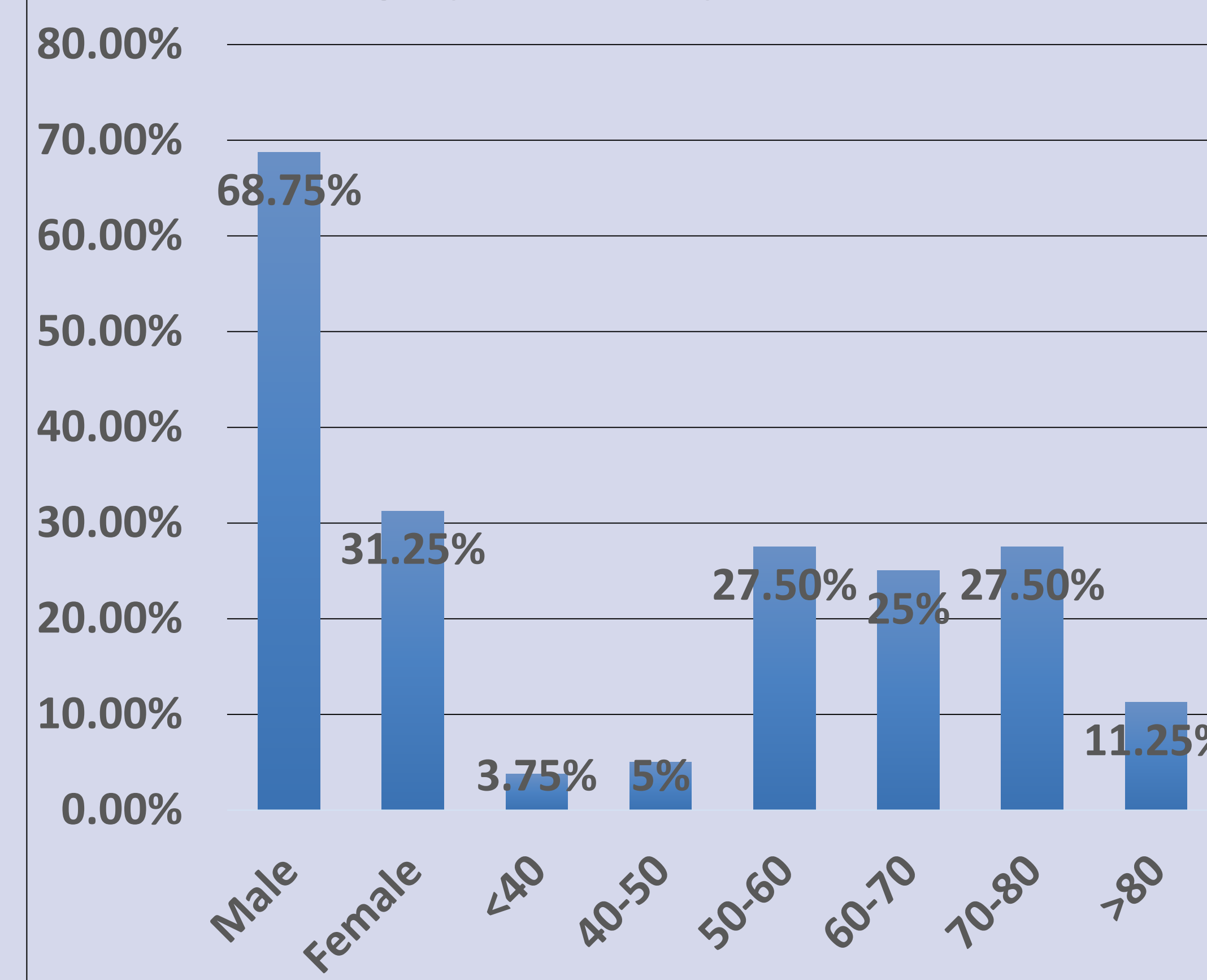
Of note, refractory cardiogenic shock was defined using NY DOH criteria: Systolic BP <80 mmHg or Cardiac Index <2.0 L/min/m² with vasopressor support or unaugmented SPB <80 mmHg with IABP support prior to the start of intervention



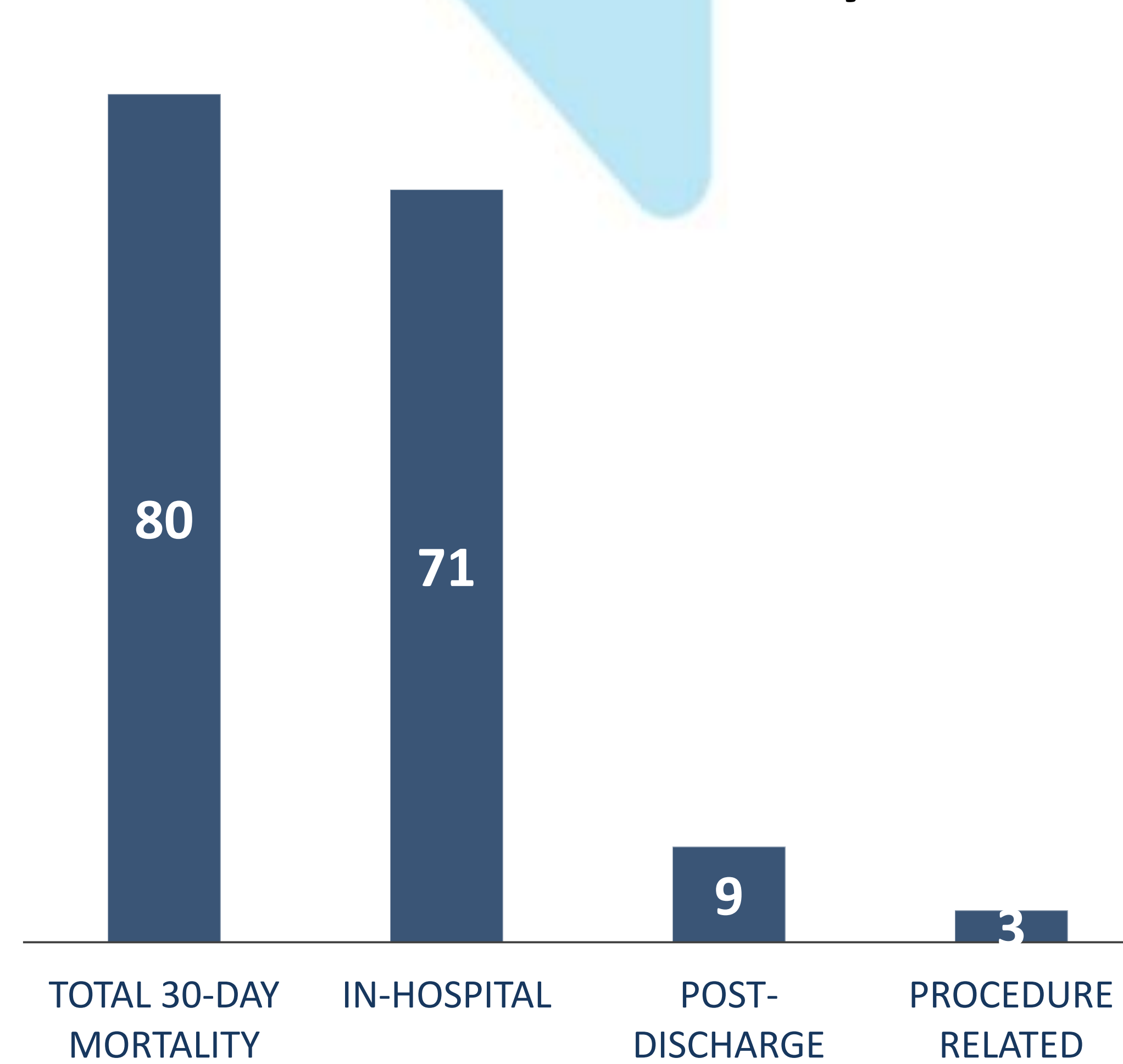
Culprit Vessel



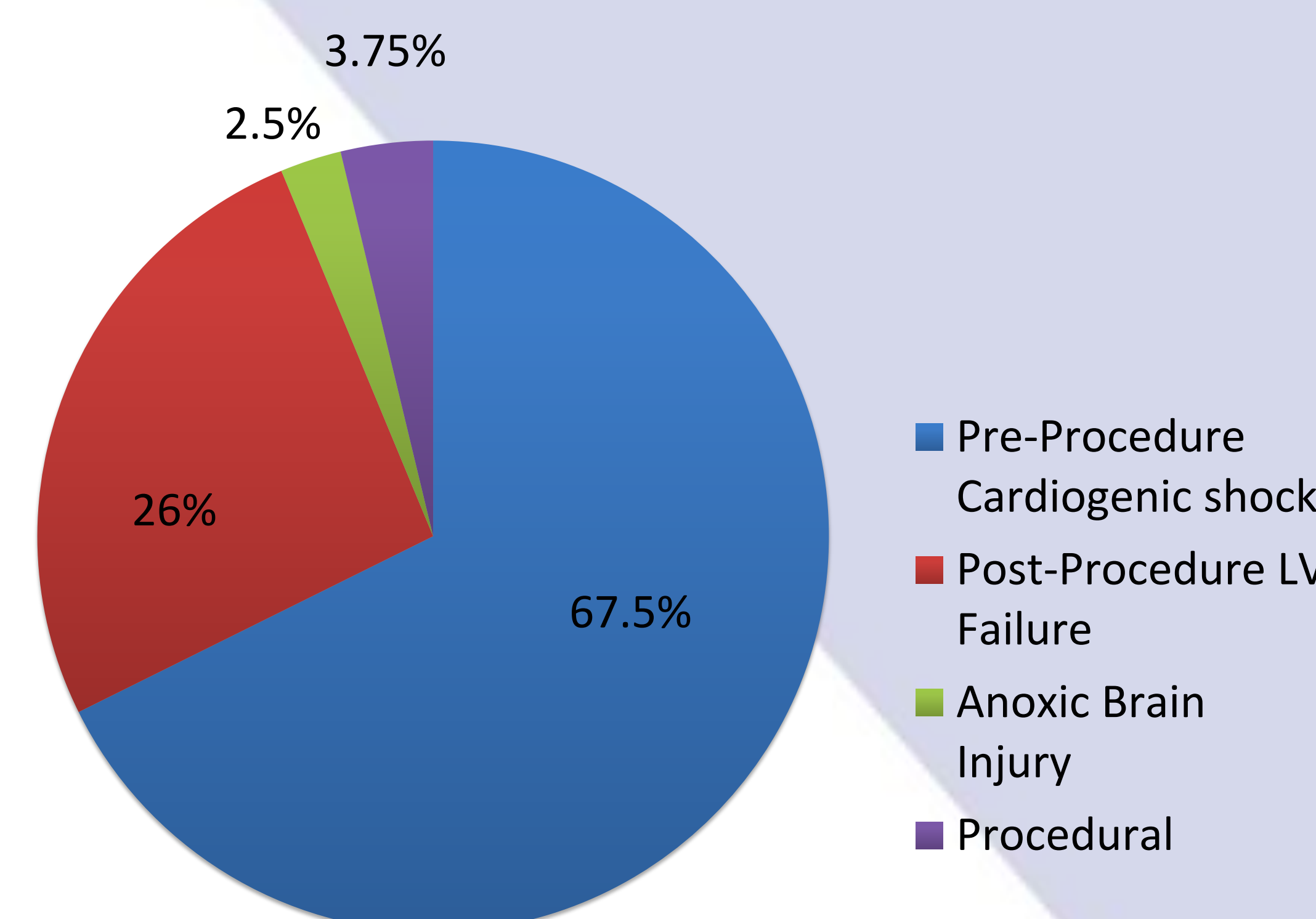
Demographics of Expired Patients



STEMI Mortality



30 Day Mortality Post PPCI



Conclusion

30-Day mortality in STEMI population undergoing PPCI is predominantly caused by etiologies unrelated to PCI procedure. Further refinement of risk-adjusted mortality models is warranted to incentivize high quality care by separating ambiguous surrogates of procedural quality from the PCI procedure itself among patients undergoing PPCI in STEMI.

Discussion

Mortality rate after STEMI has steadily declined over the past few decades. This progress is largely attributed to increased utilization of timely reperfusion therapy, specifically primary PCI, as well as evidence-based medical treatment strategies in the peri-infarct period. However despite these efforts, the mortality and morbidity from STEMI remains significant and in the vast majority of these patients it is unavoidable. In our analysis we found that the most common cause of post STEMI mortality was cardiogenic shock at the time of presentation followed by LV pump failure which developed post procedure. These results are similar to other contemporary analyses that have been published recently.¹ Aside from timely revascularization of the culprit lesion, and in some cases multivessel intervention, there are no new recommendations to treat these patients. Additionally, the use of hemodynamic support devices remains controversial and more data are needed regarding their use in this group of patients.³ Importantly, we found that a only small percentage of the patients who expired could be attributed to the procedure itself and this portion was approximately 0.24% of the total number of STEMI patients.

Data from PCI procedures are comprehensively analyzed in an effort to discover areas that may need improvement. The analysis of these metrics is paramount to quality initiatives that are necessary to improve patient care and the systematic delivery of care. Many of these metrics are now utilized in both in public reporting systems as well as payment models.² However, the current statistical models and quality metrics may not accurately reflect modifiable risk factors or results. Further investigation is needed to improve these statistical models.

References

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