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# Trends of Revascularization in Acute Myocardial Infarction Patients with Coronary Artery Anomalies: A Nationwide Analysis of 8,131 Patients

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## BACKGROUND:

- Coronary artery anomalies (CAA) are rare anatomic variations in the course of coronary vessels. Their overall prevalence ranges from 0.3-5.6%.<sup>1</sup>
- The commonest CAA is separate origin of left anterior descending (LAD) and left circumflex (LCX), which is often inconsequential. This followed by LCX arising from right coronary artery (RCA) ostium. The most clinically challenging anomalies are anomalous RCA arising from left main or anomalous left main arising from RCA, especially if the anomalous vessel follows an interarterial course.<sup>2</sup>
- Acute myocardial infarction (AMI), both ST elevation MI (STEMI) & non ST elevation MI (NSTEMI) can rarely be associated with CAA which makes it difficult to identify & treat the culprit lesion with percutaneous coronary intervention (PCI).<sup>3</sup>
- This is especially true if the culprit lesion is located within an anomalous segment or vessel, which can make angiography and intervention difficult. This can potentially lead to prolonged procedure times, higher risk of complications and inability to perform a successful PCI.
- However, only small single center studies<sup>3</sup> or case reports are published in the literature on this topic, resulting in paucity of data on AMI in patients with CAA.

## METHODS:

- We included adult patients (>18 years) from the Nationwide Inpatient Sample, the largest all-payer database in US.
- We included patients with STEMI or NSTEMI who underwent coronary angiography with an International Classification of Diseases (ICD)-9 diagnosis code of 746.85 for CAA in any diagnosis field from 2000-2011.
- Using ICD-9 procedure codes, we identified patients who underwent revascularization with PCI or coronary artery bypass grafting (CABG).
- Chi square test for trend was used to compare revascularization rates over time in patients with STEMI and NSTEMI.

## RESULTS:

- Our study population consisted of 8,131 patients, including 3,425 patients with STEMI & 4,706 patients with NSTEMI.
- The mean age of our study population was 59.0 years [standard deviation (SD) 14.4 years].
- There were 63.6% males in our study population.
- Overall, the PCI rate was 47.8%. It was 67.1% in patients with STEMI and 33.8% in patients with NSTEMI.
- The overall coronary artery bypass grafting (CABG) rate was 8.8%. It was 7.7% in patients with STEMI and 9.6% in patients with NSTEMI.
- The overall in-hospital mortality rate was 1.2% and stent thrombosis rate was 2.8%.
- In STEMI patients with CAA, the PCI rate increased from 49.9% in 2000 to 77.8% in 2011 ( $p < 0.001$ ), with an increase in the overall revascularization rate from 63.3% in 2000 to 81% in 2011 ( $p < 0.001$ , Figure 1).
- However, in NSTEMI patients with CAA, the PCI rates remained low at 33.3% in 2000 & 37.3% in 2011 ( $p = 0.34$ ). The overall revascularization rate also remained unchanged from 40.5% in 2000 to 44.8% in 2011 ( $p = 0.34$ , Figure 2).

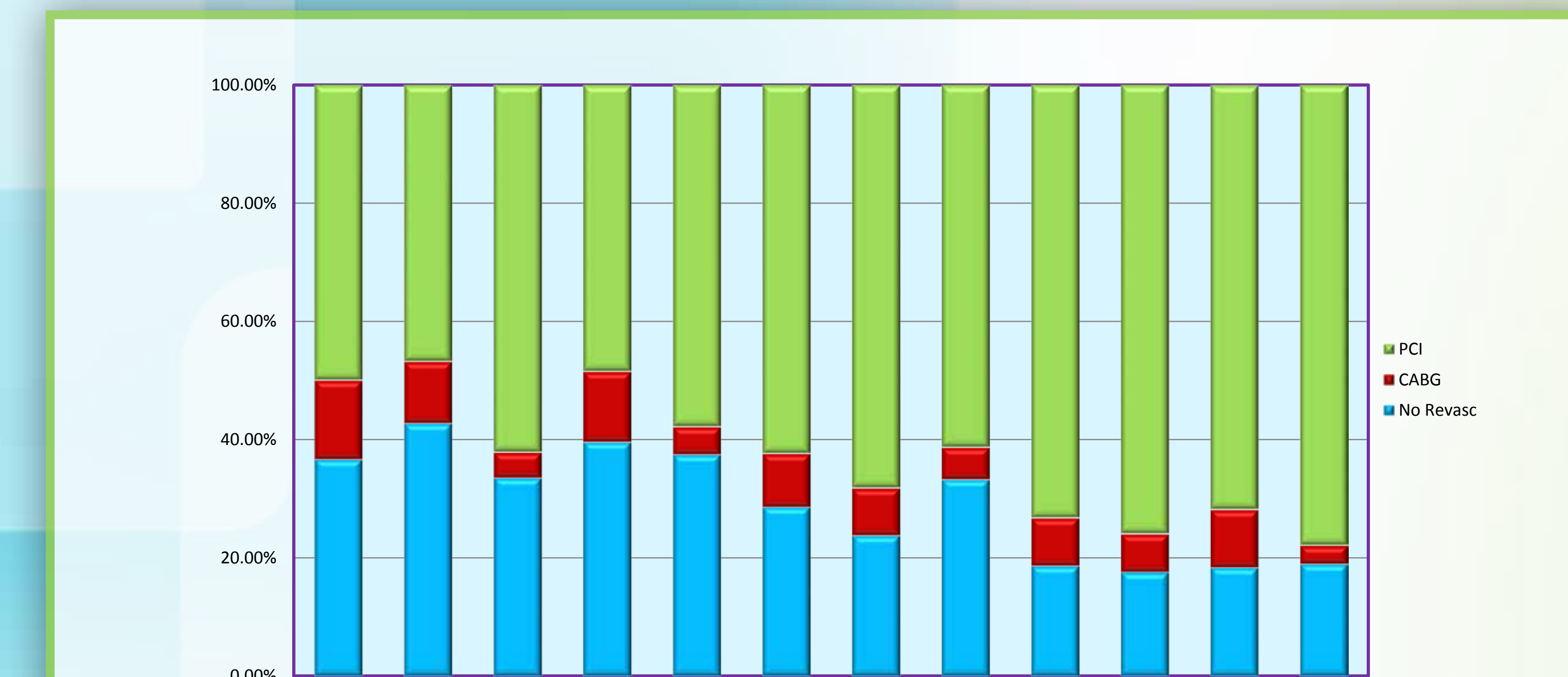


Figure 1: Trends of revascularization in STEMI patients with coronary artery anomalies.

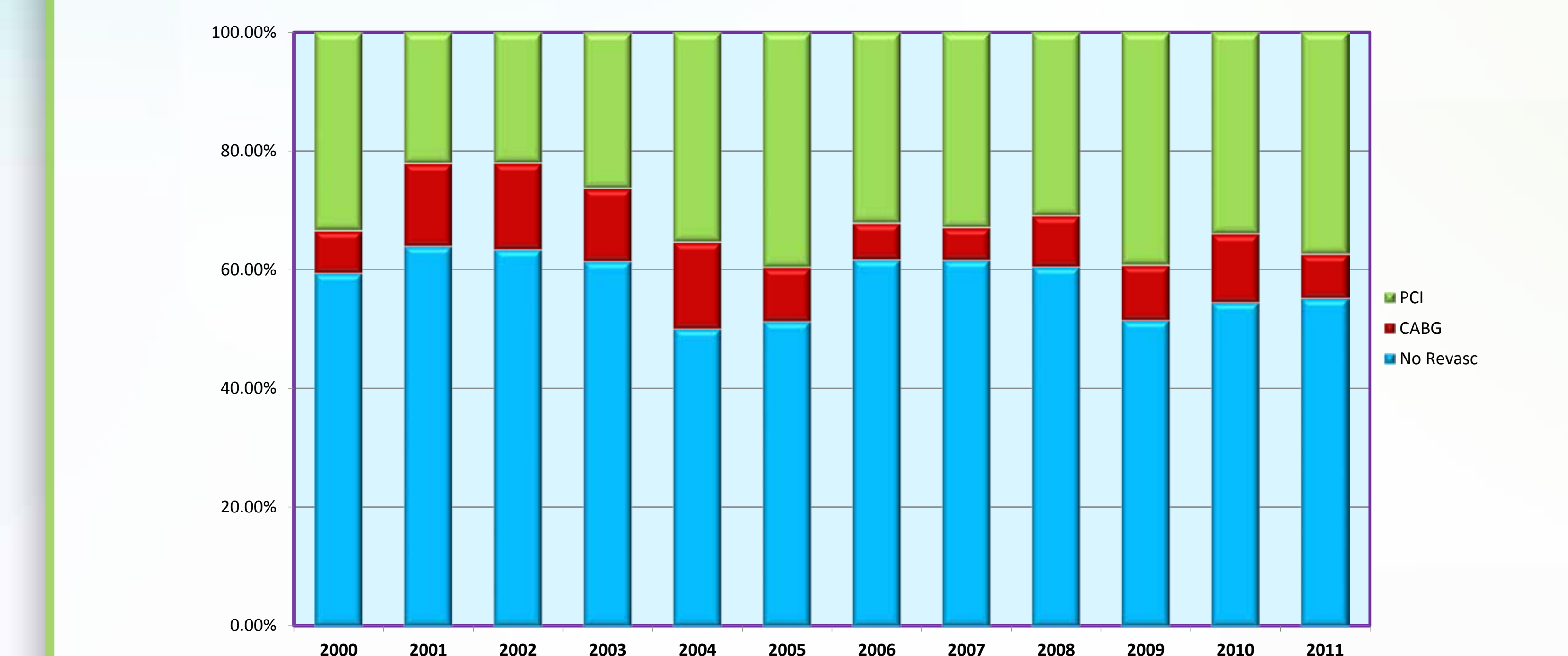


Figure 2: Trends of revascularization in NSTEMI patients with coronary artery anomalies.

## CONCLUSIONS:

- Despite the technical challenges associated with emergent primary PCI, the PCI rates in STEMI patients with CAA continue to increase over time, with revascularization rates close to 80%.
- However, out of all NSTEMI patients undergoing coronary angiography who are found to have CAA, only a third receive PCI and less than half undergo revascularization. Future efforts should focus on use of tools and technology to improve revascularization strategies in NSTEMI patients with CAA.

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