Akshay Machanahalli Balakrishna, MD

Creighton University School of Medicine

Omaha

dr.akshaymb@gmail.com

(531) 777-4003

Original research (includes database studies and QI projects)

Title: Comparing Optical Coherence Tomography and Intravascular Ultrasound Guidance for Percutaneous Coronary Intervention: Trends and Outcomes 2010 – 2019

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Authors: First/presenting author: Akshay Machanahalli Balakrishna, MD (Cardiology fellow)

Faculty Mentor: Khagendra Dahal, MD

Abstract:

Background: Intracoronary imaging optimizes percutaneous coronary intervention (PCI) by accurately measuring vessel dimensions and characterizing lesion morphology. Optical coherence tomography (OCT) and intravascular ultrasound (IVUS) are the 2 intracoronary imaging modalities currently available. We compared the utilization of OCT and IVUS to guide PCI and their relative association with in-hospital mortality and readmission rates.

Methods: We queried the National Readmission Database to identify patients undergoing intracoronary imaging-guided PCI from 2010 to 2019 and compared outcomes and readmission rates between patients undergoing OCT-guided PCI and IVUS-guided PCI. Multivariable logistic regression was performed to generate adjusted odds ratios (aOR) of adverse outcomes between the 2 groups.

Results: Of 3,71,450 intracoronary imaging-guided PCI admissions, OCT (n=12,808) was used less frequently than IVUS (n=358,642). The use of OCT-guided PCI increased from 0.1% in 2010 to 0.6% in 2019 while the rate of IVUS-guided PCI decreased from 7.2% in 2010 to 5.6% in 2015 before increasing to 9.4% in 2019 (both ptrend<0.001). Patients undergoing OCT compared to IVUS had lower in-hospital mortality (aOR 0.69, p=0.015) and 30-day readmission rate (aOR 0.91, p=0.040) with no statistical difference in 90-day readmission rate (aOR 0.93, p=0.065). Heart failure was the most common cause of 30-day and 90-day readmissions in both cohorts.

Conclusion: In patients undergoing intracoronary-imaging guided PCI, OCT-guided PCI during index hospitalization appears to be associated with lower in-hospital mortality and 30-day readmission rates compared to IVUS-guided PCI with no difference in terms of the 90-day readmission rates. Randomized controlled trials are necessary to confirm these findings.

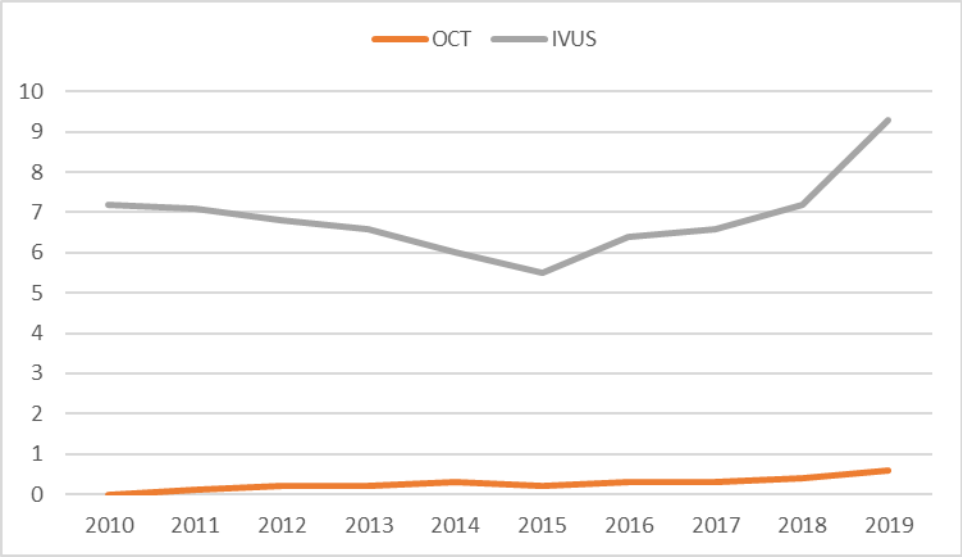

Figure 1. Trends in utilization of IVUS-guided PCI compared to OCT-guided PCI

Variables	IVUS	OCT	p-value
In-hospital mortality	1.8	1.1	<.001
30-day Readmission	12.4	10.6	<.001
Disease-specific 30-day Readmissions			
Acute Myocardial Infarction	7.4	9.7	
Unstable Angina	8.3	7.7	
Chest Pain	5.3	5	
Arrythmia	2.9	4.5	
Heart Failure	10.2	7.1	
Pericardial Complication	2.1	2.9	
Cardiac Arrest	0.2	*	
Pulmonary Embolism	0.7	*	
Respiratory Failure	1	*	
Mechanical Ventilation	0.6	*	
Acute Renal Failure	2.4	2.2	
GI Bleed	2.1	*	
Acute Ischemic Stroke	1.1	*	
Sepsis/Septic Shock	2.9	3.5	

Table 1. Comparison of in-hospital mortality, 30-day readmission and causes of readmission between IVUS and OCT cohorts. Note. An * indicates the number of observed hospitalizations was ≤10, so data cannot be presented per NIS data use agreement.