93. Diagnostic Performance of Coronary In-stent Restenosis by Coronary Computed Tomography Angiography

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Background: Coronary in-stent restenosis (ISR) is reported to account for approximately 10% of all percutaneous coronary intervention (PCI) performed. Although ISR is confirmed by coronary angiography (CAG) as a reference standard, several studies have been conducted on the diagnostic accuracy of ISR using coronary computed tomography angiography (CCTA). The results of the diagnostic accuracy of ISR using CCTA in these studies are somewhat different and the explanation for reason of discrepancy between CAG and CCTA is insufficient. Therefore, we investigated the diagnostic reliability of ISR by CCTA and factors affecting the discrepancy between CAG and CCTA.

Methods: Among the patients who underwent PCI from January 1, 2010 to December 31, 2020, 146 patients (269 stents) who performed CAG within 3 months after CCTA were analyzed. In CAG and CCTA, ISR is equally defined as a stenosis greater than 50% of the vessel diameter of within the stented segment or its edge (5-mm segments adjacent to the stent).

Results: According to the performed CAG, ISR was identified in 68 of 269 stents. Among them, the concordance group was 232 (86%) and the discrepancy group was 37 (14%) comparing CCTA. The diagnostic accuracy of ISR by CCTA comparing CAG is that, the sensitivity was 0.66, the specificity was 0.93, the positive predictive value was 0.76 and the negative predictive value was 0.89. The overall accuracy was 86.2% and Cohen's kappa coefficient (k) (Confidential interval) was 0.62 (0.51 – 0.73). Interpreting the results of analysis, it was confirmed that CCTA had a higher probability of reading patients with the diseases as non-existent. Among the factors affecting discrepancy, stent diameter is significant bigger and left anterior descending artery (LAD) lesion and overlapped stents tended to be more distributed in the discrepancy group compared with the concordance group.

Conclusion: In the present study, the diagnostic accuracy of ISR by non-invasive CCTA was similar with those of other coronary artery disease diagnoses were obtained. Therefore, CCTA may provide diagnostic value as non-invasive screening tool of ISR after PCI.

Table 1. Agreement of ISR diagnosis between CCTA and CAG

CCTA	CAG		Total
	ISR (+)	ISR (-)	
ISR (+)	45	14	59
ISR (-)	23	187	210
Total	68	201	269

Table 2. Comparison of factors affecting concordance of ISR diagnosis between CCTA and CAG

Affecting factors	Concordance	Discrepancy	P-value
Total	232 (86%)	37 (14%)	
Stent			
Overlapped	63 (84%)	12 (16%)	0.64
2nd layer	7 (87%)	1 (13%)	1
ISR lesion			
LMCA	11 (100%)	0 (0%)	0.37
LAD	97 (82%)	22 (18%)	0.06
LCX	56 (92%)	5 (8%)	0.22
RCA	68 (87%)	10 (13%)	0.92
Diameter (mm)	3.01	3.17	0.03
Length (mm)	23.72	23.19	0.66

Clinical Implications: confirm ISR by using CCTA as a screening test when ISR is suspected during follow-up among patients who have undergone previous PCI.