

Agreement between coronary CT angiography and invasive coronary angiography in atherosclerotic plaque detection

B. Szilveszter¹, M. Kolossvary¹, I. Edes¹, Z. Bagyura¹, S. Voros²,
B. Merkely¹, P. Maurovich-Horvat¹

(1) MTA-SE Cardiovascular Imaging Research Group, Heart and Vascular Center, Semmelweis University

(2) Global Genomics Group LLC

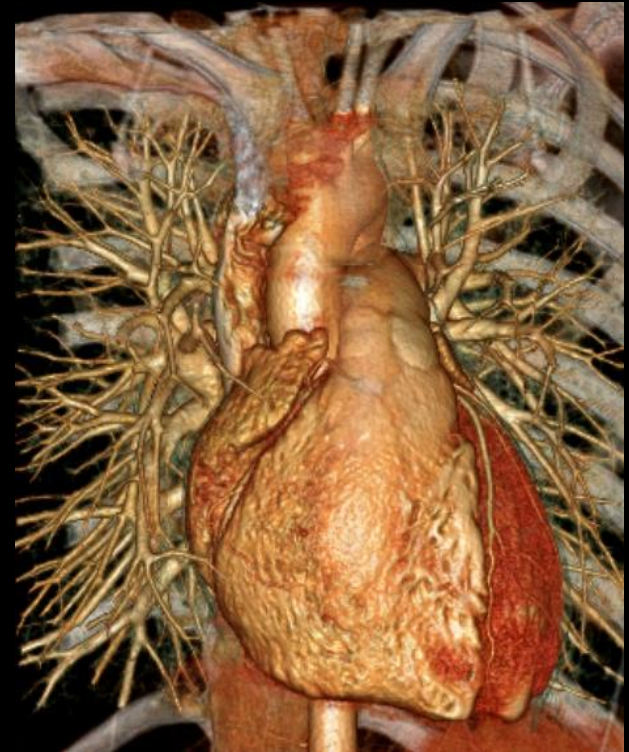


CIRG
MTA-SE "Lendület"
Cardiovascular Imaging
Research Group



Background

- ❖ Strong relationship between atherosclerotic disease burden and risk for adverse events
- ❖ Few studies have compared coronary CTA and ICA regarding semi-quantitative plaque burden measurements



Our aim was to compare coronary CTA and ICA regarding semi-quantitative plaque assessment

Patients and methods

Patient characteristics

N=71

age (years)	60.8 ± 11.7
BMI (kg/m ²)	27.9 ± 4.3
female/male (%)	36.6/63.4
hypertension (%)	71.8
diabetes (%)	18.3
dyslipidemia (%)	60.5

- 71 consecutive patients underwent both ICA and CTA with a median of 32 [IQR:15-62.5] days between the two examinations
- **1016** coronary segments were analysed by 2 expert readers
- Invasive coronary angiography as the clinical gold standard
- Modified 18-segment AHA classification, segment stenosis score (SSS) and segment involvement score (SIS)

SSS and SIS indices

Segment Stenosis Score (SSS)

Amount and severity of the stenosis

- 0-normal
- 1-minimal
- 2-mild
- 3-moderate
- 4-severe
- 5-occluded

$$\text{SSSindex} = \frac{\text{Segment Stenosis Score}}{\text{all assessed segments}}$$

Segment Involvement Score (SIS)

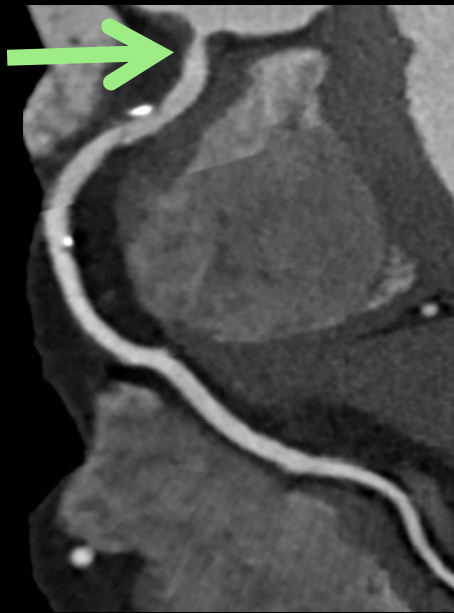
Number of segments with plaques

- 0-without plaque
- 1-with plaque

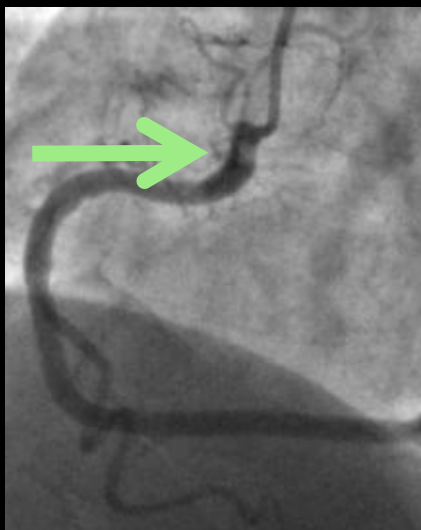
$$\text{SISindex} = \frac{\text{Segment Involvement Score}}{\text{all assessed segments}}$$

Examples

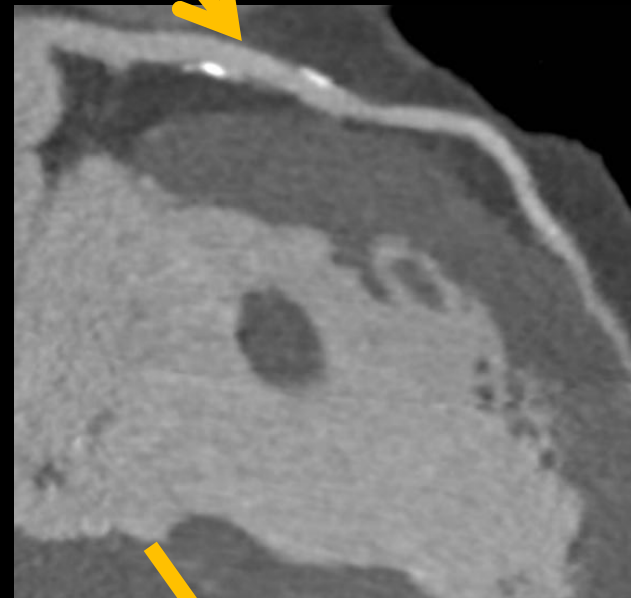
CTA



ICA



Case 1



Case 2

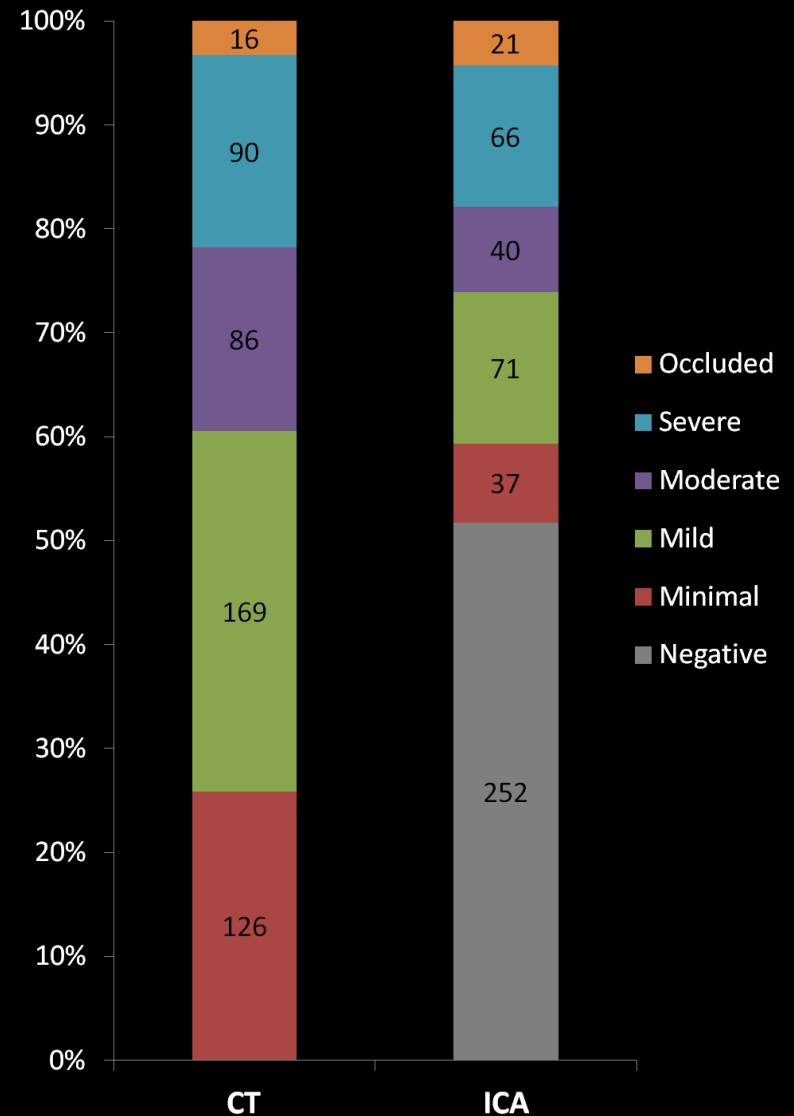
Performance of CTA vs ICA

- CTA described plaques in **48.7% segments** vs ICA **23.5%** segments ($p < 0.001$)
- ICA found plaques in **2.7%** segments where CTA was negative

- CTA versus ICA:

SISi 0.49 ± 0.22 vs. 0.24 ± 0.14 ($p < 0.001$)

SSSi 1.17 ± 0.64 vs. 0.67 ± 0.50 ($p < 0.001$)



Conclusion

- Coronary CTA detected two times more coronary segments with atherosclerotic plaques compared to the ICA
- Significant number of plaques do not cause luminal stenosis
- Coronary CTA overestimates the luminal stenosis caused by coronary plaques compared to the ICA, which resulted higher SSSi values in CTA

Thank you for your attention!

