Lipid-containing Plaque Distribution In Native Coronary Arteries: A Near-infrared Spectroscopy Study

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BACKGROUND The near-infrared spectroscopy (NIRS) catheter system identifies lipid core-containing coronary plaques (LCP) of interest in the coronary arteries. The purpose of this study was to evaluate axial distance in location between the maximum LCP site and the site that had the most luminal-narrowing as assessed by NIRS system.

METHODS Overall, 45 patients (49 native coronary arteries) underwent NIRS imaging. Intravascular ultrasound (IVUS) derived lesion was defined as a lesion with a plaque length $>4$ mm and a plaque burden $>40\%$. The site of greatest luminal-narrowing was defined as the site of minimal lumen area (MLA) within the IVUS-derived lesion. Otherwise, an NIRS-derived lesion was defined as having a 10mm maximum lipid core burden index (maxLCBI). The maximum LCP site was defined as the center of 4mm maxLCBI within the NIRS-derived lesion. The distance between the MLA site and the maximum LCP site was evaluated for each vessel.

RESULTS The mean distance between the MLA site and the maximum LCP site was 4.7 $\pm$ 14.5 mm. The maximum LCP site was located proximal to the MLA in 33 of lesions and distal to the MLA in 16 of the lesions. Of the total of 49 vessels, 21 were in the left anterior descending (LAD), 14 were in the left circumflex (LCx) and 14 were in the right coronary artery (RCA). Most of the maximum LCP site in LAD and LCx were located proximal to the MLA site. Conversely, the maximum LCP site in the RCA tended to be further away from the MLA site and more widely distributed than those in the LAD and LCx ($p = 0.057$).

CONCLUSION The present study raises the possibility that the pattern of LCP distribution differs among coronary arteries.

Figure. Frequency of the maximum LCP site (Max LCP) according to distance from the minimal lumen area (MLA)

Discrepancies Between Direct Catheter And Echocardiography Based Values In Aortic Stenosis And Impact On Clinical Decision

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BACKGROUND Current guidelines discourage aortic stenosis (AS) evaluation by direct pressure measurement if echocardiography (echo) is adequate. Crossing the valve at catheterization (cath) is a class III recommendation due to potential stroke risk and the fact that echo derived AVA correlates highly with cath derived AVA. However several studies show sizable differences between echo and catheterization (cath) lab measurements. Using pressure wire for aortic stenosis assessment may offer a safer and higher quality techniques to assess the quality of echo results.

METHODS Sequential patients with suspected AS by echo (n =75) aged 61-94 underwent right and left heart cath by two operators with pressure gradients via left ventricular (St. Jude) pressure wire and ascending aorta catheter. Values were based on simultaneous pressure wire recording of left ventricular pressure and fluid filled pressure catheter recording of aortic pressure measured $>5$ cm above the valve. Cardiac output was calculated by thermodilution. Echos were from 5 different labs, interpreted by 18 different readers, and reviewed by 2 independent level III readers blinded to original reads and cath results to assess the quality of community-based readings.

RESULTS Independent readers considered 66 of the 75 echos to have good quality. There was no difference between these and poorer quality echos at predicting cath parameters. Independent reader interpretation did not significantly differ from the original interpretation. 23 patients had an EF $<50\%$, 52 had an EF $\geq 50\%$. Cath Assessment of severity of aortic valve area (AVA) was discordant with echo by more than 0.2cm$^2$ in 48%, 0.3cm$^2$ in 25% and 0.5cm$^2$ in 7% of patients. Values changed to over or under the surgical threshold of AVA $<1cm^2$ in 30% of the patients (Pearson correlation of 0.47). Mean echo gradients had better correlation with cath gradients (75%, Pearson correlation of 0.82). Urgent surgical valve replacement was avoided in 18 patients (24%). No clinical strokes or TIA were observed in the 30 days after procedure.

CONCLUSIONS Cath-echo correlation of AS severity is lower in contemporaneous practice than previously assumed. This can alter the decision for aortic valve replacement. Sole reliance on echo-derived assessment of AS may need to be reconsidered.