CONCLUSIONS Nicorandil IC bolus injection is a simple, safe and effective way to induce maximal hyperemia and can be used as a substitute for adenosine.

CATEGORIES IMAGING: FFR and Physiologic Lesion Assessment

KEYWORDS Adenosine, Fractional flow reserve, Nicorandil

**TCT-299**

In Vivo Validation of Mathematically-derived Fractional Flow Reserve for Assessing Hemodynamics of Coronary Tandem Lesions

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**BACKGROUND**

The aim of this study was to provide and validate a mathematical model of tandem lesion for the prediction of post-stenting fractional flow reserve (FFR) across the remaining stenosis without a repeated FFR measurement.

**METHODS**

Following treatment of either proximal or distal stenosis, the residual FFR gradient across the remaining lesion (ΔFFRd,pred or ΔFFRd,post) was calculated as ΔFFRp / (1 - wΔFFRd) or ΔFFRp/(1-kwΔFFRd), respectively. Considering ΔFFRd (ΔFFR across the proximal segment to the proximal stenosis), the predicted FFRd was [1 - ΔFFRd - ΔFFRd,post]. For in vivo validation, twenty patients with a tandem lesion (DS>50% for each lesion) were evaluated. After stenting a stenosis with a larger ΔFFR, post-stenting ΔFFRd was re-measured and compared with the calculated FFRd,pred. The accuracy was also compared with a previous model that did not consider a side branch flow.

**RESULTS**

ΔFFRd,pred using our model (vs. previous model) showed a closer correlation with the measured FFRd (R²=0.89 vs 0.80) and a greater prediction power in terms of mean absolute error (0.02±0.02 vs 0.04±0.03, p=0.045), (Figure A and B). When FFR gradients across proximal and distal stenosis were equal (ΔFFRd,pro = ΔFFRd), prioritizing treatment of distal (vs. proximal) stenosis was more effective to reduce the residual FFR gradient (Figure C). Especially in tandem lesions with a big side branch and a large sum of ΔFFRd and ΔFFRd, even with a slightly larger ΔFFRd (vs. ΔFFRd), consequent FFR recovery was less effective compared to distal stenosis treatment (‘disagreement zone’ in Figure D).

**CONCLUSIONS**

Our prediction model accurately predicts FFRd after treatment of a stenosis and is useful to optimize treatment strategy in tandem lesion.

**CATEGORIES IMAGING:** FFR and Physiologic Lesion Assessment

**KEYWORDS** Coronary artery disease, Fractional flow reserve, Modeling

**TCT-299**

Adenosine Versus Regadenoson In Assessing Fractional Flow Reserve, A Meta Analysis

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**BACKGROUND**

Fractional Flow Reserve (FFR) has become the standard method of assessing the physiological severity of intermediate coronary artery stenosis. It requires maximum hyperemia. Traditionally Adenosine has been used. Regadenoson, a selective A2A receptor agonist, is an approved hyperemic agent for pharmacological stress imaging, its role for measuring FFR is unknown. We therefore systematically reviewed published literature to compare the efficacy and safety between those two drugs in measuring FFR.

**METHODS**

We searched PubMed, Cochrane Library & Web of Science for randomized controlled trials (RCT) comparing the use of Adenosine versus Regadenoson in measuring FFR. The primary endpoint was the correlation of FFR values using those two drugs. We also assessed the change in mean blood pressure, heart rate, and development of advanced heart block as safety outcomes. Odd ratio and 95% confidence intervals were used to evaluate categorical variables. Standard difference in the mean and 95% confidence intervals were used to evaluate continuous variables. All the analysis was done with the Der Simonian and Laird random effect model. Sensitivity and cumulative analysis were performed for each outcome.

**RESULTS**

A total of 4 RCT with a total of 202 patients were included. Each patient underwent FFR measurement using IV Adenosine first then with IV Regadenoson. A strong linear correlation of FFR was noted in between the two methods. The pooled mean correlation factor was R 0.981. There was no statistically significant difference in mean FFR values between both groups (Sdm =-0.008, CI = [-0.08, -0.01], P=0.07). The standard mean difference was lower with sensitivity analysis but remained statistically insignificant (Sdm ~0.008, CI = [-0.21, 1.9], P=0.94). Change in heart rate were less in Adenosine arm.