

RESULTS Baseline characteristics of patients are shown in Table 1. IMR was measured in 34 patients (one patient was excluded for a technical problem). 56% of the patients were males with a mean age of 70+/-15 years. All procedures were performed by radial approach. Pressure wire physiological measurements demonstrated a significant MD. IMR showed a median value of 32+/-16 with normal IMR in healthy humans being < 20-30U (median value of 12.6). Coronary flow reserve (CFR) was also concordant with a MD and statistically associated with IMR ($r = -0.4$, $p = 0.03$). A significant association between IMR and BNP levels were found ($r = -0.4$, $p = 0.02$). A nonsignificant correlation with age and IMR was found ($r = 0.32$, $p = 0.06$). Interestingly a significantly lower IMR was found in patients in treatment with beta-blockers ($p = 0.013$). No significant relationship between IMR other clinical, biochemical, physiological or echocardiogram parameters were found.

Table 1

Characteristics	Percentage/Value
Diabetes	26%
Hypertension	57%
Atrial fibrillation	11,7%
Severe aortic calcification	16%
Beta blocker treatment	40%
Oligosymptomatic	8,5%
FFR<0.75 in LAD	3%
Body mass index	28,9 +/- 4.5 kg/m ²
LV ejection fraction	62 +/- 8.4 %
Mean gradient	53 +/- 16 mm/Hg
Index AVA	0,44 +/- 11 cm ² /m ²
Ejection Time	0,299 +/- 59 sec.
FFR	0,87 +/- 0.8
CFR	1,39 +/- 0.6

CONCLUSIONS Invasive IMR measurement confirm that patients with AS have a high coronary resistance and MD. IMR showed a median value of 32+/-16 and was statistically associated with CFR and with BNP levels. Interestingly a significantly lower IMR was found in patients in treatment with beta-blockers.

CATEGORIES IMAGING: FFR and Physiologic Lesion Assessment

KEYWORDS Aortic stenosis, Coronary microcirculatory dysfunction, Coronary Physiology

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Nicorandil as Hyperemic Agent to Evaluate Fractional Flow Reserve

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BACKGROUND Fractional flow reserve (FFR) is useful for determining the functional significance of epicardial coronary stenosis and may facilitate clinical decision making in patients with an equivocal coronary stenosis. Therefore, determining an efficient and safe method to achieve hyperemia is important for evaluating FFR.

METHODS We evaluated appropriate hyperemic dose of nicorandil (NIC) in 42 vessels (LAD:27 vessels, CX:8 vessels, RCA: 7 vessels) of 30 patients. Next, we compared the FFR induced by ATP and by 2-mg NIC in 170 vessels of 129 Japanese patients. Finally, we examined effect of adding NIC to ATP to evaluate FFR in 41 vessels (LAD:31 vessels, CX:4 vessels, RCA: 6 vessels) of another 35 patients.

RESULTS 76.2% of vessels achieved hyperemia with 2-mg NIC. If an accidental error was defined as a difference of 0.01 in the FFR measurements, hyperemia was achieved in 95.2% vessels when up to 2-mg NIC was administered. The FFR values obtained with ATP were significantly correlated with those obtained with 2-mg NIC (regression coefficient = 0.960, $R^2 = 0.918$, $P < 0.001$). FFR value were not different in size of catheter (4Fr vs 5,6Fr), site of approach (TR vs TB,TF), and type of catheter (sones vs others). There were one hypotension case needing a vasopressor and two cases of transient second-degree atrioventricular block after ATP administration but not after NIC administration (0.6% vs 0.0%, 1.2% vs 0.0%, not significantly). The time taken to achieve hyperemia after NIC administration (17.7±8.7 s) was significantly shorter than that after

ATP administration (196.5±26.0 s) ($P < 0.001$). Adding 2-mg NIC to ATP reduced FFR value, -0.017 ± 0.035 , but not reaching significance. Reductions of FFR value were not different in size of catheter (4Fr vs 5,6Fr), site of approach (TR vs TB,TF), and type of catheter (sones vs others), but FFR value in non LAD came down more than LAD (non-LAD : -0.038 ± 0.034 , LAD : -0.010 ± 0.033 , $p = 0.036$).

CONCLUSIONS Intracoronary nicorandil administration is more useful than and as safe as intravenous administration of ATP for evaluating FFR in Japanese patients.

CATEGORIES IMAGING: FFR and Physiologic Lesion Assessment

KEYWORDS Fractional flow reserve, Hyperemia, Nicorandil

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Fractional Flow Reserve Measurement in Non-ST-Elevation Myocardial Infarction: Analysis of the National Inpatient Sample Database

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BACKGROUND Fractional flow reserve (FFR) measurement is being used increasingly in patients with coronary artery disease to guide treatment. However, limited data are available on the contemporary utilization rates and in-hospital outcomes of FFR measurement in patients with non-ST-elevation myocardial infarction (NSTEMI).

METHODS We queried the 2009-2012 National Inpatient Sample (NIS) databases to identify all patients admitted with the primary diagnosis of NSTEMI (ICD-9-CM code 410.71). Multivariate logistic regression and linear regression models were used to analyze the utilization rates and in-hospital outcomes of FFR measurement in NSTEMI patients undergoing coronary angiography.

RESULTS Of 1,605,295 (57.7% men, mean age 69±14 years) patients hospitalized with NSTEMI from 2009-2012, 992,183 (61.8%) underwent coronary angiography. Among NSTEMI patients who underwent coronary angiography, FFR measurement was performed in 9,086 (0.9%) patients. FFR utilization rates increased from 0.4% in 2009 to 1.5% in 2012 (adjusted OR per year, 1.46; 95% CI, 1.43-1.49; $p < 0.001$). Among NSTEMI patients who underwent coronary angiography, those who had FFR measurement performed were less likely to undergo percutaneous coronary intervention (PCI) (54.2% vs 54.4%; adjusted OR, 0.91; 95% CI, 0.87-0.95, $p < 0.001$) or coronary artery bypass grafting (CABG) (9.9% vs 11.5%; adjusted OR, 0.79; 95% CI, 0.73-0.85, $p < 0.001$) compared to those who did not have FFR measured. In-hospital mortality was lower (0.8% vs. 1.8%; adjusted OR, 0.53; 95% CI, 0.42-0.67, $p < 0.001$) and average length of stay was shorter (4.4 days vs 4.8 days; adjusted parameter estimate 0.96; 95% CI 0.95-0.98; $p < 0.001$) in FFR group compared to the no FFR group. Average total hospital charges were higher in the FFR group compared to the no FFR group (\$82,621 vs \$79,019; adjusted parameter estimate 1.05; 95% CI 1.04-1.07; $p < 0.001$).

CONCLUSIONS In NSTEMI patients undergoing coronary angiography, although we observed an increasing trend in the use of FFR measurement over the last few years, the absolute utilization rates remain exceedingly low. FFR measurement during coronary angiography is associated with lower revascularization rates, lower in-hospital mortality, shorter average length of stay, but higher average hospital charges.

CATEGORIES IMAGING: FFR and Physiologic Lesion Assessment

KEYWORDS Fractional flow reserve, Non-ST elevation myocardial infarction

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Comparison of Simplified and Comprehensive Methods for Assessing the Index of Microvascular Resistance in Heart Transplant Recipients

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BACKGROUND Coronary physiologic methods like coronary flow reserve, fractional flow reserve and the index of microvascular resistance (IMR) have emerged as complementary methods to angiography and intravascular ultrasound for assessing the physiological status of