

## ASNC/JSNC JOINT SYMPOSIUM—REVIEW ARTICLE

# The Report of ASNC-JSNC Joint Symposium in JSNC 30<sup>th</sup> Annual Scientific Meeting

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**A** SNC-JSNC joint symposium has been one of the highlight sessions in JSNC annual meetings. This joint session in 30<sup>th</sup> annual meeting was held on Dec. 19<sup>th</sup>, entitled “Clinical Significance of Measurement of Flow Reserve in the Multi-modality Era” modulated by Dr. Nanasato and me.

Recently, revises in European Society of Cardiology (ESC) guideline (1) and new evidence of ISCHEMIA trial (2) may bring dramatic change in diagnostic strategy and medical care for coronary artery disease (CAD). In such revolutions, the precise evaluation of physiological coronary flow by non-invasive imaging modalities is becoming more important.

In this joint symposium, we invited four experts in coronary flow measurement by positron emission tomography (PET) imaging or computed tomography (CT) for the comprehension and future prospects of these modalities.

Firstly, Dr. Viviany R. Taqueti from Brigham and Women’s Hospital/Harvard Medical School presented with the title “Quantitative PET/CT Imaging for Diagnosis and Management of Stable Ischemic Heart Disease and Coronary Microvascular Dysfunction” as a key note lecture.

As an introduction, she explained about the novel concept of “ischemia with no obstructive coronary artery disease (INOCA)” and its prevalence (2, 3). Then, she introduced the speculation that the culprit of INOCA might be the coronary microvascular dysfunction (CMD) (4). Moreover, she described the difficulties for the diagnosis of CMD, and the importance of evaluation of coronary flow reserve (CFR) and index of microcirculatory resistance (IMR) by invasive strategy, or CFR by PET imaging (4). She also introduced several reports showing that impaired CFR was association

with cardiovascular disease risks (5,6), and CFR might modify the effect of early revascularization (6). She also raised the problem that there is no effective treatment that specifically targets CMD, despite the development of the comprehension of disease concept and diagnostic strategy. Finally, she summarized her lecture as follows: 1. Focus on obstructive CAD is no longer adequate, 2. Effective diagnostic testing needs to identify patients (pts) at high risk without over-testing those at low risk, 3. Diagnostic clarification of CMD may help to avoid costly/unnecessary additional testing, and better define disease to develop evidence-based management.

Secondary, Dr. Hiroaki Takashima from Aichi Medical University presented about the usefulness and current status of FFR<sub>ct</sub> provided by HeartFlow, Inc. with the title “Clinical utility of FFR<sub>ct</sub> in daily practice.”

He introduced several new evidences of FFR<sub>ct</sub> as follows: 1. Good correlation to invasive FFR (DISCOVER-FLOW) (7), 2. Significant better diagnostic accuracy compared to coronary CT angiography alone (NXT) (8), 3. The improvement of detecting rate of obstructive CAD in pts underwent invasive coronary angiography (CAG) compared to conventional strategy. Moreover, the prognosis in pts of CAG defer group was not deteriorated, and medical cost could be cut effectively than conventional strategy (PLATFORM) (9), 4. The therapeutic strategy in 63% of chronic coronary syndrome patients were changed after the evaluation of FFR<sub>ct</sub> (ADVANCE Registry) (10). Moreover, he introduced novel function of “PCI planner” in FFR<sub>ct</sub>. This function could predict virtually about the improvement of FFR<sub>ct</sub> after PCI, compared to pre-PCI state. Finally, he raised the issues such as

the adequate cutoff value of FFR<sub>ct</sub>, proper use guidelines of FFR<sub>ct</sub>, and precautions for indication of health insurance.

Third, Dr. Sadako Tanizawa from Fujita Health University presented about the novel method of CT-FFR developed by collaboration with Cannon Medical Systems Corporation with the title “Potential of CT-FFR.”

Firstly, she explained about the novel methodology of “fluid structure interaction” algorithm in CT-FFR, which was different from that of FFR<sub>ct</sub>, and advantages and disadvantages between FFR<sub>ct</sub> and CT-FFR. For example, 1. CT-FFR was able to analyze with on-site workstation, however, it needed data acquired by 320 slice CT (11), 2. Diagnostic performance of CT-FFR was similar to FFR<sub>ct</sub> (11,12), and better than CT-CAG and myocardial perfusion imaging (MPI). Moreover, she introduced the usefulness of combined assessment with CT-FFR and CT perfusion (13). Advantage of this strategy was the simultaneous assessment of both anatomical stenosis and physiological flow limitation, which were important for comprehensive assessment of CAD.

Finally, Dr. Masanao Naya from Hokkaido University lectured about the clinical impact of CFR by PET imaging with the title “Effects of Coronary Revascularization on CFR.”

He firstly focused on the pathology of CMD, and described the importance of quantitative assessment of myocardial blood flow (MBF) for evaluation of CMD. He also introduced the useful cases with CMD for PET MPI, such as “symptomatic pts with diabetes mellitus (DM) and normal single photon emission computed tomography (SPECT)”, “symptomatic pts of postmenopausal state with normal SPECT or negative/positive exercise tolerance test (ETT),” and so on. Then, he explained the novel concept of “coronary flow capacity” which could be better alternative to CFR, and its usefulness for prediction of event rate reduction in pts with revascularization (14). In addition, he introduced several studies as follows: 1. pts with CFR less than 1.8 showed poor prognosis and they could be better candidates for revascularization (15), 2. Coronary revascularization ameliorated reduced CFR in pts with obstructive CAD (16), 3. Coronary revascularization improved the regional stress MBF and CFR in pts with stable CAD (17).

In discussion after four presentations, moderators asked the opinions to the panelists about the better cases for functional analysis first, and the feasibility of FFR<sub>ct</sub>/CT-FFR for the evaluation of Multi-vessel disease. Dr. Naya recommended several better cases for functional analysis first, such as postmenopausal women, DM pts, and elderly pts with mild ischemia. Dr. Takashima and Dr. Tanizawa described about the limitations of FFR<sub>ct</sub>/CT-FFR for CMD evaluation, and

necessity of the combination with CT perfusion or PET imaging.

Although this symposium was very thought-provoking and valuable for the comprehension of CAD, it was unfortunate that we could not discuss face-to-face with the audience, since this session was broadcast on web.

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## Conflicts of interest

None.

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