JSNC AWARD

Recent Research Topics from the Japanese Society of Nuclear Cardiology Young Investigator Award Session

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Abstract

Each year, the Japanese Society of Nuclear Cardiology (JSNC) annual scientific meeting holds a young investigator competition (YIA) session. Until 2013, each candidate under the age of 40 submitted their published work prior to the meeting and the top 3 candidates presented their work at the YIA session. Although the previous format provided excellent data to the audiences, the presented data was actually a number of years old by the time it was presented. Therefore, last year, the JSNC executive committee changed the format of YIA. From the abstracts submitted to the JSNC annual meeting, the top 3 by candidates under the age of 40 were selected to be considered for YIA. The 3 YIA candidates made a presentation at the YIA session. The 3 abstracts included the latest findings in nuclear cardiology on topics including cardiac sarcoidosis, risk stratification, and CT myocardial perfusion.

Keywords: Award, Japanese Society of Nuclear Cardiology, Myocardial perfusion imaging, Sarcoidosis

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The Japanese Society of Nuclear Cardiology (JSNC) has given Young Investigator Awards (YIA) to researchers under age 40 since 2000 to promote nuclear cardiology research activities among young physicians. In the earlier format, candidates submitted their published work to the JSNC selection committee and the top 3 candidates made a presentation at the YIA competition session. Participants had performed highly sophisticated research. For example, among 3 candidates who were selected, 2 had had their work published in Circulation (1,2). However, the published work was already somewhat out of date. Bearing that in mind, in 2014 the JSNC executive committee changed the YIA selection format so that the top 3 of all abstracts submitted for the JSNC society meeting were selected for YIA candidacy. Under the modified format, participants can learn about the newest research topics in a timely manner, in line with the aims of a scientific meeting. Under this new selection format, the chances for JSNC members under the age of 40 to be awarded a YIA prize are also increased. In this review, we will report on the latest research topics from the 2014 JSNC YIA session.

Latest research topics in nuclear cardiology and cardiac imaging

The presence of cardiac sarcoidosis (CS) increases the risk of cardiovascular events including conduction abnormalities, ventricular arrhythmia and heart failure in patients with sarcoidosis (3,4). Recently the Heart Rhythm Society (HRS) issued a consensus regarding the detection of CS and discussing the importance of CS in patients with conduction abnormalities or rhythm abnormalities (5). The report indicated that ^{18}F-

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fluorodeoxyglucose（FDG）positron emission tomography（PET）is an important diagnostic modality in the diagnosis of CS, and the JSNC issued ^{18}F-FDG PET imaging guidelines for the detection of CS（6）. Research on how to detect cardiac involvement is therefore important for the management of sarcoidosis. Dr. Shohei Kataoka, a cardiologist at Tokyo Women's Medical University, and his colleagues evaluated characteristics of cardiac lesions in 15 patients with CS using rest ^{201}thallium（Tl）myocardial perfusion imaging, rest ^{123}I-beta-methyl-p-iodophenyl-pentadecanoic acid（BMIPP）myocardial fatty acid imaging, ^{18}F-FDG PET, and cardiac magnetic resonance imaging（CMR）. Based on the CMR findings, myocardial regions were classified into 3 categories: no myocardial fibrosis, partial fibrosis, and all-layer fibrosis. ^{123}I-BMIPP defects and ^{201}Tl defects increased in relation to the severity of myocardial fibrosis. Importantly, ^{123}I-BMIPP defects were larger than ^{201}Tl defects, a finding that possibly means ^{123}I-BMIPP, already used in the detection of ischemic heart disease, could also be used in the detection of early cardiac damage in patients with CS（7）. The amount of ^{18}F-FDG positive uptake was lower in the segments with all-layer fibrosis. This study revealed the importance of being able to image cardiac fatty acid metabolism in the detection of CS. Further investigation of this finding is necessary.

Risk stratification using stress myocardial perfusion single-photon emission computed tomography（SPECT）has been widely applied in clinical settings. A summed stress score, which includes both the size of myocardial injury and the degree of stress-induced ischemia is considered to be the most powerful parameter of cardiovascular event risk measurement（8,9）. The COURAGE trial nuclear sub-study showed that a reduction in ischemic burden as assessed by a summed difference score（SDS）was associated with improved patient prognosis（10）. In particular, a reduction in ischemic burden of more than 5% contributed to a decrease in the number of patients who had hard cardiac events including cardiac death and non-fatal myocardial infarction. Recently, Yusuke Hori, a cardiologist at Nihon University, and his colleague documented the relationship between ischemic burden reduction and patient prognosis including cardiac death, non-fatal myocardial infarction and unstable angina after coronary artery revascularization in the Japanese population（11）. They found that there was a significantly greater reduction in ischemic burden in the coronary intervention group than in the medically treated group. Of 513 patients who were followed up on, 45 had hard cardiac events. Multi-variate analysis showed that a reduction in ischemic burden of more than 5% following revascularization contributed to an improvement in a patient's prognosis. As well, LV ejection fraction was a significant predictor of hard cardiac events. This manuscript emphasized the importance of physiological assessment in cases of coronary revascularization.

Myocardial blood flow（MBF）quantification has been developed primarily using PET（12）. PET MBF quantification is considered to be accurate. However, accessibility to cardiac PET is limited in clinical settings. Therefore, alternative approaches to MBF quantification are required. Yasuka Kikuchi, a diagnostic radiologist at Hokkaido University, and her colleague developed a method of MBF quantification using 320 multi-slice computed tomography（CT）（13）. Based on their previous work, the authors aimed to further develop MBF measurements using multi-slice CT. In the current study, the authors evaluated regional MBF in regions such as left anterior descending（LAD）territory, right coronary artery（RCA）territory, and left circumflex（LCX）territory using a single-tissue compartment model（14）. Rest and hyperemic MBF were correlated with MBF measured by ^{15}O-labeled water PET, which was considered to be the gold standard（15）. The data may imply that CT MBF quantification may be suitable for the analysis of regional MBF.

Conclusions

Topics under consideration in the JSNC YIA competition included cardiac sarcoidosis, risk assessment using myocardial perfusion imaging, and CT myocardial perfusion. These 3 presentations reflected current research topics. The next YIA session will be expected to provide JSNC members with information on the latest significant research topics.

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