PREDICTIVE POTENTIALS OF DISTAL EMBOLISM DURING PERCUTANEOUS CORONARY INTERVENTION (PCI) BY INTRAVASCULAR ULTRASOUND (IVUS) AND MULTI DETECTOR COMPUTED TOMOGRAPHY (MDCT)

ACC Moderated Poster Contributions
McCormick Place South, Hall A
Saturday, March 24, 2012, 9:30 a.m.-10:30 a.m.

Session Title: Imaging - CT - Plaque Imaging
Abstract Category: 24. Imaging: CT
Presentation Number: 1115-527

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Background: Distal embolism (DE) during PCI sometimes induces myocardial infarction or hemodynamic compromise. It tends to occur in lipid rich plaque and reported to be predicted by attenuated plaque in IVUS (IVUS-AP). However, this IVUS evaluation has many pseudo positive predictions. MDCT has potential of non-invasive plaque histological diagnosis. Plaque with low CT density is reported as low attenuated plaque (LAP) which contains much lipid component. We investigated predictive potential of DE during PCI of stable CAD patients by MDCT in addition to IVUS in this study.

Methods: We studied consecutive 1000 lesions of 723 patients which underwent MDCT examination with GE VCT (64-slice) and IVUS guided PCI with stent between May 2007 and January 2011. ACS, CTO, Rotablator use and unacceptable CT image cases were excluded. DE was defined as slow flow phenomenon with ST segment elevation or chest pain after stent deployment. CT image was analyzed by ziostation (Ziosoft Inc.) with “thin slab MIP method” and MPR image. CT density was evaluated by vessel cross sectional image with “color map method”. “Color map method” is to superimpose color area classified depend on CT density to gray scale CT image. We defined the plaque which contain less than 0HU area as very low attenuated plaque (v-LAP). All lesions were confirmed IVUS-AP before stenting. IVUS-AP was defined as plaque which vessel wall is invisible because of echo attenuation in spite of no major calcification.

Results: 22 lesion (2.2%) had DE during PCI in this population. 146 lesions (14.6%) had v-LAP, 130 lesions (13.0%) had IVUS-AP and 61 lesions (6.1%) had both of these two findings. Positive predictive value (PPV) / negative predictive value (NPV) of DE by v-LAP and IVUS-AP were 13.0% / 99.8% and 13.0% / 99.6%, respectively. v-LAP and IVUS-AP dual positive 61 lesions and other 939 had DE in 19 (31.1%) and 3 (0.3%), respectively. Dual evaluation by v-LAP and IVUS-AP improved PPV without impairing of NPV.

Conclusions: v-LAP and IVUS-AP had similar predictive performance of DE during PCI and their negative prediction was very good and positive prediction was not so good. Dual evaluation by MDCT and IVUS had more accurate predictive performance.