Reviewer's report

Title: Comparison between integrated backscatter intravascular ultrasound and 64-slice multi-detector row computed tomography for tissue characterization and volumetric assessment of coronary plaques

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Reviewer: Atsushi Tanaka

Reviewer's report:

Yamaki et al. reported an interesting paper that investigated the feasibility of MDCT assessment for plaque characteristics using a sophisticated IVUS technique. The result of this manuscript potentially has a good clinical implication. However, there are several issues that should be resolved.

Major

1. First of all, the text is redundant. For example, the second paragraph of discussion, sub-headed “comparison between….” seems not to expand nor enhance the results of this manuscript.

2. This reviewer was unable to understand the meaning of the conclusions. This reviewer thinks that the term of useful should not be used for the device with limited ability. The author should revise the conclusions.

3. Although the author clearly stated that the ability of MDCT for volumetric assessment of lipid pool was slightly limited, they also insisted that it might be useful for clinical risk assessment. This reviewer can’t understand this logic.

4. Human atherosclerotic plaque often contains complex components. This reviewer would like to know the results for calcium and mixed components assigned by IB-IVUS. Please add them.

5. The ROI sizing and shape strongly affect the results. The spatial resolution of X-ray is around 0.5mm in the air. The MDCT data was reconstructed with approximately 0.5mm increment from the 0.0625 mm thickness slice data using the half reconstruction technique. Considering these physical conditions, the size of ROI for MDCT image might be reasonable. However, this reviewer thinks that the rectangular shape with 0.5 x0.5mm size might be too large for picking up the homogenous plaque components in usual human plaque. Please mention this.

6. IB-IVUS technique used in this study can’t discriminate between lipid pool and necrotic core. Therefore, it might be difficult to compare the result of this study with the previous studies using histology.

7. The author should mention that IVUS and MDCT calculate the intima plus media area.

8. Page 12, line 6 and Page 14, line 9. With respect to the cut off HU for lipid and TCFA, a gray scale-IVUS paper (Tanaka A, 2008, Circ J) has been reported the mean HU of ruptured plaque as 46.8 that is quite similar number of 50 from this
study. The same group has also reported the mean HU value of thin-cap fibroatheroma as 35.1 (Kashiwagi M. JACC img. 2009) that is very similar number of high risk plaque for future events by Motoyama. These data would help the author to discuss and enhance their observations.

Minor
1. Page 3, the first paragraph. Please delete or rewrite this paragraph.
2. Page 4, line 2, In those… Please delete this sentence.
3. Page 4, line 6. Value should be read as IVUS.
4. Page 5, line 18, During PCI… Please delete “During PCI”.
5. Page 6, line 4, The reliability… Please delete this sentence or move this to the introduction.
6. Page 6, line 12, This method was… Please delete this sentence.
7. Page 9, line 2. Please delete the term of “most reliable”.
8. Page 10, the 2nd paragraph. Please delete this paragraph.
9. Page 12, line 2, Lipid pool is generally… Please cite the reference. Otherwise the author should delete this section.
10. Page 14, Third,… This reviewer can’t understand the context of this paragraph.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

None