Journal of Cardiovascular Magnetic Resonance

Poster presentation

Open Access

Identification and classification the coronary artery plaque with MRI coronary wall imaging - A Comparative Study Using 64-MDCT

Yi He*[1], Zhaoqi Zhang[1], Qinyi Dai[1], Wei Yu[1], Biao Lu[1], Zhanming Fan[1], Jing An[2], Lixin Jin[3], Renate Jerecic[4], Guobin Li[2], Wolfgang Rehwald[5], Meng Li[1] and Ning Li[1]

Address: [1]Anzhen Hospital, Capital Medical University, Beijing, PR China, [2]Siemens Mindit Magnetic Resonance Ltd, Shenzhen, GuangDong, PR China, [3]collaboration team Siemens Ltd, shang hai, PR China, [4]Siemens Ltd, Healthcare - Magnetic Resonance, shang hai, PR China and [5]Siemens Healthcare USA, Chicago, IL, USA

* Corresponding author

from 13th Annual SCMR Scientific Sessions
Phoenix, AZ, USA. 21-24 January 2010

Published: 21 January 2010

Journal of Cardiovascular Magnetic Resonance 2010, **12**(Suppl 1):P44 doi:10.1186/1532-429X-12-S1-P44

This abstract is available from: http://jcmr-online.com/content/12/S1/P44

© 2010 He et al; licensee BioMed Central Ltd.

Background

Several studies indicated(1) that high-resolution black blood coronary arterial wall MRI has the potential to assess coronary artery wall thickness, non-invasively and measure plaque burden. But a systematical evaluation of coronary plaque components and morphology by MRI has not been done so far.

Purpose

To evaluate the ability of black-blood coronary arterial wall MRI to identify and classify coronary artery plaque, using 64-MDCT as reference standard.

Methods

13 patients(mean age 56.2 ± 11.8 years, 9 men) with confirmed coronary artery disease by coronary CTA (64-MDCT) underwent black-blood coronary wall MRI within 10 days. All scans were performed on a 1.5 T scanner (MAGNETOM Sonata, Siemens, Germany). Cross-sectional coronary wall imaging was acquired using a 2D double-inversion-recovery, ECG-triggered, navigator-gated, fat-suppressed, Turbo-Spin-Echo sequence (TSE) sequence [2] on the lesion coronary artery from the ostium to the middle segment continuously without gap. The vessel cross-sectional area (CSA), luminal CSA, maximal wall thickness, plaque burden, CNR (SI vessel wall - SI perivascular area/SD noise) and SNR (SI vessel wall/SD noise) were measured in each slice which were then com-

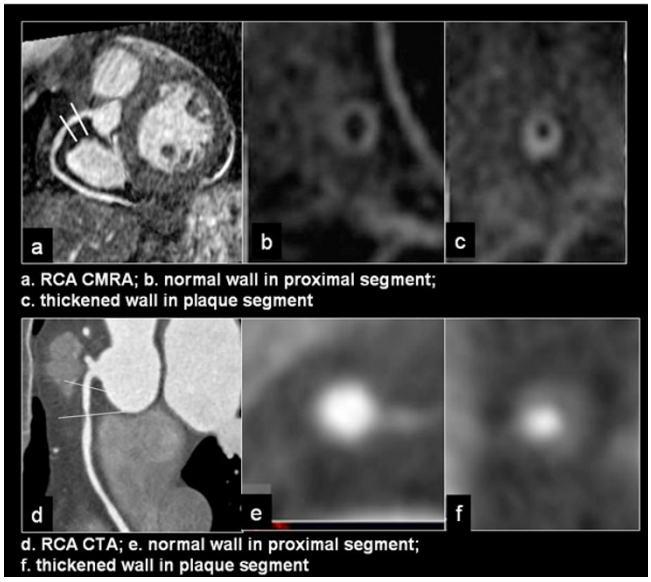

Figure 1

pared with the CTA images. CTA were divided into 5-mm segments to compared side by side with MRI.

Results

11 coronary arteries, 62 slices from 10 patients were imaged and analyzed by both MRI and contrast-enhanced 64-MDCT. 3 patients were ruled out (2 due to poor MR image quality, one due to claustrophobia). 39/62 slices were found plaques on both CTA and MRI; those 39 plaques were classified as 3 groups: 10 were calcified plaques, 19 were soft plaques and 10 were mixed plaques by CTA. In MRI, the plaque burden, maximal wall thickness, SNR, CNR in the coronary wall containing plaque were greater compared to the normal coronary wall (0.82 ± 0.08 vs 0.74 ± 0.08, 1.90 ± 0.91 vs 1.54 ± 0.26 mm, 13.10 ± 2.80 vs 10.08 ± 2.46, 6.81 ± 2.52 vs 3.82 ± 1.63 respectively, $p < 0.05$). The luminal CSA was smaller compared to normal coronary wall (2.56 ± 1.59 mm^2 vs 4.48 ± 2.35 mm^2, $p < 0.05$). The SNR in soft plaque was significantly higher than in calcified plaque and mixed plaque ($p < 0.05$). There was no significant difference in CNR of different plaque types Figure 1.

Conclusion

Coronary wall MRI can identify coronary plaque in proximal segments, and also has the potential to differentiate different types of plaques.

References

1. Miao C, *et al.*: *JACC* 2009, **53:**1708-1715.
2. Shea S, *et al.*: *Proc ISMRM* 2007, **15:**2475.

Publish with **BioMed Central** and every scientist can read your work free of charge

"BioMed Central will be the most significant development for disseminating the results of biomedical research in our lifetime."

Sir Paul Nurse, Cancer Research UK

Your research papers will be:

- available free of charge to the entire biomedical community
- peer reviewed and published immediately upon acceptance
- cited in PubMed and archived on PubMed Central
- yours — you keep the copyright

Submit your manuscript here:
http://www.biomedcentral.com/info/publishing_adv.asp

BioMedcentral