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**TITLE**

3D ultrasound measurement of carotid plaque volume: can compound imaging improve measurement reliability?

**AUTHORS**

[1]**Ying M**, [2]Zheng YP

[1]Department of Health Technology and Informatics and [2]Interdisciplinary Division of Biomedical Engineering, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong SAR, China

**ABSTRACT** (max 300 words)

**BACKGROUND:** Carotid plaque volume is a useful marker in predicting cardiovascular events, and it can be measured using three-dimensional ultrasound (3DUS). This study aimed to assess the intra-observer repeatability of 3DUS with and without compound imaging in carotid plaque volume measurement.

**SUMMARY OF WORK:** A total of 15 type 2 diabetes patients with at least one carotid plaque were recruited. Each patient had a carotid ultrasound examination and 3DUS was performed on the largest carotid plaque of the patient. 3DUS was performed using a free-hand technique with a 3D add-on system in conjunction with a commercially available ultrasound unit. For each patient, 3DUS of the carotid plaque was performed twice in the same ultrasound session: with and without compound imaging. After the ultrasound examination, archived 3DUS data of the patient was reviewed and the carotid plaque volume was measured. To evaluate intra-observer repeatability without recall bias, measurement was performed twice with a time interval of 3 days. All measurements were performed by the same operator. The operator was blinded to the result of the first measurement when performed the second measurement.

**SUMMARY OF RESULTS:** Result showed that 3DUS with compound imaging provided better delineation of the boundaries of the carotid plaque for volume measurement. In carotid plaque volume measurements, 3DUS with compound imaging (89.6%) had higher intra-observer repeatability than 3DUS without compound imaging (49.3%).

**DISCUSSION AND CONCLUSIONS:** To conclude, 3DUS with compound imaging has high intra-observer repeatability in carotid plaque volume measurement, and has potential for assessing atherosclerotic burden.

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