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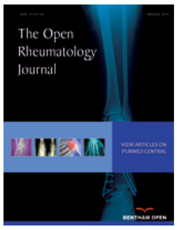


# Carotid Artery Atherosclerosis in Patients with Active Rheumatoid Arthritis: Predictors of Plaque Occurrence and Progression Over 24 Weeks

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## CAROTID ULTRASOUND MEASUREMENTS

On longitudinal views of the common carotid artery using B-mode ultrasound, the subject was scanned to visualize all plaques. For each and every plaque, the US probe was manipulated in order to visualize the largest extent of each single plaque; this image was used for each plaque to segment the local intimal thickening and the area was immediately calculated by the microprocessor on the scanner. VWV measurements in all 3D US images acquired from the left and right carotids were quantified using 3D Quantify Software (REF) as previously described (REF). Briefly, the VWV was calculated using the trapezoidal rule and the average area enclosed by two sequential contours multiplied by the inter-slice distance to generate the volume between the two adjacent slices. The inter-slice volumes were summed to determine the total volume of each contour. VWV was calculated by subtracting the volume enclosed by the lumen contours from the volume enclosed by the vessel contours.

Pulse wave velocity (PWV) was also acquired within 10 minutes of 3DUS to obtain a measure of arterial stiffness between two locations in the arterial tree [7]. Aortic (central) arterial stiffness was assessed with carotid-femoral PWV using tonometry (SphygmoCor, Atcor Medical, Sydney, Australia). This non-invasive device utilized a 10-second snapshot of the radial arterial pressure wave and derived the ascending aortic pressure wave. Approximately 8 to 10 consecutive cycles were recorded for each analysis and two compliant readings were reported. The aortic pressure waveform was derived from the radial artery pulse wave using a validated transfer function.

Carotid IMT was defined as the distance between the leading edge of the lumen-intima echo and the leading edge of the media-adventitia echo. Both left and right carotid arteries were examined at the levels of the common carotid artery, carotid bifurcation and internal carotid artery. Ultrasound images was acquired from an anterolateral longitudinal view and saved to S-VHS tapes. The resultant digitized ultrasound images, captured at end-diastole, were analyzed using Prowin (Selzer and Hodis REF) edge-detection software. Two to six points were placed manually on each of the lumen-intima and media-adventitia boundaries on the far wall of the artery using a mouse driven cross-haired cursor. The software algorithm functions by deleting weak edge points and filling boundary gaps by linear interpolation. Mean IMT was then computed from 80 to 120 measurements over a 10-mm span ending 5mm proximal to the transition between the common carotid and bulb regions. Patients with IMT $< 0.6$ mm were considered to have no atherosclerosis, whereas the presence of atherosclerosis was defined as IMT $\geq 0.6$ mm.