

The Estimation of Aortic Atheromas by TEE: Do 3D Images Better Estimate Atheromas' Size?

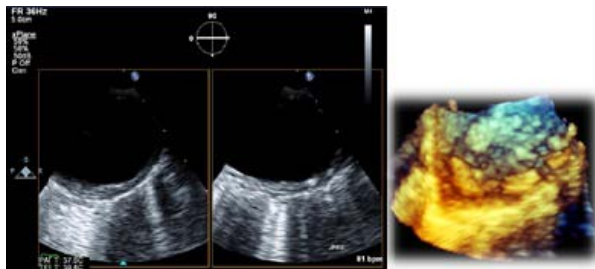
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Background: Aortic atherosclerotic plaques (AAP) with complex configuration (i.e. thick, protruding, mobile and/or ulcerated), bear significant risk of embolism. With the increasing popularity of percutaneous cardiac interventions using bulky devices (e.g., TAVI), an accurate pre-procedure evaluation of the AAP burden may predict complications and affect the selection of vascular access. TEE can detect AAP of the thoracic aorta. We hypothesized that 2D TEE images underestimate AAPs' size compared to 3D images.

Methods: The study included 15 patients (age 76 ± 12 years, 9 females), who had routine TEE studies, using the Phillips IE33 3D-imaging platform, at our institute during 2011. The thoracic aorta was studied from arch to distal descending part, using the x-plane mode (simultaneous short and long axis views). If focal intimal thickening (suggestive of AAP) detected, the 3D zoom algorithm was exercised on the specific site with further post processing on a Q-lab workstation to measure its thickness and length in the X,Y and Z planes. The AAPs contour was defined qualitatively as regular or irregular (i.e. anything but flat) in each mode.

Results: A total of 22 AAPs were investigated. The AAP thickness estimation was significantly greater in the 3D mode than in 2D (Table1). No difference in AAP length was found between the two modes. The rate of irregular AAPs was significantly greater when evaluated in the 3D mode (77.3% in 3D vs. 14% in 2D, $p < 0.001$) (Figure 1). The difference in AAP thickness between x- and y-planes (Table 1) supports the qualitative estimation of AAP irregularity.



	2D measurements	3D planes	3D measurements	p value (2D vs. 3D)
AAP thickness, median (mm) (IQR 25th; 75th percentile)	0.2 (0.2;0.3)	x-plane	0.24 (0.18;0.33)	0.005
AAP thickness, median (mm) (IQR 25th; 75th percentile)	0.2 (0.2;0.3)	y-plane	0.28 (0.22;0.4)	0.01
p value (x- vs.y-plane)			0.02	