Diagnostic value of cardiac computed tomographic angiography in suspected prosthetic valve dysfunction

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Objectives: Determine the incremental diagnostic value of cardiac computed tomographic angiography (CTA) over transesophageal echocardiography (TEE) in patients with suspected prosthetic valve dysfunction (PVD) and its impact on treatment decisions.

Methods: 50 consecutive patients with suspected PVD underwent both 64-slice ECG-gated CT and TEE and the results were compared. Imaging was compared against surgical findings (Reference standard).

Results: ECG-gated CT showed findings that were not detected by TEE in fifteen patients (30%). Additional aortic root abscess in four patients (8%), additional aortic root pseudoaneurysm in four patients (8%), and sclero-degenerative change across one of occluder of aortic prosthesis as cause of PVL in another patient (2%) not detected by TEE. CT negated the presence of aortic root abscess in one patient (2%), negated the presence of PVL in another patient (2%) both were detected by TEE. CT diagnosed occluder malfunction in one patient (2%) and underlying cause in two patients (4%) both were not detected by TEE. CT diagnosed presence of aortic arch dissection in one patient (2%) with large aortic root pseudoaneurysm. CT showed minor diagnostic change in six patients (12%). CT showed better delineation of site and perianul extension of aortic root abscess in four patients (8%). CT showed better assessment severity of PVL in one patient (2%) and cause of PVL across mechanical aortic prosthesis in another patient (2%). CT resulted in change of treatment strategy in 14 patients (28%). This included surgical excision of additional aortic root abscess or aortic root pseudoaneurysm in four patients (8%), surgical removal of prosthesis for underlying pathology (vegetation, malfunction due to underlying thrombus or PVL) in four patients (8%), aortic arch replacement with tubular graft and reimplantation of coronaries in one patient (2%) and conservative treatment with antibiotic therapy for small aortic root abscess not detected by TEE in 2 patients (4%), proper anticoagulation therapy and close monitor of INR in one patient (2%).

Conclusion: ECG-gated CT and TEE are complementary in patients with prosthetic valve dysfunction. Therefore, CT imaging has to be considered after clinical routine workup and TEE in patients with a high suspicion on prosthetic valve dysfunction.