**CASE IMAGE**

Ultra-low-dose left ventricular injection-guided computed tomographic angiography prior to transcatheter aortic valve implantation: A novel technique for imaging

Transkateter aort kapak değişimi öncesi sol ventrikül enjeksiyonu ile çok düşük doz kontrast kullanılarak bilgisayarlı tomografik anjiyografik görüntüleme: Görüntüleme için yeni bir teknik

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Transcatheter aortic valve implantation (TAVI) has evolved as a novel procedure for the treatment of severe aortic stenosis. Since large-diameter catheters (18-24 F) are required for TAVI procedures, procedural evaluation of the peripheral vascular pathways and precise annular sizing is crucial both for patient selection and guidance of the intervention. However, the population is frequently frail and elderly, and these patients often have a greater prevalence of peripheral artery disease. A 50 to 140 mL intravenous contrast agent is required for computed tomographic angiography (CTA), which may induce contrast-induced nephropathy, particularly when performed in patients with chronic kidney disease. An 87-year-old man with a history of coronary artery disease, dilated cardiomyopathy, end-stage renal disease (creatinine level: 2.7 mg/dL, glomerular filtration rate: 27 mL/minute), and severe aortic stenosis was scheduled for TAVI. Since he had severe end-stage renal failure, a CTA (256-slice CT scanner, Brilliance iCT; Koninklijke Philips N.V., Amsterdam, The Netherlands) with left ventricular injection was performed prior to the TAVI procedure. The 256-slice CTA was conducted according to the following parameters: 128×2×0.625 mm collimation, 270 ms rotation ext, pitch of 0.16, tube voltage 120 kVp, and effective tube current-time product (normalized to pitch) 800–1000 mAs, scanning delay 1-2 seconds 15 m. Contrast (iohexol 350 mg I/50 mL; Omnipaque, GE Healthcare, Chicago, IL, USA) diluted in 15 mL saline was injected at 10 mL/second through a power injector with the pressure limit set at 300 psi via a 6-F marker pigtail catheter inserted into the left ventricle from a left radial approach and the administration of 5000 U heparin to prevent thrombosis. Accurate CT images that excluded extrasystoles were obtained to determine a precise measurement of annular diameters and peripheral access pathways (Fig. A–D). Opaque nephropathy was not observed after the procedure (creatinine level on second day 3.01 mg/dL with a GFR of 20 mL/minute). Although intra-arterial injection in the infra-abdominal aorta for iliofemoral imaging has been performed for CT angiography, there is no reported case of left ventricular CT angiography, to the best of our knowledge. Initial practice guidelines suggested transesophageal echocardiography (TEE) for preoperative sizing; however, recent studies have indicated that TEE frequently underestimates annular size, leading to paravalvular leak or device migration. Therefore, CTA is the current standard for noninvasive assessment for annular measurement. The technique may be time-consuming, and includes a risk for embolism, extrasystole, and increased pulmonary edema in cases of severe diastolic and systolic dysfunction, and may yield poor image quality due to inadequate catheter position; however, left ventricular CTA preceding TAVI offers the opportunity for a dramatic reduction in contrast volume, which is associated with higher mortality and morbidity risk in the frail and elderly population.
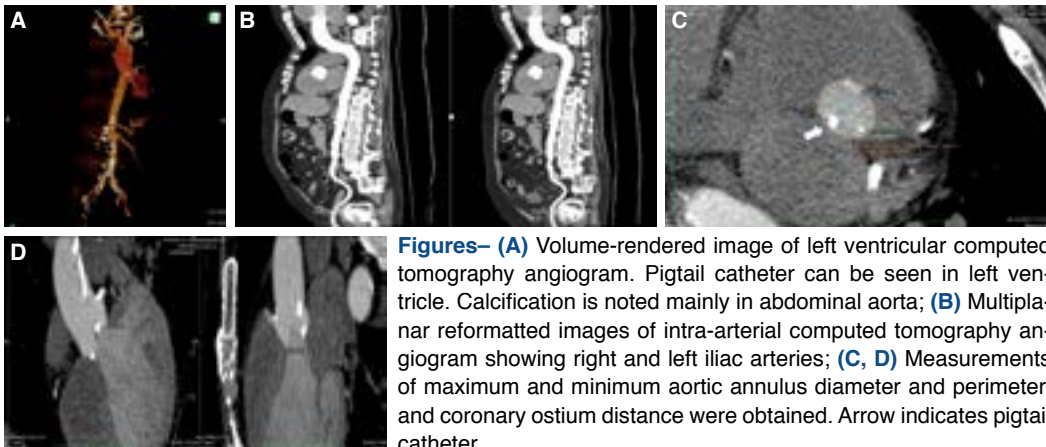
Figures– (A) Volume-rendered image of left ventricular computed tomography angiogram. Pigtail catheter can be seen in left ventricle. Calcification is noted mainly in abdominal aorta; **(B)** Multiplanar reformatted images of intra-arterial computed tomography angiogram showing right and left iliac arteries; **(C, D)** Measurements of maximum and minimum aortic annulus diameter and perimeter, and coronary ostium distance were obtained. Arrow indicates pigtail catheter.