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CASE REPORT

Incidental Computed Tomography Angiography Finding of a Delayed Asymptomatic Ascending Aortic Dissection after Transcatheter Aortic Value Implantation: a Case Report

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INTRODUCTION

Transcatheter aortic valve implantation (TAVI), also referred to as transcatheter aortic valve replacement, is suitable for patients with severe symptomatic aortic stenosis who are not eligible for surgical aortic valve replacement due to high surgical risk. More recent clinical trials have determined that TAVI is also indicated in intermediate-risk patients and could be a potential therapeutic choice in low-risk patients.[1,2] The transfemoral approach remains the preferred access route. Vascular complications account for 2% to 17% of all adverse events and ascending aortic dissection (AAD) is reported in only 0.2% to 0.3% of patients.[3] We present a case of asymptomatic AAD in a patient who underwent TAVI in 2020.

CASE REPORT

Patient Information and Clinical Findings

An asymptomatic 84-year-old woman presented to our hospital for a routine cardiological check-up to evaluate the possibility of transcatheter tricuspid valve repair with TriClip system (Abbott Structural Heart, Santa Clara [CA], United States). On presentation she was afebrile with blood pressure 150/80 mmHg, pulse 75 beats per minute and oxygen saturation 90% with oxygen support (2 L/min). She was alert and oriented to time, place, and person. Her medical history was significant for hypertension, severe aortic stenosis with a planimetric aortic valve area of 0.8 cm^2, chronic atrial fibrillation, chronic obstructive pulmonary disease, and osteoporosis. Her surgical history revealed previous hysteroannessiectomy for uterine fibroids and conservative surgery and irradiation (quadrantectomy, axillary dissection, and radiotherapy) for left-sided breast cancer.

She had undergone TAVI in 2020 (aortogram not available in our local picture archiving and

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communication system) with a CoreValve prosthetic aortic valve (Medtronic, Minneapolis [MN], United States), as well as invasive assessment of the coronary tree that revealed non-significant stenosis. No immediate complications following TAVI were reported. A voluminous iatrogenic active bleeding haematoma at the right access site developed 10 days after the procedure; unfortunately, computed tomography (CT) performed during the management of this complication did not include review of the prosthetic valve. As a result, it became necessary to admit her to our Interventional Radiology Unit. A superselective angiogram of two distal branches of the right deep femoral artery directed towards the haematoma was performed via a 2.8-French Progreat microcatheter (Terumo Medical Corporation, Japan) and embolisation was successful with 500-μm Embozene microspheres (CeloNova Biosciences, Newnan [GA], United States). She was discharged from hospital with no further complications until the current admission (Table).

Diagnostic Assessment and Therapeutic Intervention

Transoesophageal echocardiography surprisingly showed an ascending aortic aneurysm with an intimal flap. The explorable descending aorta was intact and no significant pericardial effusion was depicted. The prosthetic aortic valve was in situ and a mild anterior paravalvular leak was demonstrated. Collateral findings included left ventricular hypertrophy with normal global systolic function (ejection fraction: 58%), moderate mitral regurgitation, severe tricuspid regurgitation (end-diastolic tricuspid valve annulus 46 mm in 4-chamber view) and consequent severe left and, mostly, right atrial dilatation. At the end of the examination a rapid electrocardiogram was performed and highlighted the known atrial fibrillation, left anterior fascicular block and a pulse rate of 80 beats per minute. No significant difference in blood pressure was recorded (155/85 mmHg). The patient was instantly escorted to the emergency department. A retrospective electrocardiogram-gated thoracoabdominal CT angiography performed on a Brilliance 64-slice scanner (Philips, The Netherlands) confirmed the presence of intimal flap originating from the anterolateral wall of the ascending aorta, immediately distal to the rim of the prosthetic valve and extending up to the proximal tract of the aortic arch (Figure). Coronary arteries and epiaortic vessels were not involved. No direct or indirect sign of aortic rupture was evident and low attenuation near water density effusion was assessed in the pericardial recesses. Mean ascending aortic and true lumen diameters were 58 mm and 20 mm, respectively. The patient was hospitalised but only conservative treatment was indicated since she was at high surgical risk and had no symptoms.

Follow-up and Outcomes

The patient remained haemodynamically stable on medical therapy and was discharged from hospital after 1 week with no apparent deficits. The follow-up plan for this patient included close monitoring through echocardiography that consistently demonstrated a haemodynamically stable condition. One-month follow-up of true and false lumen dimensions and of the extension of the intimal flap demonstrated no change. CT angiography was not advised due to the probability of kidney injury. The patient continues to be kept under surveillance through follow-up examinations and echocardiography. No alarming signs or symptoms have emerged to date.

DISCUSSION

AAD following TAVI is a rare but life-threatening complication that usually occurs during the procedure.[4] Damage to the ascending aortic wall can result from mispositioning of the prosthetic valve, guidewire and/or delivery system manipulation, and the excessive

Table. Brief clinical history of the patient.

Date	Clinical history
19 June 2020	Accepted aorto-iliac CTA for TAVI planning
25 June 2020	Underwent the TAVI procedure
7 July 2020	CTA showed sudden swelling of right thigh due to acute haematoma with active bleeding
8 July 2020	Underwent angiographic embolisation of active bleeding from deep femoral artery branches
23 December 2020	Transthoracic echocardiographic follow-up showed mild aortic periprosthetic leak with no signs of aortic dissection
18 May 2021	Transesophageal echocardiography for TriClip evaluation showed asymptomatic aortic dissection confirmed by CTA
May-June 2021	Transthoracic echocardiography follow-up showed stable aortic findings

Abbreviations: CTA = computed tomography angiography; TAVI = transcatheter aortic valve implantation.

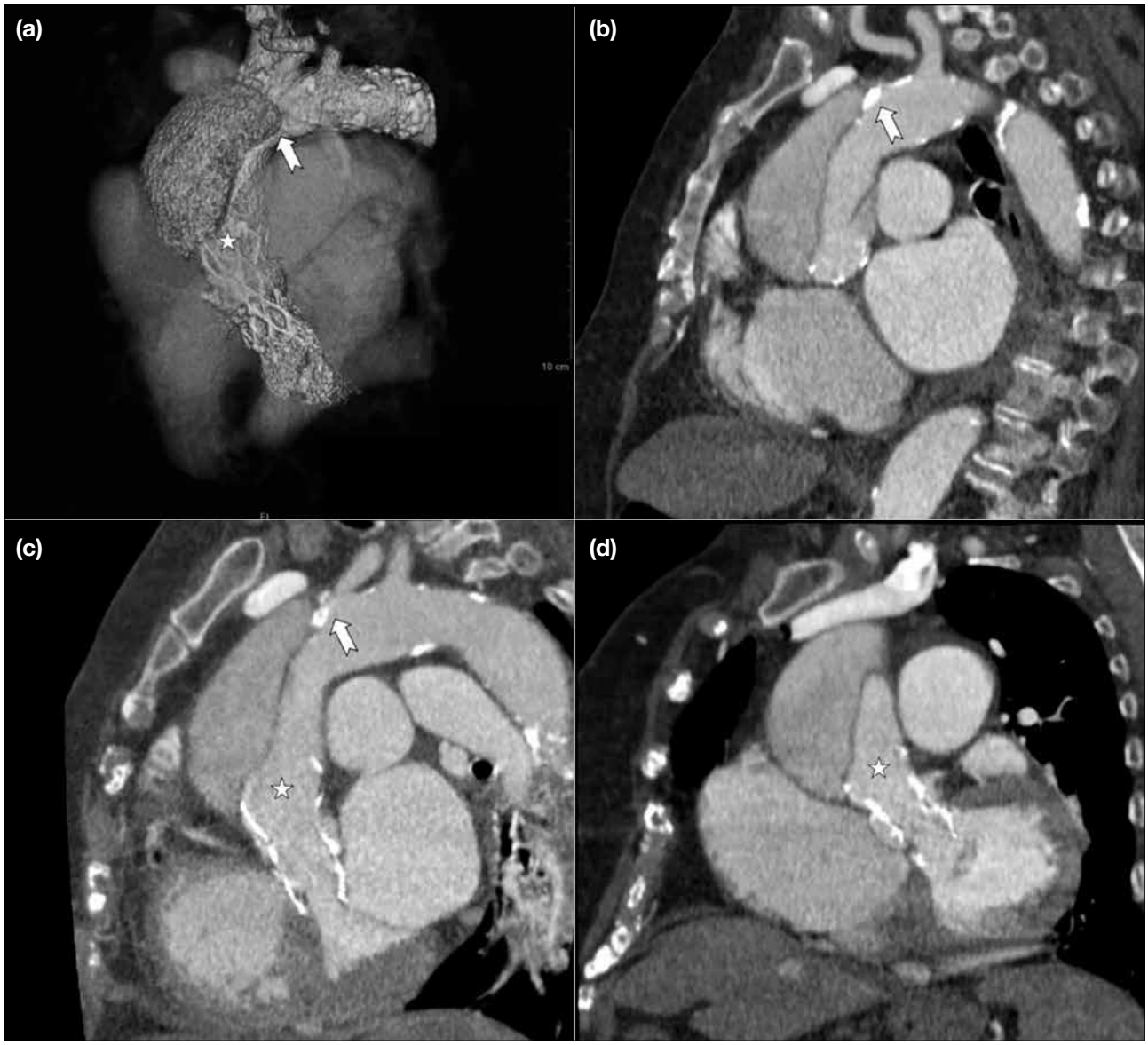

Figure. Computed tomography angiography with (a) 3D-volume rendering technique, (b and c) sagittal, and (d) coronal multiplanar reformation views showing acute ascending aortic dissection, with the extension of the intimal flap originating from the anterolateral wall of the ascending aorta, immediately distal to the edge of the prosthetic aortic valve (stars in [a, c and d]) and up to the proximal tract of the aortic arch (arrows in [a-c]).

amount of eccentric calcifications in the left ventricular outlet tract. Delayed AAD has been infrequently described as a complication of TAVI. In our case, transthoracic echocardiography performed about 6 months after TAVI revealed the prosthetic valve in situ and a mild paravalvular leak. This finding suggests that the asymptomatic AAD was more likely a delayed and unexpected complication rather than a previously missed intraoperative complication. Losmanova et al[5] reported a case of acute aortic dissection in an 81-year-old patient 3 years after TAVI, while Gerber et al[6] outlined two post-mortem examinations that determined AAD as a cause of death at 6 and 22 days following TAVI. In none of these cases was the asymptomatic presentation highlighted. In this respect, the International Registry of Acute Aortic Dissection found that 6.3% of AADs were painless.[7] Although asymptomatic presentation has been described in isolated case reports,[8,9] Imamura et al[10] showed that the true percentage of asymptomatic AAD cases was higher (17%). In these studies, patients with painless AAD were more likely to present with impaired consciousness or stroke and have a higher mortality risk

than AAD patients who experienced pain. Aoyama et al[11] compared the results of conservative (medical) and surgical treatment in an elderly population with AAD and demonstrated that although all-cause in-hospital death was significantly lower in surgical patients, there was no significant difference in event-free survival. In view of the rarity of AAD following TAVI and its mode of presentation, we believe that follow-up protocols for patients post-TAVI will not change, at least at our hospital. There is no consensus to perform routine CT angiography after TAVI.[12-14] CT can be useful to depict and evaluate hypo-attenuated leaflet thrombosis if echocardiography is suspicious. Transthoracic echocardiography is the technique of choice for evaluating the prosthetic valve, whereas CT may be appropriate for some cases.

In conclusion, AAD represents a potentially fatal condition and may be encountered more frequently with the current increase in number of TAVI procedures. A high index of suspicion should be maintained in symptomatic and asymptomatic patients.

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