## **Case Report**

# Identification and treatment of asymptomatic central venous catheter thrombosis after TAVI

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### Abstract

One of the most serious complications of central venous catheterisation is thrombus, particularly asymptomatic thrombus. If not recognised and promptly treated, it can result in pulmonary emboli. Here, we describe transcatheter aortic valve implantation performed in a 77-year-old female patient with the insertion of a central venous catheter into the right internal jugular vein as part of the procedure. The patient experienced no associated discomfort and received standard antiplatelet and antibiotic treatment. Given that the catheterisation procedure was unsuccessful on the first attempt, an ultrasonographic examination of the blood vessel was performed in order to prepare for extubation of the patient. A thrombus was identified, which was resolved with low-molecular-weight heparin anticoagulation therapy. The patient experienced no complications with removal of the central venous catheter.

Keywords: central venous catheterisation, transcatheter aortic valve implantation, thrombus, low-molecular-weight heparin, ultrasound

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#### Case report

A 77-year-old female sought medical attention for a two-month history of fatigue and shortness of breath after exercising. Severe stenosis of the aortic valve was observed on echocardiography. She had a history of hypertension and diabetes but no evidence of malignancy.

A bioprosthetic aortic valve was implanted through the right femoral artery after complete pre-operative evaluation, and a central venous catheter (CVC) was inserted into the right jugular vein as part of the procedure. Dual antiplatelet and antibiotic therapies were administered after transcatheter aortic valve implantation (TAVI).

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On day two after the procedure, echocardiography indicated normal aortic valve function. The CVC was to be removed on the fifth day post procedure. However, the procedure to install the catheter was not successful on the first attempt and ultrasonographic examination was not performed during CVC implantation and use. Therefore, ultrasonographic assessment of the vasculature was performed as a safety precaution before extraction.

Ultrasonography revealed a floating thrombus in the distal part of the right internal jugular vein and a mural thrombus in the proximal part of the right internal jugular vein (Figs 1, 2). This resulted in cessation of the dual antiplatelet therapy and the addition of 12-hourly 0.4-ml subcutaneous doses of low-molecular-weight heparin (LMWH), continuing after the antibiotic course was completed. After four days of anticoagulation treatment, there was still a floating thrombus in the distal jugular vein; however, it was smaller than before, based on colour Doppler ultrasonography of the local blood vessels (Figs 3, 4).

The presence of residual jugular vein thrombosis was re-assessed after eight days of anticoagulation therapy, and no apparent thrombosis was observed (Fig. 5). Thereafter, LMWH was discontinued, the CVC was removed, and the patient did not experience a pulmonary embolism or any other complications.



Fig. 1. Ultrasonography revealing a proximal mural thrombus (red arrow) in the right internal jugular vein catheterisation.



Fig. 2. Ultrasonography revealing a distal floating thrombosis (red arrow) in the distal part of the right internal jugular vein.



Fig. 3. Doppler ultrasonography revealing a distal floating thrombosis (red arrow) in the distal part of the right internal jugular vein.

#### Discussion

CVCs are frequently used in clinical settings. They are used for blood pressure monitoring, fluid infusion and blood transfusion, particularly in critically ill patients.<sup>1</sup> A symptomatic or asymptomatic thrombosis is one of the most serious complications of these devices.

Ultrasonography is used during catheter placement because it can improve placement success and reduce the risk of complications. It is rarely used regularly to detect the presence of a thrombus, but ultrasound is another examination that is frequently used to diagnose thrombus.<sup>2-5</sup>

CVC thrombi can result in infection, pulmonary emboli, right heart thromboemboli and vascular and duct obstructions.<sup>4,6</sup> In two to 26% of instances, thrombotic incidents occur.<sup>7,8</sup> Asymptomatic CVC-related thrombosis is more prevalent in these patients, but its clinical significance is unknown.<sup>9</sup>

Although the best therapeutic approach has not been found, LMWH, a safe and effective medication, is useful in treating



Fig. 4. Doppler ultrasonography revealing no thrombus in the right internal jugular vein catheterisation.



catheter-related thrombosis.  $^{10,11}$  Platelet aggregation is a key component of thrombus formation.  $^{12}$ 

In this patient, one could argue that following TAVI, we focused more on thrombosis and infection of the implanted biological valve, as well as the usual antiplatelet and infection treatment. Insufficient attention was paid to a potential thrombosis associated with the CVC because of the patency of the vessel and the patient's lack of discomfort during catheter use.

There seems to be a consensus that even if there is thrombosis, the vessel is usually unobstructed. Therefore, CVC implantation with ultrasound guidance is not advised for routine thrombosis prevention.<sup>13,14</sup> This increases the challenge of thrombus identification.

#### Conclusion

This case emphasises the need to improve early detection and prompt treatment of CVC-related thrombosis, particularly in those patients with asymptomatic thrombosis.

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