CASE REPORT: CEREBRAL STENTRETRIEVER THROMBECTOMY OF AN EMBOLIZED VALVE FRAGMENT AFTER VALVE IN VALVE TAVI

Jan-Erik Guelker / Peter Schott / Marcus Katoh / Alexander Bufe
Helios Clinic Krefeld, Krefeld, Germany

CASE

Successful valve in valve TAVI was first reported by Grube et al in 2007 [1]. Until now the procedure has been established as a standard technique in elderly patients with multimorbidity who bear an enhanced risk for major cardiac adverse events following cardiac surgery [2].

We present a case of a 78-year-old woman with a degenerated and severely stenosed Hancock II 21 mm bioprothesis which was implanted 2007 because of a symptomatic aortic valve stenosis. Since 2014 the patient presented aortic valve stenosis related clinical symptoms such as recurrent syncope and dyspnea at light exercise.

Transoesophageal reevaluation of the implanted Hancock II bioprothesis revealed a degenerative disease of the valve, the mean transvalvular pressure gradient was 50 mmHg, the valve opening area 0.50 square cm. Coronary artery angiography excluded an additional stenotic coronary artery disease. The Euroscore was 18.05 %.

The Heart Team decided to perform a valve in valve TAVI, a proven procedure [3,4,5], and implanted an Edwards Sapien XT valve. The implantation was performed transfemorally, the size of the implanted Sapien valve was 21 mm; the patient had a regular anaesthesia and was mechanically ventilated. The intraoperative transoesophageal evaluation after implantation displayed the prosthesis in a regular position and function; there was no mismatch, no relevant leakage of the valve, and the final peak transvalvular pressure gradient was within normal range (19 mmHg).

After cessation of anaesthesia the patient was extubated. However the patient failed to wake up and to resume spontaneous breathing. Soon a reintubation was required, and mechanical ventilation was reinstalled.

Following a neurological check we decided to perform computed tomography (CT) according to our stroke protocol. A noncontrast CT-scan of the brain ruled out an intracranial bleeding. Early signs of ischemic demarcation were also missing. However perfusion CT showed a decrease in the mean transit time (MTT) in the territory of the left middle cerebral artery (MCA) while the cerebral blood volume within the lesion was normal in most parts, suggesting the affected brain parenchyma was still vital. Finally CT-angiography demonstrated an occlusion of the left MCA-bifurcation.

Subsequently systemic thrombolysis with 90mg of Alteplase was initiated. The patient was then transferred to the digital-subtractions angiography unit of the Department for Radiology for emergency revascularization. Through a transfemoral access an 8F-balloon-aspiration catheter was placed in the left internal carotid artery (ICA). Digital subtraction angiography (DSA) revealed a persistent occlusion (Fig 1a). A 2.3F microcathether was maneuvered behind the occlusion, then a Solitare2-FR 4x20 mm stentretriever (EV3) was implanted. After 5 minutes the ICA was blocked by the balloon and the stent was retrieved during simultaneous aspiration. A white solid piece of tissue was recovered from the stent (Fig 2). The control angiogram showed a full restauartion of blood flow (Fig 1b).
The pathological analysis proved a fragment of the degenerated Hancock II bioprothesis. After extraction of the embolized material and restoration of a regular cerebral perfusion the patient recovered soon with full spontaneous awareness. Artificial ventilation was stopped. The neurological follow up revealed a complete restitutio ad integrum.

DISCUSSION

Cerebral microembolization is inherent to TAVI, and can occur during all stages of the procedure [6]. The incidence of periprocedural manifest stroke is reported to be around 2 - 3% [7,8]. In the majority of cases the embolized material cannot be identified. The stroke may be transient, but its impact is often persistent despite subsequent thrombolytic and antiplatelet medication.

The intention of this case report is to show that in case of stroke following valve in valve TAVI valve fragments may be the source of embolization requiring an active interventional management of this complication, since fragments cannot be targeted by thrombolytic therapy. Until now we have no data showing the incidence of cerebral embolizations on the basis of circulating valve fragments. The basis of an active management is an immediate CT angiography of the brain. On the basis of this case report a catheter based intracranial diagnostic and active intervention is gaining an important role in the acute management of periprocedural stroke in TAVI [9]. This is in line with new clinical trials demonstrating a better outcome for acute stroke treated with embolectomy compared to thrombolysis [10,11].

As shown in this case a complete regression of stroke can be achieved if the required procedure is done consequentially and without time delay.

Considering this case also the routine use of mechanical cerebral protection device to prevent embolization of fragments of the degenerated implanted valve should be taken into consideration.
Fig. 1 Digital subtraction angiography
Fig. 2  Embolized tissue fragment 2 x 2 square mm of the degenerated Hancock II bioprosthesis