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Dissection of the left common carotid artery during TAVI procedure successful treated by surgical intervention

Short title: Complications during TC-TAVI procedures

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Transcatheter aortic valve implantation through the common carotid artery (TC-TAVI) is one of the options for patients without transfemoral (TF) access. The first TC-TAVI was performed by Thomas Modine in 2010 [1]. In Upper Silesian Medical Center in Katowice 150 TC-TAVI have been performed with good results since 2017. With such a surgical access the vascular complications are uncommon [2]. A 75-year-old woman with comorbidities such as atrial fibrillation, ischemic heart disease treated with percutaneous coronary intervention, hypertension and diabetes was admitted to our center for treatment of severe symptomatic aortic stenosis (AS). The main reason for qualification for TC-TAVI was peripheral artery disease precluding TF access (Figure 1A). Calculated mortality risk according to EuroScore was 5.6%. After analyzing the computed tomography, we decided to implant the Edwards Sapien III Ultra 26 prosthesis (Edwards Lifesciences Corp., Irvine, CA, USA) through the left common carotid artery (LCCA). The procedure was performed under general anesthesia. Delivery sheath (E-

Sheath, Edwards Lifesciences Corp., Irvine, CA, USA) passed through the calcified ostium of LCCA into the ascending aorta (Figure 1B–C). During introduction of the delivery system the sheath was unintentionally retracted from ascending aorta above the calcified ostial lesion of LCCA. The unsheathed valve was blocked between the entrance to the aortic arch and the delivery sheath in LCCA. It was not possible to pass the system to the ascending aorta or resheath it. We decided to remove the delivery system and sheath in one block. The new delivery sheath was introduced into the ascending aorta and the Edwards Sapien III Ultra 26 valve was implanted without any problems (Figure 1D). The artery was closed typical by using two 5–0 sutures. Follow-up transthoracic echo showed good function of the prosthesis. In arteriography we observed dissection of the LCCA caused by the valve retracted without the protection of delivery sheath. We decided to surgically revise the LCCA. The skin incision was extended proximally and distally. The carotid artery was ruptured with massive bleeding. After carotid artery clamping and opening, a tear in the intima was observed with a flap that blocked the lumen of the vessel proximally to the entry site. The dissected part was surgically replaced with an Intergard 8F vascular prosthesis. The procedure and clamping time were respectively 3 hours and 20 minutes. Postprocedural angiography showed a good effect (Figure 1F). We transfused the patient with 2 units of blood. No neurological complications were observed. After 6 days the patient was discharged home. The incidence of vascular complications in TC-TAVI procedures ranges from 2.4% to 7.7% [3–5] This situation showed that in TC-TAVI procedure the delivery sheath position must be always under visual control. When passing the delivery system, the end of the delivery sheath must be in the ascending aorta. The need to replace the damaged carotid artery is a dramatic complication which Can successfully by treated using complementary “heart team” skills in the hybrid operating room.

Article information

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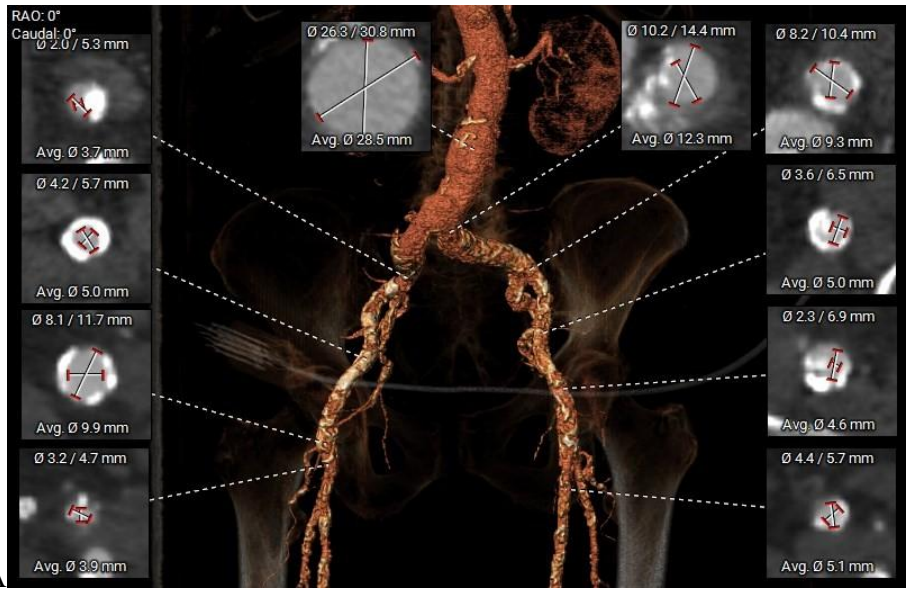
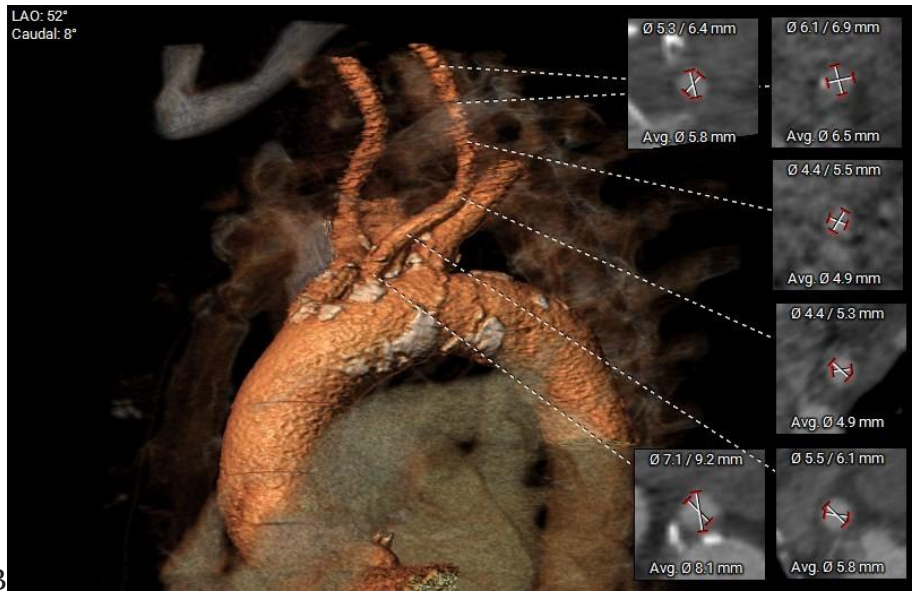


A

B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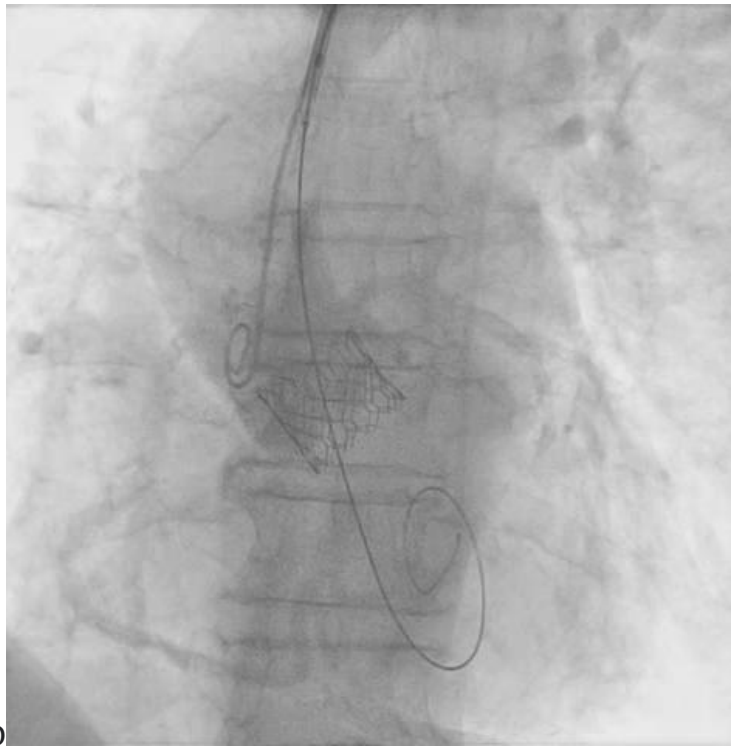
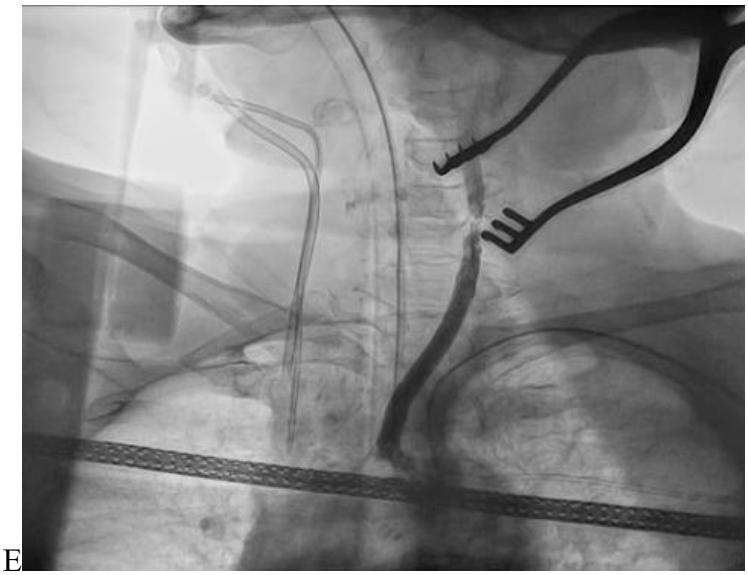
D 

E 

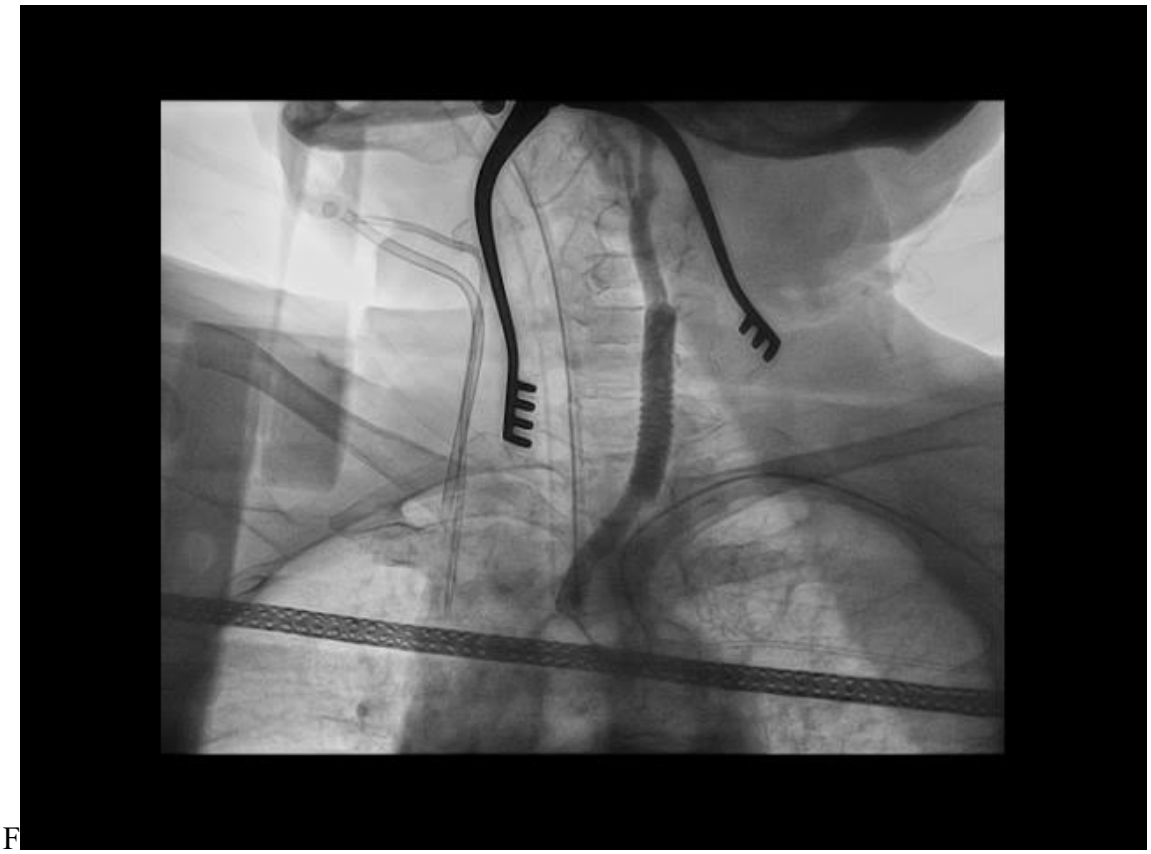
F 

Figure 1. A. Calcification of the femoral and iliac arteries (3D reconstruction); **B.** calcified ostium of the left carotid artery in the aortic arch (3D reconstruction); **C.** calcified ostium of the left carotid artery in the aortic arch; **D.** Edwards Sapien III Ultra 26 valve correctly implanted; **E.** dissection of the left common carotid artery after TAVI procedure; **F.** left common carotid artery after surgical intervention