

A rare complication of transcatheter aortic valve replacement: Free-floating nose cone

Nadir bir transkateter aortik kapak replasmanı komplikasyonu: Serbest yüzen koni uç

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Summary– Presently described is a case in which the tip of the delivery catheter system (nose cone) has been broken during catheter removal after valve deployment in a femoral transcatheter aortic valve replacement procedure and the successful management of this rare complication.

Özet– Bu olguda, femoral yol ile yapılan transkateter aortik kapak replasmanı işleminde, kapak yerleştirilmesi sonrasında kateterin çekilmesi esnasında, taşıyıcı kateter sisteminin uç kısmı (nose cone) kopan bir hasta ve bu gelişen nadir komplikasyonun başarılı yönetimi sunuldu.

Although transcatheter aortic valve replacement (TAVR) provides an alternative to surgical replacement in patients with severe aortic valve stenosis who have a high or prohibitive risk for surgery, it is associated with a wide range of cardiac and non-cardiac complications, such as coronary obstruction, paravalvular aortic regurgitation, valve migration/embolization, ancillary device embolization, cardiovascular injury, conduction system disturbances, vascular access-related complications, and death.^[1–3] Presently described is a case in which the radiopaque, atraumatic tip of the delivery catheter system (nose cone) was broken during catheter removal after valve deployment and was successfully retrieved using microsnare catheters before further distal embolization could occur.

CASE REPORT

An 81-year-old male patient with severe calcific aortic stenosis and New York Heart Association class III-IV congestive heart failure symptoms was referred to our institution for TAVR. The predicted operative mortality for surgical valve replacement based on the Society for Thoracic Surgeons score was calculated to be 9.2%, and a multidisciplinary heart team decided

to proceed with a TAVR procedure. After a comprehensive pre-procedural evaluation, including transthoracic and transesophageal echocardiography, coronary angiography, and computed tomographic evaluation (Fig. 1a) of the aortic valve/annulus and iliofemoral vessels, the patient was found to be an appropriate candidate for transfemoral TAVR utilizing a 31-mm CoreValve transcatheter heart valve (Medtronic, Inc., Minneapolis, MN, USA).

Abbreviation:

Transcatheter aortic valve replacement

After the administration of locoregional anesthesia, an 18-F introducer sheath was inserted into the right common femoral artery. A temporary transvenous pacemaker was positioned in the right ventricular apex via a 6-F venous sheath in the left femoral vein and a 6-F pigtail catheter was introduced through the left femoral artery and positioned in the non-coronary sinus of Valsalva. The stenosed aortic valve was crossed with a 0.035-in straight-tip guidewire supported by a 6-F Amplatz Left (AL) 1 catheter. The AL1 catheter was exchanged for a pigtail catheter and a preformed pigtail-shaped Amplatz Super Stiff guidewire (Boston Scientific, Natick, MA, USA) was inserted over the pigtail and positioned in the apex of the left ventricle.

Received: October 12, 2018 Accepted: March 14, 2019

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After predilatation of the aortic valve with a 22-mm balloon (Z-med; NuMED Inc., Hopkinton, NY, USA) under rapid pacing, a 31-mm CoreValve device was successfully deployed under fluoroscopic guidance. The nose cone was still integrated with the catheter system at the distal ascending aorta (Fig. 1b).

Following deployment of the valve, the capsule was retrieved to the proximal descending aorta for closure, and after the capsule was closed, the operator pulled the catheter back through the introducer sheath despite feeling some resistance. After forced passage, fluoroscopic control revealed a free-floating nose cone in the descending aorta that was dragged to the left iliac artery within seconds. To retrieve this broken nose cone, a microsnare catheter (AndraSnare Micro

AS-10; Andramed GmbH, Reutlingen, Germany) was advanced through a 7-F left femoral sheath. After few attempts, the nose cone was trapped with the snare (Fig. 1c). Another microsnare catheter was advanced through the 18-F introducer sheath after withdrawal of the sheath to the iliac bifurcation level. The previously stabilized nose cone was caught by the second snare and successfully retrieved (Fig. 1d, Video 1*). The right femoral artery was closed percutaneously using the Perclose ProGlide Suture-Mediated Closure system (Abbott Vascular Inc., Santa Clara, CA, USA).

DISCUSSION

In this case, a broken nose cone of the CoreValve transcatheter heart valve system was successfully re-

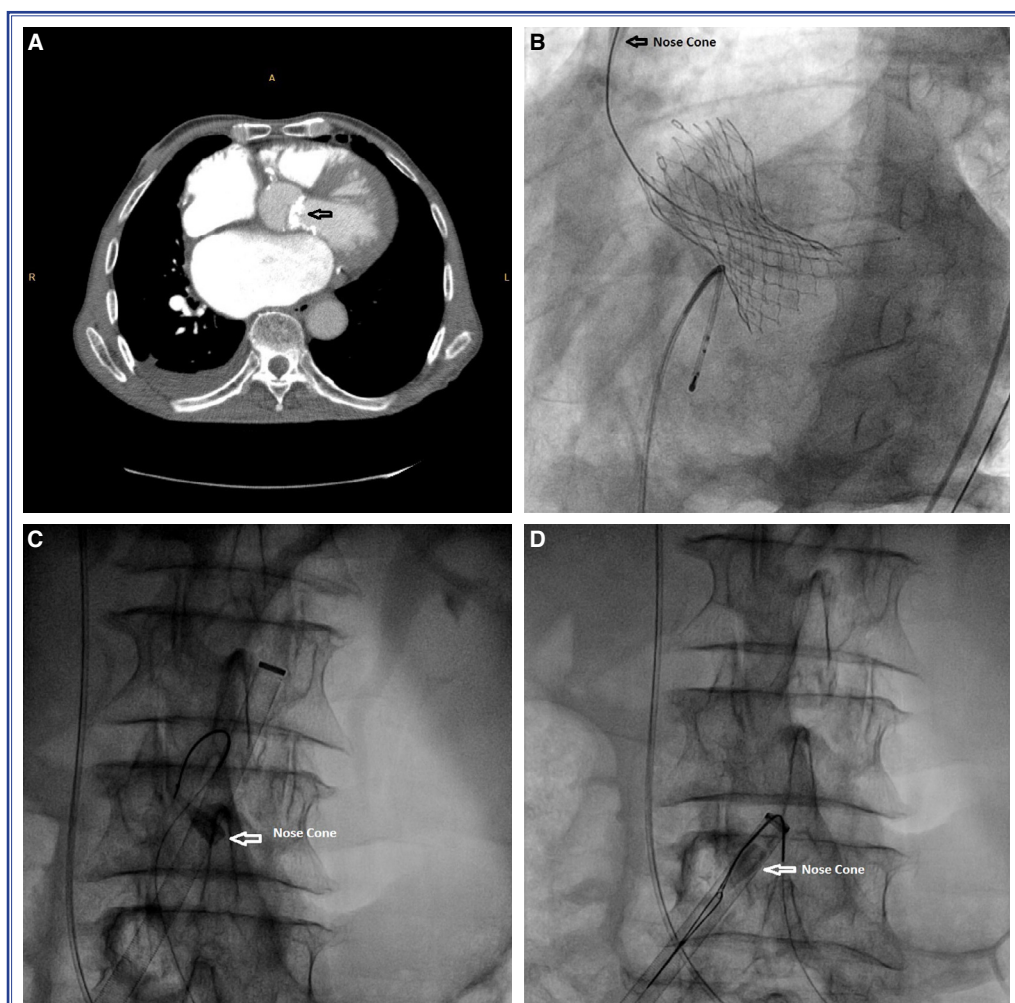


Figure 1. (A) Computerized tomography image showing heavy calcification (arrow) in the aortic root. (B) After deployment of the valve, the nose cone was still integrated with the catheter system at the distal ascending aorta. (C) A microsnare catheter was advanced through a 7-F left femoral sheath. After a few attempts, the nose cone was secured by the snare. (D) The previously stabilized nose cone was caught by the second snare and successfully retrieved.

trieved using microsnare catheters. It was likely as a result of forced passage, which underlines the importance of avoiding strained passage when resistance is encountered during catheter removal.

The CoreValve transcatheter heart valve system uses a balloon with a crimped valve advanced with a delivery catheter, which integrates a nose cone at the distal end to facilitate advancement of the delivery system around the aortic arch and to eliminate resistance when crossing the native aortic valve. Following deployment of the valve, the catheter is withdrawn under fluoroscopic guidance until the catheter tip is positioned in the descending aorta. After closure of the capsule, the catheter is removed through the introducer sheath. In some cases, resistance is encountered when removing the catheter through the introducer sheath. Since increased resistance may indicate a problem, passage must not be forced in this case. Otherwise, a damage to the device and/or harm to the patient may occur. According to the instructions for the use of the CoreValve system, the catheter and introducer sheath should be removed as a single unit over the guidewire when the cause of resistance cannot be determined or corrected. Inspection of the catheter to confirm that it is complete should be the final step (www.accessdata.fda.gov/cdrh_docs/pdf13/P130021c.pdf).

There is a report in the literature of nose cone entrapment between the meshes of a prosthetic valve and a heavily calcified aortic root occurring after a CoreValve prosthesis deployment.^[4] In another report, the balloon-expandable valve implantation process became complicated with embolization of both the aortic valve and the accompanying balloon into the thoracic aorta.^[5] Although there was a heavy calcification at the aortic roof of our patient, the nose cone was broken at the site of the descending aorta.

In conclusion, TAVR represents a less invasive approach to aortic valve replacement, but it is not without potential complications. Operators must have an in-depth knowledge of the implantation technique and

be familiar with the techniques and materials required for bailout procedures. Complete removal of the all catheters is the final step rather than the placement of the valve alone during TAVR procedure.

*Supplementary video file associated with this article can be found in the online version of the journal.

Peer-review: Externally peer-reviewed.

Conflict-of-interest: None.

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

Authorship contributions: Concept: D.T.; Design: D.T., Supervision: H.K.; Materials: D.T., K.Ç.; Data collection: D.T.; Literature search: D.T., K.Ç.; Writing: K.Ç., D.T.

REFERENCES

1. Leon MB, Smith CR, Mack M, Miller DC, Moses JW, Svensson LG, et al; PARTNER Trial Investigators. Transcatheter aortic-valve implantation for aortic stenosis in patients who cannot undergo surgery. *N Engl J Med* 2010;363:1597–607.
2. Laborde JC, Brecker SJ, Roy D, Jahangiri M. Complications at the time of transcatheter aortic valve implantation. *Methodist Debaque Cardiovasc J* 2012;8:38–41. [\[CrossRef\]](#)
3. Mwipatayi BP, Picardo A, Masilonyane-Jones TV, LARBALSTIER R, Thomas S, Turner J, et al. Incidence and prognosis of vascular complications after transcatheter aortic valve implantation. *J Vasc Surg* 2013;58:1028–36.e1. [\[CrossRef\]](#)
4. Pyxaras SA, Pizzulli L, Gerckens U. Nose cone entrapment after transcatheter aortic valve implantation of a CoreValve self-expandable bioprosthesis. *J Cardiovasc Med (Hagerstown)* 2016;17 Suppl 2:e183–e184. [\[CrossRef\]](#)
5. Patrice Mwipatayi B, Nair R, Papineau JL, Vijayan V. A difficult case of retrieval of an aortic valve and balloon during a transcatheter aortic valve implantation. *Int J Surg Case Rep* 2013;4:846–8. [\[CrossRef\]](#)

Keywords: Aortic valve disease; percutaneous valve therapy; transcatheter valve implantation.

Anahtar sözcükler: Aort kapak hastalığı; perkütan kapak tedavisi; transkateter kapak implantasyonu.