Cardiovascular Intervention and Therapeutics (2019) 34:70–71
https://doi.org/10.1007/s12928-018-0509-x

IMAGES IN CARDIOVASCULAR INTERVENTION

Aortic stenosis with right-sided aortic arch treated with transfemoral aortic valve implantation

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Received: 20 January 2017 / Accepted: 2 January 2018 / Published online: 10 January 2018

Keywords Aortic stenosis · Right-sided aortic arch · Transcatheter aortic valve implantation · And pacemaker implantation

A 74-year-old man diagnosed as having severe aortic stenosis and worsening dyspnea was referred to our center. He had a tortuous right-sided aortic arch (RAA) with an aberrant left subclavian artery (ALSA) and left ductus arteriosus/ligamentum (Fig. 1a, b) that complicated transfemoral aortic valve implantation (TF-TAVI), and severe bronchiectasis (Fig. 1c, d) with reduced lung function, decreased forced expiratory volume, and decreased vital capacity. He was considered high risk for general anesthesia. Consequently, the heart team performed TF-TAVI under local anesthesia with sedation. A 26-mm Sapien XT valve (Edwards Lifesciences) was implanted using the NovaFlex delivery system (Edwards Lifesciences) through the right femoral artery. A Lunderquist stiff wire (Cook Medical Inc.) was inserted as a buddy wire through the left femoral artery to straighten the right-sided descending aorta. The delivery system was gently advanced over a stiff wire and rotated 180° to negotiate the left-bending curve of the right-sided aorta (Fig. 1e). After crossing there, we returned the delivery system to the normal position, flexed it according to the sharp aortic arch, and advanced it cautiously past the arch (Fig. 1f). An aortic arch angle in patients with a RAA is usually sharper than that in normal subjects and we needed to flex the delivery system more than usual. Finally, the valve was successfully delivered and deployed (Fig. 1g). He developed a complete atrioventricular block on postoperative day 2; therefore, a temporary pacemaker was inserted, with difficulty, through the superior vena cava (SVC). Retrospective multidetector computed tomography (MDCT) analysis showed that the RAA had caused narrowing of the SVC (Fig. 1h). After permanent pacemaker implantation, he was discharged on postoperative day 11.

Although there are some reviews and comprehensive reports about RAAs or endovascular treatment for associated aortic aneurysm, only one report has demonstrated TF-TAVI in a patient with an RAA with mirror-image branching, which includes some very useful tips [1]. To our knowledge, our case is the first report of performing the TAVI procedure in a patient with RAA with an ALSA. In addition to the technique of rotating the delivery system 180°, we used a very stiff wire as a buddy wire. Furthermore, we experienced difficulty with inserting a pacemaker lead though the SVC, which has never been mentioned in previous reports. Careful tracking of the tortuous aorta, by rotating the delivery system and straightening the right-sided descending aorta with a Lunderquist stiff wire, enabled successful delivery and deployment of the transcatheter heart valve. MDCT assessment of venous anatomy is also essential for pacemaker lead insertion. It is important that the risk of injury to the tortuous aorta and difficulty of pacemaker implantation be considered before selecting TF-TAVI for patients with RAA.

Compliance with ethical standards

Conflict of interest Drs. K. Hayashida and H. Shimizu are proctors for Edwards Lifesciences. The other authors have no relationships to disclose.

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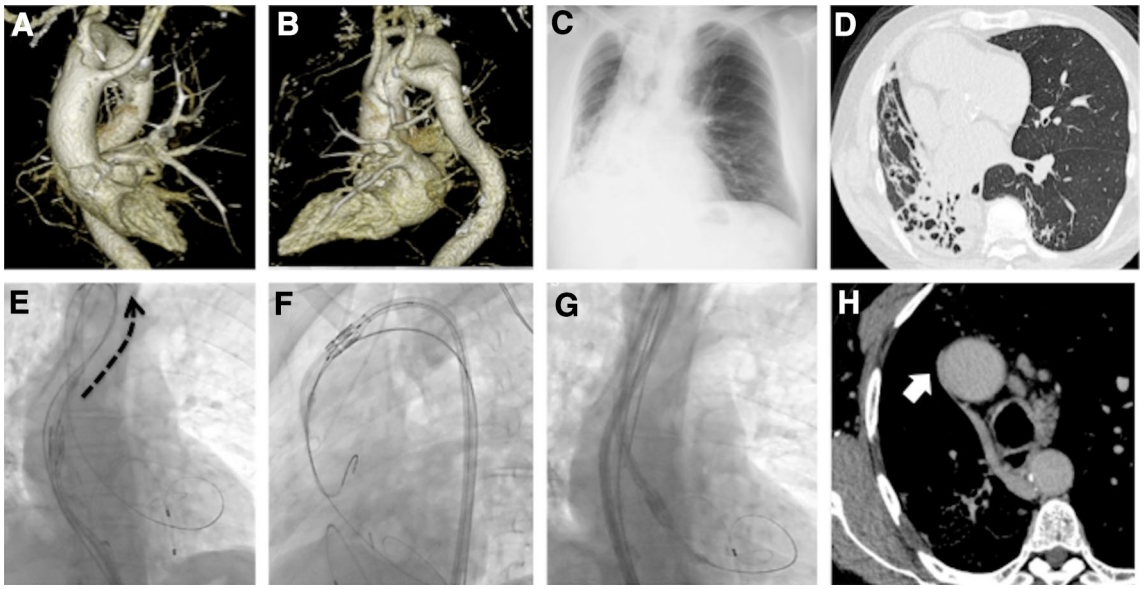

Fig. 1 Multidetector computed tomography (MDCT) scans, radiographs, and cine images. **a**, **b** Three-dimensional images of the right-sided aortic arch. **c**, **d** Chest radiograph and MDCT images of the bronchiectasis. **e**–**g** Procedural cine images of transfemoral aortic valve implantation (black dotted arrow; left-bending curve of the right-sided aorta). **h** Superior vena cava compression through the right-sided aortic arch (white arrow)

Informed consent Informed consent was obtained from the participant included in the study.

Reference

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