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Percutaneous Trans-Iliac Transcatheter Aortic Valve Implantation: First in Human Experience

A 75-year-old man was admitted to the intensive care unit due to pulmonary edema. His medical history included a previous coronary artery bypass surgery, and a stent was implanted in the left iliofemoral artery due to peripheral artery disease. He has been on hemodialysis twice a week due to chronic renal failure for 10 years. Appropriate medical therapy and frequent hemodialysis resolved the shortness of breath and pulmonary edema. The echocardiographic examination revealed severe calcific aortic stenosis; the aortic valve area was calculated as 0.6 cm^2 with the continuity equation, and the mean aortic gradient was measured as 60 mm Hg.

Because of high surgical risk (Euroscore 2: 18) and the previous history of coronary artery bypass surgery, it was decided to perform transcatheter aortic valve implantation (TAVI) for the treatment of symptomatic severe aortic stenosis.

Preoperative aortic angio CT revealed an annulus perimeter of 78.5 mm and an annular area of 510 mm^2 (Figure 1A). Tomographic peripheral artery examination revealed calcific severe stenosis on right common femoral artery, which was found to be completely occluded above the bifurcation (Figure 1B). In addition, it was observed that there was a stent in the left common femoral artery with a significant restenosis having a minimum diameter of 3.0 mm (Figure 1C). Unfortunately his right subclavian-aortic arch angle was 270 degrees, which makes right subclavian route impossible for the TAVI procedure (Figure 1D). Since the patient had an arteriovenous fistula in the left arm used for hemodialysis, the left subclavian artery route was also considered to be unsuitable.

After informed consent was signed with the patient and relatives, the patient was taken to the cath lab to perform TAVI. The right external iliac artery route was decided as the most appropriate TAVI intervention site. Puncture was performed under ultrasound and CT fusion guidance (Figure 1E-H). After the puncture, 2 ProGlides were placed. The entry site was dilated first with a 6 F, then with a 7 F sheath, and finally a 14 F sheath was placed. Through a right brachial access, a 6 F pigtail was advanced to the aortic sinus venosus site in order to obtain aortographic images. Medtronic Evolute R 29 mm valve implantation was performed via transiliac acces (Figure 1I). After the procedure, the entry site was closed with the ProGlides previously inserted. After the procedure, neither perforation nor hematoma was observed in control DSA imaging (Figure 1J). The patient was discharged without any complications 2 days after the procedure, and at his 1-month follow-up visit, it was observed that there were no additional complications at the entry site (Figure 1K and L).

Current guidelines recommend the transfemoral route as the entry site for TAVI, and the transaxillary route for unsuitable femoral anatomy.[1] In our case, the transfemoral intervention could not be used because the right femoral artery was completely occluded, and there was a stent in the left femoral artery which had a very narrow diameter due to significant restenosis. The axillary routes were also inappropriate because of the unfavorable angle between the right subclavian artery and the aorta, and there was a hemodialysis fistula in the left arm. Considering all of the above-mentioned factors, the transiliac route was ought to be preferred.

Since the external iliac artery lies between the transverse fascia and the iliopectineal fascia, puncture and sheath placement in this area is very difficult and may cause retroperitoneal bleeding through this funnel.[2] Therefore, it is not

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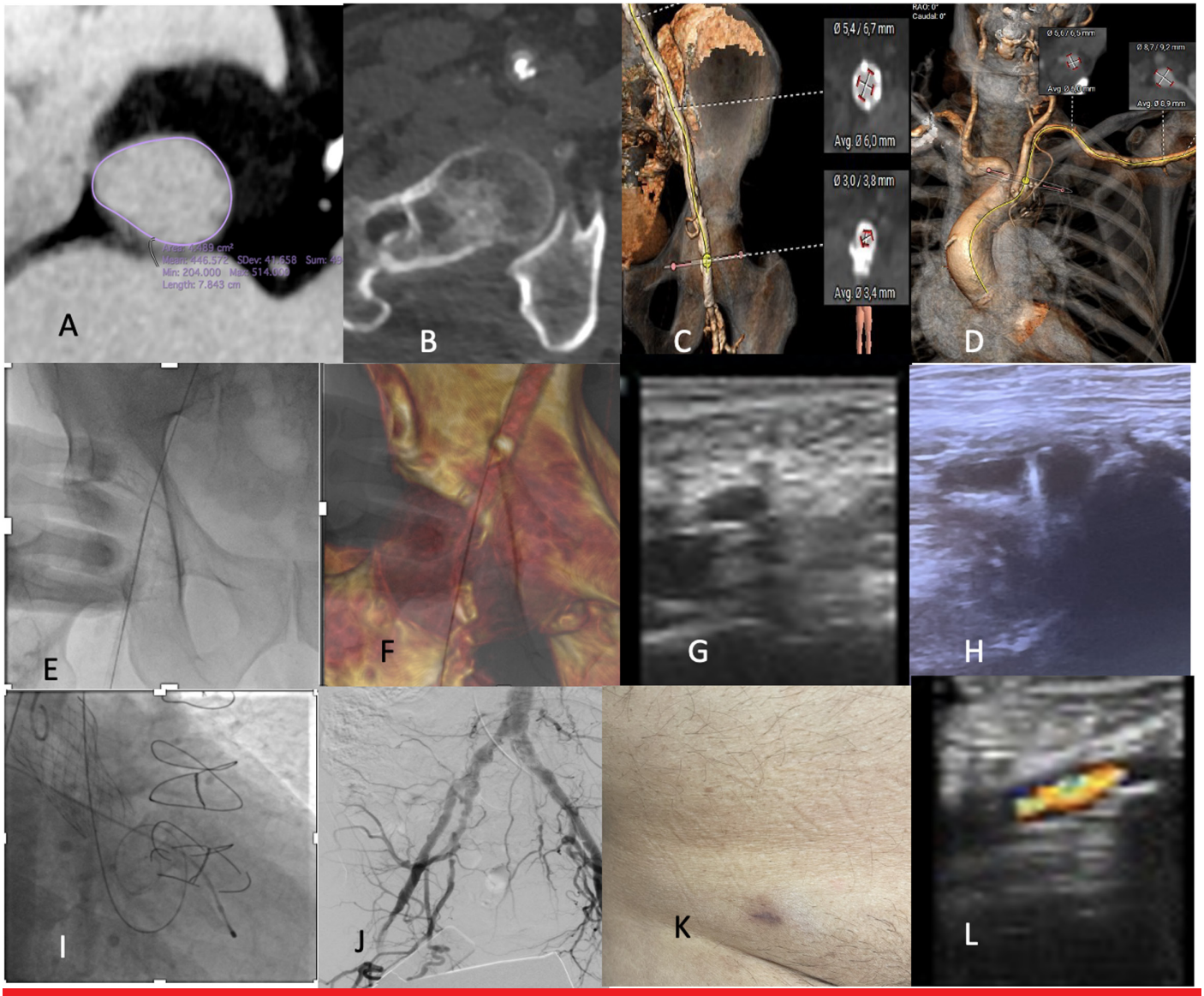

Figure 1. A: Aortic annulus calculations. B: Calcific severe stenosis on right common femoral artery. C: The stent in the left common femoral artery with a significant restenosis having a minimum diameter of 3.0 mm. D: The right subclavian-aortic arch angle was 270 degrees. E, F, G, H: A transiliac puncture was performed under ultrasound and CT fusion guidance. I: A Medtronic Evolute R 29 mm valve was implanted. J: Control DSA. K, L: Entry side controls.

recommended as a puncture site. In our case, the puncture was performed with the help of new techniques such as Doppler ultrasound and CT fusion, and hemostasis was achieved with ProGlide after procedure.

In our literature research, we found that in one case, transiliac TAVI was performed with surgical cutdown.[3] To the best of knowledge, this case is the first complete percutaneous transiliac TAVI case.

Informed Consent: Written informed consent was obtained from the patient.

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