

# Redo aortic valve replacement with a non-conventional intraoperative decision to avoid left main stem obstruction.

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## Abstract

Redo aortic valve surgery for failure of a previously implanted valve is always challenging. In case of small-sized implanted valves, the use of a balloon-expanding Sapien-3 valve can enhance the final effective orifice area, avoid complex annulus enlargement techniques, and can reduce operative time and morbidities. We describe a case where after explanting a failed 19mm St. Jude mechanical aortic valve and further deployment of a 23mm Sapien-3 valve, the left coronary ostia was obstructed by the skirt of the transcatheter prosthesis. After careful removal of a little part of the skirt, we were able to restore the coronary flow and the patient had a favorable outcome.

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## Abstract

Redo aortic valve surgery for failure of a previously implanted valve is always challenging. In case of small-sized implanted valves, the use of a balloon-expanding Sapien-3 valve can enhance the final effective orifice area, avoid complex annulus enlargement techniques, and can reduce operative time and morbidities. We describe a case where after explanting a failed 19mm St. Jude mechanical aortic valve and further deployment of a 23mm Sapien-3 valve, the left coronary ostia was obstructed by the skirt of the transcatheter prosthesis. After careful removal of a little part of the skirt, we were able to restore the coronary flow and the patient had a favorable outcome.

**Key words:** Redo aortic valve surgery, Transcatheter aortic valve, Sapien valve.

## CASE REPORT

An 80 years old female admitted to our department in heart failure. In 2011, she underwent an aortic valve replacement with a 19mm St. Jude mechanical valve (St. Jude Medical, Minneapolis, MN) for severe symptomatic aortic stenosis. A trans-thoracic echocardiogram and fluoroscopy, revealed a thrombus on the mechanical valve with an immobile leaflet, pannus formation and mean gradient of 45mmHg (Fig.1A, B).

The patient scheduled for urgent redo valve surgery and two coronary bypasses as she presented critical stenosis at the coronary angiogram. The decision of using a transcatheter balloon-expanding Sapien-3 valve (Edwards Lifesciences, Irvine, CA) was determined by the shorter estimated CPB and XC time in this elderly fragile lady (Logistic Euroscore II:42.5% ). After completing the bypasses, a 23mm Sapien-3 was implanted intra-annularly under direct vision. However, it was immediately noticed that the skirt of the Sapien-3 valve was obstructing the left coronary ostia (Fig. 2A, B). In order to avoid this complication we gently cut a little piece of the skirt of the valve to free the coronary ostia (Fig.2C, D). After successful weaning from cardiopulmonary bypass, the transesophageal echocardiographic examination revealed an excellent flow on the left main stem and normal ventricular function with a mean aortic gradient of 8 mmHg (Fig 3). The patient had an optimal recovery and discharged after 11 days with 3 months of Warfarin and aspirin, followed by DAPT for life. Clinical and echocardiographic control after 36 months showed excellent flow through the left coronary ostia and improved ventricular function.

## DISCUSSION

Redo aortic valve surgery in small aortic roots and previously implanted mechanical or tissue bioprosthesis can be a challenge [1].The redo operation has three objectives: perform a safe operation with careful access, minimize cardiopulmonary bypass time and insert a prosthesis with optimal size and gradients in order to prevent PPM [2]. In the present case, the decision of using a Sapien valve was based on the increased surface area with low gradients in a small annulus that was accepted already at the previous operation. Moreover, the use of an annulus enlargement technique was not an option as it could be a challenge with increasing surgical times [3].

The last generation of the Sapien valves proved excellent results, good stability and easy implantability during valve-in-valve procedures. A metanalysis by Tam et al [4] suggested that using the valve-in-valve technique in high-risk cases results are comparable with redo high-risk surgery. Using the expandable valve, studies suggested a less length of hospital stay and less incidence of pacemaker implantation when compared to standard procedures [1].

Using the transcatheter valve during an open operation, when the failed prosthesis is totally removed leaves a rough area for the implantation of the transcatheter valve. In this contest, the coronary obstruction becomes possible, as most of these small roots have been decalcified when the pathological native valve was removed. This can create an abnormal area that can make distortions of the annulus near the coronary ostia. Therefore, careful analysis of the type of the valve that need to be implanted with all the characteristics

including the height, the size and the structural characteristics is very important. If a coronary obstruction happens with a Sapien, we confirm that part of the skirt can be safely and easily removed to guarantee the flow. Probably, a “surgical model” of Sapien valve with no skirt at the level of the coronary ostia can avoid this complication.

### Authors ‘contributions :

Concept/design: EF, TT

Data analysis/interpretation: EF, TT, SD

Drafting article: TT, EF, SC, DT

Critical revision of article: TT, EF

Approval of article: SD, EF, TT

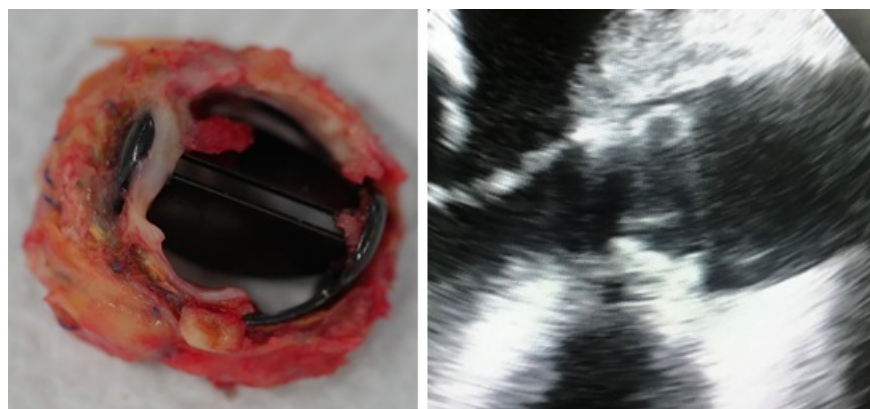
Data collection: DT

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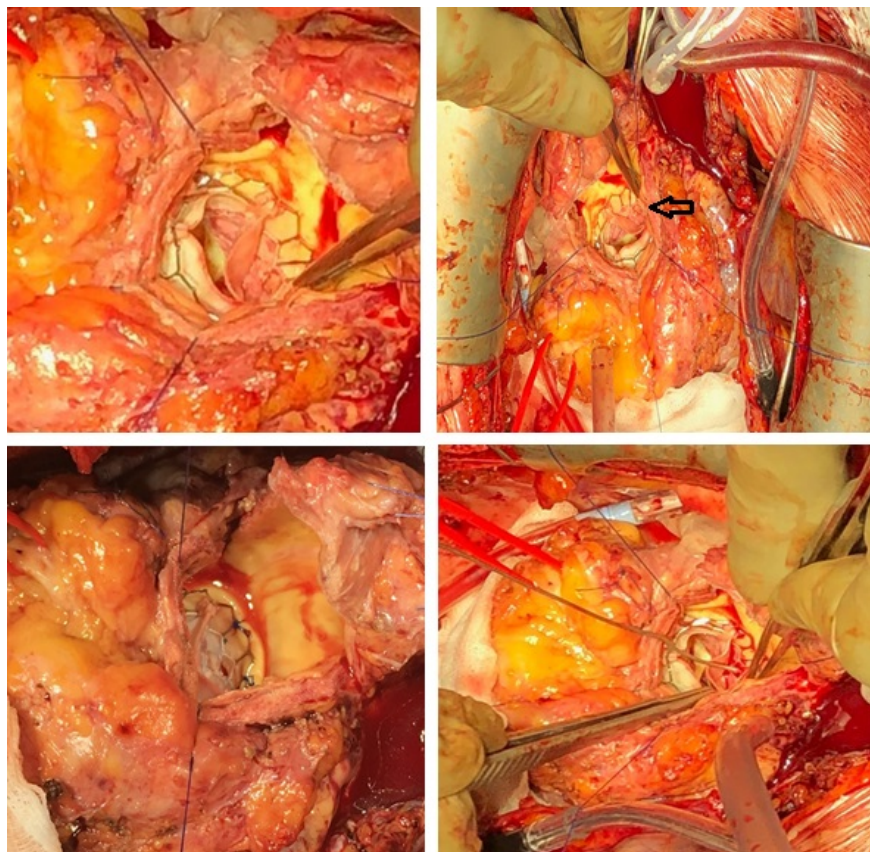
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### FIGURE LEGENDS

**Fig 1.** Previous 19mm St Jude mechanical aortic valve. A) Surgical view with pannus and thrombus formation. B) Echocardiographic view.



**Fig 2.** Evidence of obstruction of the left coronary ostia: 2A, 2B (see arrow). Intraoperative field view showing the removal of part of the skirt tissue of the Sapien-3 valve that was obstructing the left coronary ostia (2C, 2D).



**Fig 3.** TOE immediate post-operative showing the left coronary ostia free of obstruction with excellent flow.

