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Featured Article

Transcatheter aortic valve replacement explantation experience in Japanese high-volume center

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Background: Transcatheter aortic valve replacement (TAVR) explant is an essential therapeutic option for late-stage biological valve failure (BVF) or prosthetic valve endocarditis (PVE) following TAVR, though poor outcomes have been reported. This study assesses TAVR explant outcomes at a high-volume Japanese center.

Methods: From October 2009 to December 2023, 10 TAVR explants were performed after 1,364 TAVR procedures at a leading Japanese high-volume center, and clinical outcomes were retrospectively analyzed. Data were drawn from a prospectively maintained database, assessing preoperative and intraoperative variables, as well as short- and long-term postoperative outcomes.

Results: Thirty-nine BVFs were observed during follow-up, and 16 (41.0%) redo-TAVRs were performed in the same timeframe. In the 10 (25.6%) TAVR explant cases, the median age of the patients was 79.5 years, with a predicted mortality for isolated surgical aortic valve replacement (SAVR) by Society of Thoracic Surgeons (STS) score of 4.5%. The primary indications for TAVR explant were PVE (40.0%) and structural valve deterioration (SVD) (30.0%). Concomitant procedures were necessary in 90% of cases, including aortic repair (40.0%) and mitral replacement or repair (30.0%). Aortic annulus reinforcement using autologous pericardium was performed in 30% of cases. The 30-day mortality rate was 20%, with 20% of cases requiring temporary mechanical circulatory support and postoperative continuous hemodiafiltration. In mid-term outcomes, the survival rate was 60% in 1 year and 40% in 3 years, respectively.

Conclusions: In this Japanese high-volume center experience, TAVR explants predominantly involved elderly patients and frequently required a concomitant procedure. The outcome was generally poor, comparable to those in Western countries. As the number of TAVR explants is expected to increase in Japan, knowledge-sharing within heart teams, including cardiac surgeons, is essential.

Keywords: Transcatheter aortic valve replacement (TAVR); explant; Japan

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Introduction

Transcatheter aortic valve replacement (TAVR), first performed in 2002 as a minimally invasive alternative for surgical aortic valve replacement (SAVR) in cases of severe aortic stenosis (AS) (1), rapidly gained global adoption due to favorable early outcomes in patients who were inoperable or at high surgical risk (2,3). With improvements in transcatheter heart valve (THV) devices, along with accumulating experience and knowledge, TAVR outcomes have continued to improve, allowing for application to patients with lower surgical risk (4,5), as reflected in the latest guidelines (6). As TAVR is increasingly performed in patients with longer life expectancies, thorough evaluation of long-term, late-phase complications has become essential. Similar to surgical bioprosthetic valves, biological valve failure (BVF) remains a major issue.

Redo-TAVR, or TAV-in-TAV, is an effective, minimally

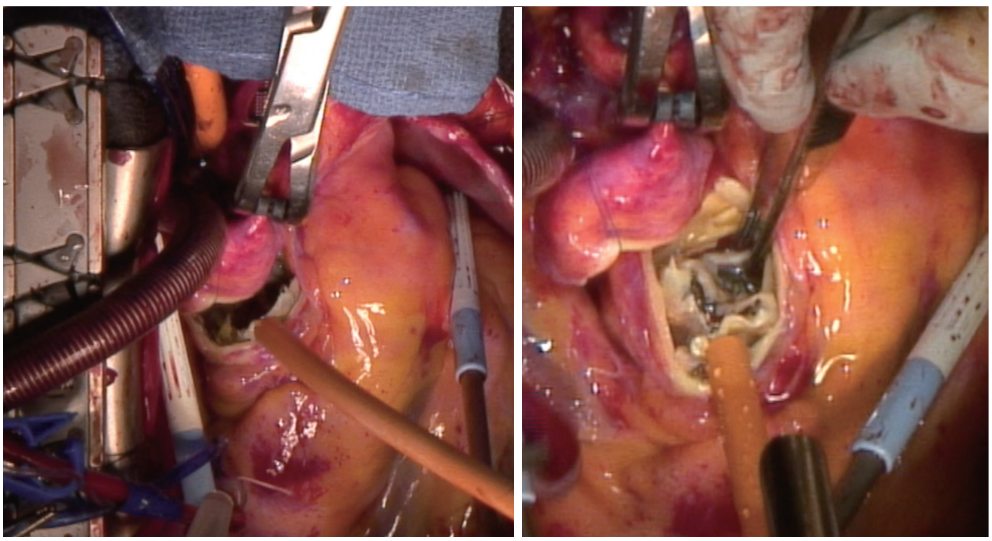

Figure 1 Explant of Evolut PRO with terniquet technique.

invasive reintervention option, but it has been reported that a significant number of patients are ineligible for redo-TAVR due to anatomical limitations (7,8). Furthermore, in cases of prosthetic valve endocarditis (PVE), removal of the infected valve is essential, making TAVR explant an important therapeutic option. However, studies predominantly from the United States (U.S.) report poor outcomes for TAVR explant, highlighting the need for further validation of this procedure. In Japan, TAVR was introduced in 2013 (9,10) and has primarily targeted an older, higher-risk population compared to the U.S. (11), but reports on TAVR explant remain limited. Therefore, this study aims to examine TAVR explant outcomes at a high-volume Japanese center that was among the first to adopt TAVR in the country.

Methods

Patients

We retrospectively reviewed 1,364 TAVR procedures (balloon-expandable THV; n=817, self-expandable THV; n=529, mechanical expandable THV; n=18) at Osaka University between October 2009 and December 2023. During follow-up [median: 36.3 months; interquartile range (IQR): 14.6–61.1 months], 10 (0.73%) patients underwent TAVR explant at Osaka University and enrolled in this study. Data were analyzed from a prospectively maintained database, assessing preoperative and intraoperative information, as well as short- and long-term postoperative outcomes. This study was approved by the Institutional Ethics Committee of Osaka University Hospital (approval number: 16105-4, date: 02/11/2016).

TAVR explant procedure

The indication for TAVR explant was thoroughly discussed within the heart team, and the procedure was performed after fully informing the patient about the benefits and risks. Additionally, any coexisting cardiac or aortic lesions were carefully evaluated for the need for concurrent surgical intervention. All TAVR explant surgeries in 10 cases were performed via a median sternotomy approach. Cardiac arrest was achieved by administering cardioplegia either antegrade through the ascending aorta or retrograde via the coronary sinus after aortic clamping. For the balloon-expandable devices, the THV frame was removed by cutting it with nippers, folding it inward, and rolling it up for explantation as described previously (12). For the self-expandable devices, the nitinol stent frame was cooled with cold saline to facilitate frame contraction. The stent frame was either severed and extracted, or a purse-string suture was placed at the upper part of the THV frame, tightened with a tourniquet, and the frame was dissected from the annulus [tourniquet technique (13) (*Figure 1*)].

Computed tomography (CT) evaluation

Contrast-enhanced cardiac CT was routinely performed before both initial TAVR and TAVR explant procedures

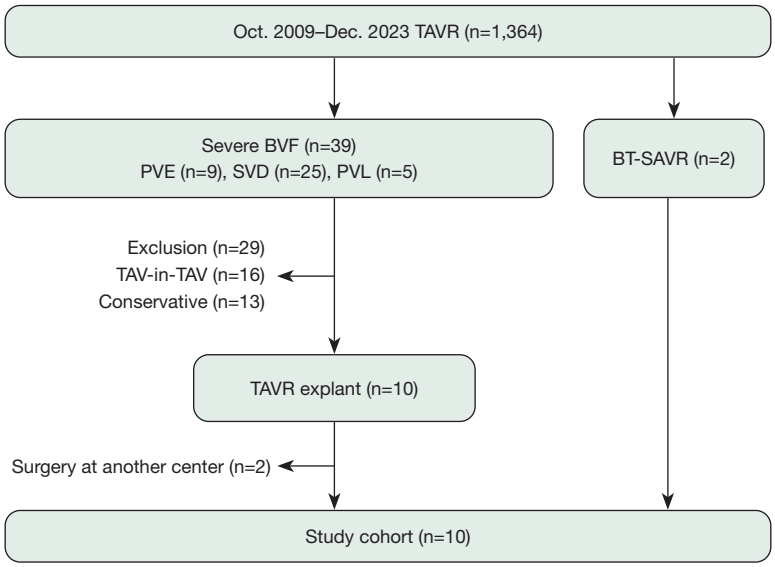

Figure 2 Inclusion of the patients. BT-SAVR, bridge to surgical aortic valve replacement; BVF, biological valve failure; PVE, prosthetic valve endocarditis; PVL, paravalvular leak; SVD, structural valve deterioration; TAV, transcatheter aortic valve; TAVR, transcatheter aortic valve replacement.

to assess the anatomical characteristics of aortic root. Perimeter and area-derived annular diameters, sinus of Valsalva (SOV) diameters, diameters of the sinotubular junction (STJ) were measured using pre-TAVR contrast-enhanced cardiac CT, whereas the implantation depth of the TAVR device or interaction to the sub-aortic annular structure were assessed using pre-TAVR explant contrast-enhanced cardiac CT. All measurements and evaluation were performed using an Aquarius NET (TeraRecon, Inc., Durham, NC, USA).

Statistical analyses

Continuous variables are reported as median (IQR) and categorical variables were reported as frequencies. Overall survival analysis was performed using the Kaplan-Meier method, with patient data censored as of the last date known to be alive. All statistical analyses were performed using the JMP Pro software program, ver.17.0 (SAS Institute, Cary, NC, USA).

Results

Patient characteristics

Among 1,364 cases, 39 cases (2.85%) developed BVF in late follow-up. The primary cause of BVF was structural valve deterioration (SVD), observed in 25 cases, followed by PVE in nine cases, and severe paravalvular leak (PVL) in five cases. Of the 39 BVF cases, 10 (25.6%) were surgically treated with TAVR explant. Among the remaining 29 cases, 16 were treated with a redo-TAVR [transcatheter aortic valve (TAV)-in-TAV], while 13 received conservative management because they were at extremely high surgical risk and were not eligible for TAV-in-TAV therapy.

Additionally, two high-risk cases with concomitant ascending/aortic arch aneurysms were treated with bridge TAVR, followed by elective aortic repair and TAVR explant. This study enrolled eight cases in which TAVR explant was performed at Osaka University for BVF, and the two bridge TAVR cases (*Figure 2*). The characteristics of the 10 patients are summarized in *Table 1*. In pre-TAVR explant status, the median patient age was 79.5 years old with a range from 54 to 86 years old, and 5/10 (50.0%) were over 80 years old. Gender was predominantly male (80.0%), and the BSA were from 1.25 to 1.71 m^2, resulting in median value of 1.60 m^2. As pre-TAVR explant comorbidities, 5/10 (50.0%) had history of cerebrovascular disease including two acute mycotic strokes in the PVE cases. Three (30.0%) end-stage renal disease patients on chronic hemodialysis were also observed. The estimated risk of mortality for isolated aortic valve replacement (AVR) by STS score was averaged at 4.5%, with a range from 0.8% to 41.9%.

Table 1 Basic characteristics of the patients enrolled in this study

Characteristics	Data (n=10)
TAVR explant data	
Age (years)	79.5 [57–82]
Male	8 (80.0)
BSA (m^2)	1.60 [1.45–1.68]
BMI (kg/m^2)	22.5 [20.6–25.0]
CVD	5 (50.0)
COPD	2 (20.0)
CKD	4 (40.0)
Hemodialysis	3 (30.0)
LVEF <40%	1 (10.0)
Erythema exudative multiforme	1 (10.0)
Mucopolysaccharidosis	1 (10.0)
NYHA class ≥ III	4 (40.0)
STS score (%)	4.5 [1.8–15.3]
Reason for TAVR explant	
PVE	4 (40.0)
SVD	3 (30.0)
PVL	1 (20.0)
Ascending/arch aortic aneurysm	2 (20.0)
Duration from initial TAVR (months)	14.4 [7.8–37.1]
Initial TAVR data	
Age (years)	78.5 [55–80]
STS score (%)	3.8 [1.8–18.1]
Device	
Balloon expandable	6 (60.0)
Self-expandable	4 (40.0)

Data are presented as median [IQR] or n (%). BMI, body mass index; BSA, body surface area; CKD, chronic kidney disease; COPD, chronic obstructive pulmonary disease; CVD, cerebrovascular disease; IQR, interquartile range; LVEF, left ventricular ejection fraction; NYHA, New York Heart Association; PVE, prosthetic valve endocarditis; PVL, paravalvular leak; STS, Society of Thoracic Surgeons; SVD, structural valve deterioration; TAVR, transcatheter aortic valve replacement.

Indication of TAVR explant

In the initial TAVR intervention, balloon-expandable devices were used in 6 (60.0%) patients, including three cases of SAPIEN XT and three cases of SAPIEN 3 respectively. All four self-expandable devices were Evolut PRO. The duration from initial TAVR to Explant had a range from 38 days to 67 months. The primary pathology necessitating TAVR explant was PVE, accounting for the highest proportion at 40.0%, followed by SVD in 3 cases (30.0%). Two cases (20.0%) had pre-existing ascending and aortic arch aneurysms prior to the initial TAVR procedure. However, due to the extremely high surgical risk at the time of the initial TAVR (one case involved circulatory collapse due to very severe AS with bicuspid valve, and the other involved inability to perform positive pressure ventilation due to a large pulmonary cyst), a bridge TAVR was performed to relieve severe AS, followed by planned surgical conversion as a second stage. The time from initial TAVR to TAVR explant ranged from 38 days to 67 months, with a median duration of 14.4 months. By cause of BVF, the time intervals were as follows: for PVE (38 days, 15 months, 36 months, and 39 months); for SVD (8, 29, and 67 months); for PVL (11 months); and for aneurysms (6 and 13 months).

Pre-TAVR CT findings

Pre-TAVR CT measurements are summarized in *Table 2*. Annulus diameters ranged from 19.9 to 28.0 mm. The THV sizes used were as follows: for balloon-expandable devices, 20 mm in one case, 23 mm in one case, and 26 mm in four cases; for self-expandable devices, 26 mm in one case, 29 mm in two cases, and 34 mm in one case. The average SOV diameter had a median of 34 mm (range, 22.5–38 mm), and the mean STJ diameter had a median of 28.7 mm (range, 18.5–36 mm). In the pre-TAVR CT evaluation, the implantation depth at the right (R), left (L), and non-coronary (N) cusps had median values of 2.0–2.6 mm, with the deepest implantation depth being 4 mm.

Procedure outcomes

Table 3 summarizes the operative procedures. Among the 10 cases, only 1 case (10%) underwent isolated AVR, while the remaining 9 cases (90%) required concomitant cardiac or aortic surgery. The most common concomitant surgery was aortic replacement or repair, performed in four cases; all of these procedures were planned preoperatively, and three cases required hypothermic circulatory arrest and selective cerebral perfusion. No case required aortic root replacement. Aortic annulus reconstruction was

Table 2 Pre-initial TAVR and pre-TAVR explant CT measurement of the aortic root

Variables	Data (n=10)
Pre-initial TAVR CT measurements	
Annulus diameter (mm)	25.0 [24.0–26.5]
LVOT diameter (mm)	24.3 [22.0–27.1]
SOV diameter (mm)	34.0 [31.7–35.2]
STJ diameter (mm)	28.7 [26.9–33.0]
Ascending aorta diameter (mm)	33.5 [32.2–39.5]
Pre-TAVR explant CT measurements	
Device implantation depth (mm)	
Right	2.5 [1.3–2.9]
Left	2.0 [0.2–3.6]
Non	2.6 [2.0–3.6]

Data are presented as median [IQR]. CT, computed tomography; IQR, interquartile range; LVOT, left ventricular outflow tract; TAVR, transcatheter aortic valve replacement; SOV, sinus of Valsalva; STJ, sinotubular junction.

Table 3 Details of operative procedures

Variables	Data (n=10)
Isolated AVR	1 (10.0)
Annular reinforcement using autologous pericardium	3 (30.0)
Concomitant procedure	
CABG	2 (20.0)
MVR	2 (20.0)
With aorto-mitral curtain reconstruction	2 (20.0)
MVP	1 (10.0)
LAA closure	1 (10.0)
Aortic repair	4 (40.0)
Patch augmentation of SOV	1 (10.0)
Ascending aorta	1 (10.0)
Hemi-arch	1 (10.0)
Total arch	1 (10.0)
Operation time (min)	384 [342–480]
ACC time (min)	154 [136–190]
CPB time (min)	228 [194–282]
Surgical valve	
Biological	7 (70.0)
Mechanical	3 (30.0)

Data are presented as n (%) or median [IQR]. ACC, aortic cross clamp; AVR, aortic valve replacement; CABG, coronary artery bypass grafting; CPB, cardiopulmonary bypass; IQR, interquartile range; LAA, left atrium appendage; MVP, mitral valve plasty; MVR, mitral valve replacement; SOV, sinus of Valsalva.

required in five cases, of which three involved a aortic annulus reinforcement using autologous pericardium and two involved a commando procedure due to aorto-mitral continuity destruction caused by PVE. In one case, the stent of a self-expandable device was firmly adherent to the membranous septum, necessitating repair with autologous pericardium after THV removal (*Figure 3*). Regarding the mitral valve, in addition to the two MVR Commando cases mentioned above, mitral annuloplasty was performed in one case for severe mitral regurgitation. Of the surgical valves used, 7 (70%) were bioprosthetic valves; however, mechanical valves were used in 3 cases (30%). The reasons for choosing mechanical valves included early bioprosthetic THV degeneration due to metabolic abnormalities in two cases, and patient preference in a younger patient (51 years old) in one case.

Early and late results

Early outcomes are summarized in *Table 4*. The 30-day mortality rate was 20% (two cases), with causes of death being multi-organ failure and cancer-related intra-abdominal hemorrhage. Perioperative complications included the need for mechanical circulatory support due to acute heart failure in two cases—one with Impella and one with extracorporeal membrane oxygenation (ECMO). Continuous renal replacement therapy (CRRT) was required for acute renal failure in 2 cases (20%), and tracheostomy for respiratory failure in 2 cases (20%). In the long-term follow-up (median follow-up duration: 22.8 months; IQR: 2.1–40.8 months; follow-up rate: 100%), five of the eight discharged patients died, resulting in survival rates of 60.0% at 1 year and 40.0% at 3 years (*Figure 4*). Causes of death included one cardiac-related death (heart failure/dilated cardiomyopathy), and four non-cardiac-related deaths (cirrhosis, aspiration pneumonia, gastrointestinal bleeding, and advanced gastric cancer).

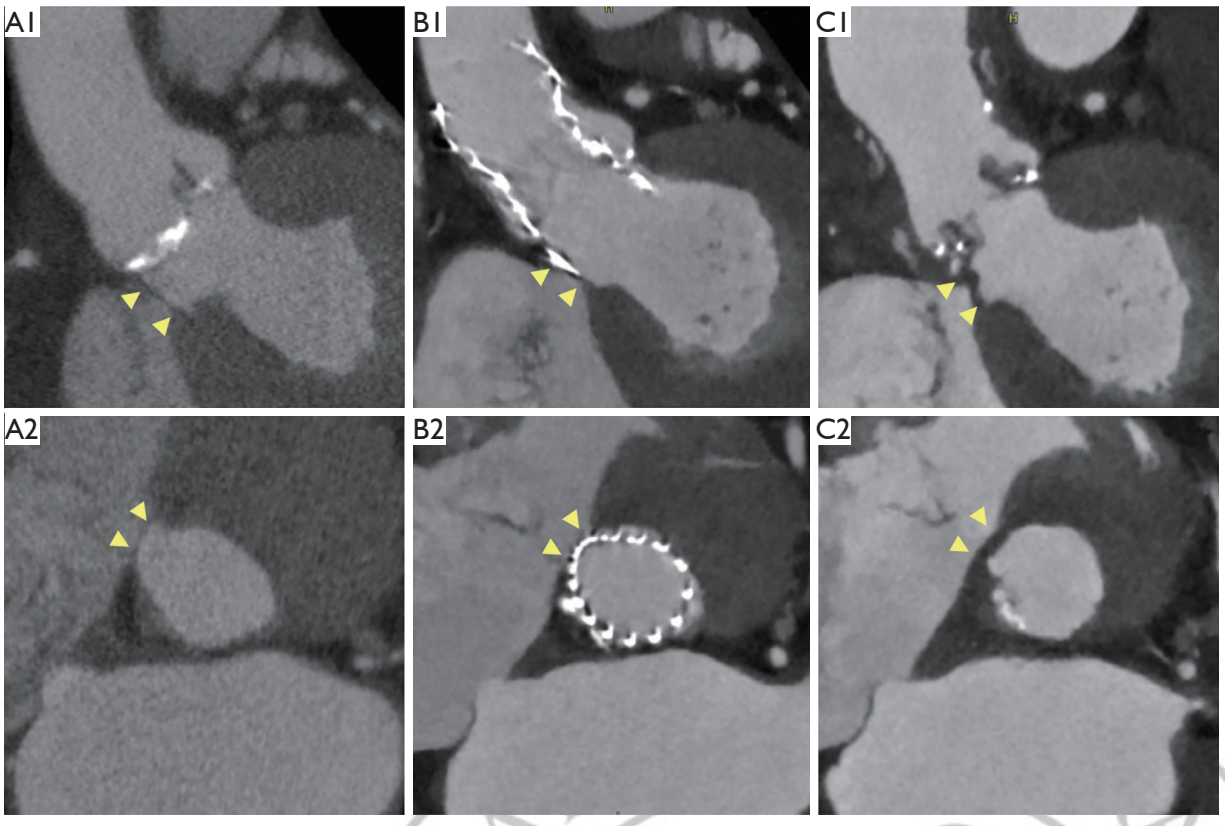

Figure 3 Evaluation of explant risk with cardiac CT. (A1,A2) Pre-initial TAVR cardiac CT image. (B1,B2) Post-initial TAVR with Evolut PRO. The proximal end of Evolut PRO device showd a compression in membrenous septum. (C1,C2) Post-TAVR expant. The yellow triangles indicate the membrenous septum. Aortic annuloplasty using autologus pericardium was done for annuloplasty after explantation of THV. Membrenous septum showed thickning with the pericardium. CT, computed tomography; TAVR, transcatheter aortic valve replacement; THV, transcatheter heart valve.

Table 4 Early results

Results	Data (n=10)
30-day mortality	2 (20.0)
In-hospital mortality	2 (20.0)
Postoperative complication	
Stroke	1 (30.0)
AHF with mechanical circulatory support	2 (20.0)
Tracheostomy	2 (20.0)
CRRT	2 (20.0)
Pacemaker implantation	0 (10.0)
ICU stay length (days)	5.5 [3–11]

Data are presented as n (%) or median [IQR]. AHF, acute heart failure; CRRT, continuous renal replacement therapy; ICU, intensive care unit; IQR, interquartile range.

Discussion

To date, most large-scale reports on TAVR explant outcomes have originated from the U.S. (13-16). However, as the indications for TAVR continue to expand globally, it is essential to examine the actual state of TAVR explantation based on reports from various regions. TAVR was approved in Europe in 2010 and in the U.S. in 2011, with a rapid increase in the number of procedures subsequently reported (17-19). In Japan, TAVR was introduced in 2013 (9), and the number of procedures has similarly been increasing, along with research publications from large registries such as Optimized Transcatheter Valvular Intervention (OCEAN) (20,21) and Japanese Transcatheter Valve Therapy (JTVT) (11,22,23). However, reports from Japan on TAVR explants have thus far been limited to case reports (12,24,25), making this study the first series-based report on the subject from

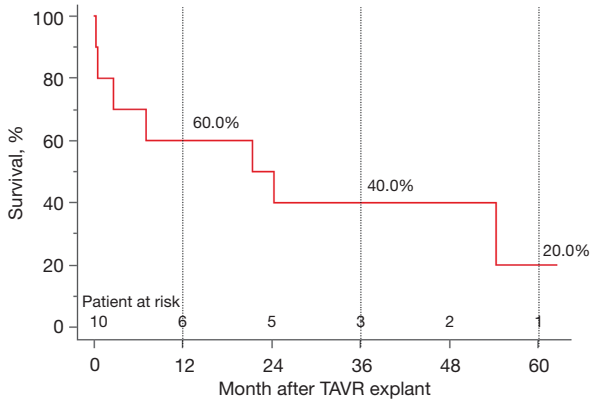

Figure 4 Overall survival after TAVR esplant (Kaplan-Meier method). TAVR, transcatheter aortic valve replacement.

Japan. Additionally, Osaka University performed Japan's first TAVR procedure as a clinical research surgery in 2009 (26), prior to national approval, and has since continued to perform TAVR. Consequently, our facility likely has the longest post-TAVR follow-up period available in Japan.

Although the number of observed cases in this study was relatively small (n=10), the following summarizes the TAVR explant results: (I) the median age of patients requiring TAVR explant was 79.5 years, indicating an elderly population; (II) PVE was the most common indication for TAVR explant, comprising 40% of cases; (III) concomitant surgery was performed in 90% of cases, with aortic aneurysm treatment being the most frequent (40%); (IV) 5 cases (50%) required aortic annuloplasty, two of which involved the Commando procedure; (V) in a cohort with a median STS score of 4.5%, the 30-day mortality rate was high at 20%, with 20% of cases requiring mechanical circulatory support and postoperative continuous hemodiafiltration, respectively; and (VI) long-term outcomes were poor, with a 3-year survival rate of only 40%.

Several considerations must be considered when interpreting these results. The median age of the cohort was 79.5 years, indicating that the patients were younger than the recommended age of 80 years for TAVR in low-risk cases according to Japanese guidelines. Additionally, the median STS score prior to TAVR explantation was 4.5%, classifying them as intermediate-risk cases. Nevertheless, it is important to note that several younger patients included in this study had high surgical risk factors that were not reflected in the STS score, and that the risk assessment assumed isolated AVR. Examples of high surgical risk factors not accounted for in the STS score include a 54-year-old female patient with a congenital metabolic disorder (mucopolysaccharidosis) with an STS score of 1.9%, as well as a 51-year-old male patient with large pulmonary bullae that made positive-pressure ventilation extremely difficult, with an STS score of 0.8%. Additionally, only 1 case (10%) underwent isolated AVR among the 10 cases, emphasizing the need to consider the STS score as a reference rather than a precise determinant of surgical risk.

Characteristics and social background of patients in Japan

In Japan, elderly individuals tend to have a longer average life expectancy (27), and the guideline-recommended age criteria for choosing between SAVR and TAVR differ from those in the U.S. (6) and European Union (EU) (28) guidelines. Additionally, since TAVR was introduced relatively late in Japan, the Japanese guidelines take a more cautious approach regarding its long-term outcomes. Specifically, SAVR is recommended for patients aged 75 years or younger, TAVR is recommended for those aged 80 years or older, and for patients between 75 and 80 years old, the decision is made through heart team discussions, incorporating patient preferences.

In other words, the recommended age for SAVR in Japan aligns with that in the EU guidelines and is higher than the 65-year threshold in the U.S. guidelines. Meanwhile, the recommended age for TAVR in Japan targets an older population compared to the EU guidelines, which specify 75 years or older. The JTVT national registry in Japan reports an average patient age of 84.4 years, significantly older than the average age reported in the U.S. transcatheter valve therapy (TVT) registry (11), resulting in older patients being eligible for TAVR. Consequently, TAVR explants for THV failure also could tend to occur at older ages compared to other regions. However, as indications for TAVR expand to younger patients, it is expected that cases requiring second interventions will increase, following trends observed in the U.S.

In addition, the anatomical compatibility and regulatory approval status of redo-TAVR also influence the decision for TAVR explantation. It has been reported that Japanese patients tend to have a smaller aortic root anatomy, raising concerns about an increased risk of coronary occlusion during redo-TAVR. According to reports from Japan (7,29), the risk of coronary obstruction in redo TAVR is estimated to be 26.2–52.1% following balloon-expandable THV and 71.3–78.9% following self-expandable THV.

These values are notably higher compared to reports from Western countries, where the risk is reported to be 2.0–23.6% for balloon-expandable THV and 41.1–45.5% for self-expandable THV (8,30). Furthermore, redo-TAVR using the SAPIEN 3 Ultra Resilia valve was approved in Japan in April 2024, but it is currently limited to initial THVs of the SAPIEN XT or SAPIEN 3 models, with no official approval for redo-TAVR following self-expandable THV failures. Redo-TAVR using supra-annular self-expandable THVs remains unapproved, posing a higher risk of patient-prosthesis mismatch (PPM) for smaller failed THV valves.

In our study cohort, three cases underwent TAVR explantation for SVD. The reasons for excluding redo-TAVR were the risk of coronary obstruction in two cases, and the rapid progression of bioprosthetic valve dysfunction due to metabolic disorders (necessitating conversion to a mechanical valve) in one case. As such, TAVR explantation rather than redo-TAVR may often be indicated for THV failure in Japan.

Characteristics of surgery

In this series, 90% of cases included concomitant surgery for other cardiac or great vessel conditions in addition to aortic valve procedures, consistent with other reports (15). In 3 cases (30%), annular repair was required due to damage potentially caused by direct THV extraction. In one case, preoperative CT with electrocardiogram (ECG) gating confirmed that the ventricular end of the self-expandable THV was in close contact with the membranous septum, allowing for anticipation of potential membranous septum damage (*Figure 3*) with explantation. As Kaneko *et al.* have advocated (13), preoperative CT assessment of the relationship between THV and aortic root structures facilitates surgical planning for extensive procedures. Accordingly, preoperative cardiac CT for TAVR explant cases is recommended as an important step to improve surgical outcomes.

In cases of a small aortic root, the device frame of the THV may come into proximity with and adhere to the STJ and the ascending aorta. Consequently, the frequency of requiring extended surgical procedures, such as root replacement or ascending aortic replacement, may increase during TAVR explantation (13). Aortic root replacement in patients with a small root requires different considerations for composite graft construction and coronary artery reconstruction compared to cases with root enlargement (31).

Additionally, when removing a small THV, the risk of prosthesis-patient mismatch increases due to SAVR conversion, raising concerns about a higher frequency of aortic root enlargement. In PVE cases, not only the fabric portion but also the bare stent portion of the THV can contribute to abscess formation. In this series, there was a case of PVE after high-frame self-expandable THV placement, which led to an infected abscess from the stent frame in contact with the ascending aorta, ultimately necessitating ascending aorta replacement (25). Additionally, in two PVE cases involving balloon-expandable THVs, abscesses formed in the aorto-mitral continuity, resulting in the need for MVR with aorto-mitral reconstruction (i.e., Commando procedure). Compared to SAVR devices, THV devices, which protrude significantly on both the ventricular and aortic sides, may necessitate careful attention to the risk of infectious destruction of adjacent structures, especially in PVE cases.

Early and long-term outcomes

The 30-day mortality in this series was high at 20%. One fatal case involved a patient with underlying polymucosaccharidosis, who had previously experienced prolonged heart failure following MVR, raising concerns about effective myocardial protection (32). This patient, despite being relatively young, had undergone initial TAVR but developed early SVD, requiring TAVR explantation. Another case involved an 82-year-old with PVE and a root abscess who underwent the Commando procedure. Although postoperative recovery was initially stable, rapid progression of undiagnosed cancerous peritonitis led to the patient's death. As previously reported, cases that progress to TAVR explant are often high-risk surgical candidates with poor outcomes expected. Some cases involve risk factors that are not captured in STS risk calculations, underscoring the need for careful deliberation within heart teams to make appropriate decisions.

Bridge TAVR

In this series, cases with favorable long-term outcomes were initial TAVR cases scheduled as bridge-to-elective SAVR, termed "bridge TAVR" cases. Two such cases were included. One involved severe AS with a bicuspid valve, a 55 mm ascending aortic aneurysm, and markedly reduced left ventricular ejection fraction (LVEF) (20%). The patient was also at high risk for positive-pressure ventilation due to

large pulmonary bullae. TAVR was first performed under local anesthesia, leading to an LVEF improvement to 65%, followed by bullae resection and, 6 months post-TAVR, TAVR explant and ascending aortic replacement (24). Another case involved a young patient with severe AS, bicuspid valve disease, and an ascending/aortic arch aneurysm, transferred to our facility in acute heart failure on mechanical circulatory support. Emergent TAVR with a self-expandable THV was performed, allowing circulatory stabilization, followed by rehabilitation for hypoxic brain injury, full recovery of activities of daily living (ADL), and TAVR explant plus total arch replacement 13 months later. Bridge TAVR allowed for an improved systemic condition and significantly reduced surgical risk for SAVR, permitting TAVR explant without extensive adhesion and leading to stable outcomes.

Conclusions

This study reports on the indications and outcomes of TAVR explantation in a single Japanese institution. The majority of TAVR explant cases involved elderly patients, with a high frequency of concomitant surgery, similar to Western reports, and with generally poor outcomes. As the number of TAVR explants is expected to increase in Japan, knowledge-sharing within heart teams, including cardiac surgeons, is essential.

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Footnote

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