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Sutureless aortic valve replacement in high-risk patients with infective endocarditis

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ABSTRACT

Objectives: This study aims to investigate whether sutureless aortic valve replacement (AVR) is a safe and technically feasible method in patients with infective endocarditits (IE).

Patients and methods: Between September 2019 and March 2023, a total of 10 consecutive patients (4 males, 6 females; mean age: 61.5±17.7 years; range, 29 to 80 years) who underwent sutureless AVR due to aortic valvular IE were retrospectively analyzed. Sutureless AVR was preferred in patients in whom suturing became complex after radical debridement. The pre, peri-, and postoperative results, and follow-up data of the patients were evaluated.

Results: The mean EuroSCORE was 23.85±20.4. The mean ejection fraction was 55.5±12.2%. Seven (70%) patients had prosthetic valve endocarditis, and three (30.0%) patients had native valve endocarditis. Eight (80%) patients had a history of cardiovascular surgery. Concomitant cardiac intervention was performed in four patients. Periprocedural mortality was observed in two patients. None of the patients required permanent pacemaker implantation. Infective endocarditis developed in one patient during follow-up, but reintervention was not needed.

Conclusion: Our study results suggest that sutureless AVR can yield favorable outcomes with low paravalvular leak rates and satisfactory hemodynamic performance and with no major adverse event in IE. We advocate the consideration of sutureless aortic valve replacement as a viable alternative in the management of IE, emphasizing the importance of meticulous execution and expertise to achieve favorable results.

Keywords: Aortic valve replacement, heart valve, infective endocarditis, prosthesis.

Infective endocarditis (IE) is a rare condition. Despite advancements in early diagnosis, new medical treatments, comprehensive antibiotics regimens, and accumulated experiences with surgical approaches, it is still associated with a high mortality rate and can present itself under various conditions.[1] Acute, subacute, and chronic states can manifest different symptoms in different organ systems with different severities. At the time of referral to a cardiac surgeon, IE has already caused multiorgan impairments such as valvular destruction, septic embolism to the central nervous system or peripheral vascular system, or abscesses in the skeletomuscular system.[2,3] Multiorgan dysfunction is already a high-risk factor for cardiac surgery, and the addition of the risks of re-exploration has led to high mortality in today's patient population.[4-6]

Surgical aortic valve replacement (SAVR) is a treatment method for advanced aortic valvular IE. In this approach, infected and damaged valvular tissue should be excised meticulously. Insufficient debridement of the aortic valve and its surrounding tissue can cause fatal complications such as reinfection, the formation of new vegetation and its embolism, paravalvular leakage (PVL), aortic pseudoaneurysm and even dislodgement of the aortic prosthesis. However, the high surgical risk scores of IE patients force surgeons to invent novel techniques or adapt existing techniques to lower the risk of these procedures.

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The development of new strategies to minimize the effects and shorten the duration of cardiopulmonary bypass (CPB) and arterial cross-clamp (AXC) is vital for reducing the risk of any cardiac surgery, not only in high-risk IE patients.[7-10]

Sutureless aortic valve replacement (Su-AVR) was introduced as a less invasive and rapid surgical approach for treating aortic valvular pathologies. It can be preferable in patients with calcified aortic valves and roots and small aortic annuli. The absence of the ring in sutureless valves leads to better hemodynamics, lower transvalvular gradients, and a better effective orifice area associated with a lower rate of patient–prothesis mismatch.[3,4] Additionally, owing to its hemodynamic advantages, Su-AVR significantly reduces the CPB and AXC times due to the simplicity of the procedure, and there is no significant difference in mortality or morbidity between Su-AVR and SAVR.[5,6]

In the current literature, despite the limited number and small sample sizes of studies reporting on the application of Su-AVR in patients with endocarditis, positive outcomes have been documented.[7] In the present study, we aimed to investigate whether sutureless AVR was a safe and technically feasible method in patients with IE.

PATIENTS AND METHODS

This single-center, retrospective study was conducted at Koşuyolu High Specialization Education and Research Hospital, Department of Cardiovascular Surgery between September 2019 and July 2023. A total of 141 patients underwent Su-AVR. Among these patients, 10 (4 males, 6 females; mean age: 61.5±17.7 years; range, 29 to 80 years) who had active IE were included. A Perceval™-S (CORCYM, previously LivaNova, Saluggia, Italy) aortic valve prosthesis was used in all the patients. Seven of those presented with IE caused by previously implemented valvular prostheses. The other three patients presented with native valve endocarditis. A written informed consent was obtained from each patient. The study protocol was approved by the Koşuyolu High Specialization Education and Research Hospital Ethics Committee (date: 06.02.2024; no: 2024/03/774). The study was conducted in accordance with the principles of the Declaration of Helsinki.

All patients were evaluated preoperatively by our institution's interdisciplinary Heart Team, which consists of cardiovascular surgeons, cardiologists, radiologists, pulmonologists, and infectious disease specialists. The Modified Duke criteria were used for differential diagnosis in association with cardiac imaging. Transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) were performed for all patients to identify possible vegetation, abscesses, or fistulas. Whole-body computed tomography (CT) was performed to detect possible septic embolism or IE-related complications.

Data were meticulously gathered from various reliable sources. Extensive preoperative information was obtained by scrutinizing medical records from relevant departments, such as cardiology, internal medicine, pulmonology, and nephrology. Furthermore, these physical records were cross-checked with the National Electronic Health Record to ensure precision. Postoperative data were extracted from both intensive care unit (ICU) and general ward records, supplemented by consultation with National Electronic Health Records.

Surgical technique

In our institution, we usually normally prefer to perform standard sternotomy for these patients, due to the possibility of complex disease. In only one patient, we performed upper reversed-T sternotomy due to anatomical suitability, the lack of abscess or pseudoaneurysm formation around the aortic root and the patient's insistent preference. In all cases, arterial cannulation was performed from the distal ascending aorta. In eight patients, double-stage venous cannulation from the right atrium was performed; in two patients, left atrial exploration was performed and bicaval cannulation was performed. Routinely, a venting cannula from the right superior pulmonary vein (RSPV) was used. Routinely isothermic blood cardioplegia was administered every 20 min in antegrade fashion. Proper deairing was performed and monitored via TEE via the aortic root via an aortic venting needle and from the RSPV with the patient in the Trendelenburg position.

Aortotomy was performed, and the native or prosthetic valve was decalcified and excised. Special care was taken to perform radical excision and debridement of all the vegetation and infected tissues. Of note, Su-AVR was performed in the patients as the complete excision of annular tissue in the valve,

resulting from endocarditis-induced destruction, left no available suture space. One patient underwent patch reconstruction at the level of the non-coronary cusp with the pericardium to the aortic annulus to achieve a proper site for fitting the valve and suturing space.

All patients in the study underwent sutureless valve replacement via a bioprosthetic nitinol-stented Perceval™ prosthesis. After the valve was sized, the Perceval™ sutureless aortic valve was placed in a standard manner over three guiding sutures (4-0 polypropylene) positioned at the lowest level of each resected and decalcified cusp. Then, the valve prosthesis was parachuted into the aorta, sliding on the guiding sutures and maintaining alignment with the aorta. After it was determined that the valve was in the correct position and fitted into the annulus, the balloon was expanded for 30 sec by 3 or 4 atm for all prosthesis sizes, if needed. Sterile 37°C saline was applied for the stabilization of the stent.

The aortotomy was closed with 4/0 continuous Prolene sutures with care to avoid intervening with the stents of the valve.

Antibiotic therapy and IE prophylaxis

All patients were treated with intravenous antibiotic therapy consisting of cefepime, vancomycin, and rifampicin, according to our standard regimen. The treatment regimen was usually planned to start four weeks before surgery and continue for two weeks after surgery, for a total of six weeks. Antibiotic therapy was changed according to sensitivity if a causative organism was isolated.

Statistical analysis

Statistical analysis was performed using the IBM SPSS version 22.0 software (IBM Corp., Armonk, NY, USA). In this study, categorical data were presented as percentages, representing the proportion of individuals in each category, while numerical data were expressed as mean values with their corresponding standard deviations (SD).

RESULTS

The mean EuroSCORE value was 23.85±20.4%. The mean ejection fraction was 55.5±12.2%. Seven (70%) patients had prosthetic valve endocarditis (PVE) and three (30%) patients had native valve endocarditis. Eight (80%) patients had a history of cardiovascular surgery. Among those eight patients, seven (87.5%) had a history of intervention in a cardiac valve. All patients suffered from multiple comorbidities (Table 1).

The intraoperative data of the patients are listed in Table 2. One of our operations was performed urgently due to severe aortic insufficiency and hemodynamic instability. In our study group, five of our patients needed concomitant surgery. Concomitant previous cardiac intervention was performed in five of the patients (50%). The mean CPB time was 159.7±36.4 min, and the mean AXC time was 83±24.3 min.

Postoperative outcomes are given in Table 3. The mean peak gradient of the aortic valve was 26.3±12.7 mmHg. In our study group, one patient needed postoperative re-exploration for bleeding. Three patients suffered from sepsis postoperatively, and one of them died due to septic shock on postoperative Day 74. This patient developed pneumonia after surgery, and the isolated microorganisms were different from those isolated via blood culture before surgery. Pneumonia progresses to sepsis and eventually causes patient death. In our study group, none of our patients experienced a stroke or transient ischemic attack. Although three of our patients had new-onset atrial fibrillation, none of them needed permanent pacemaker (PPM) implantation. None of the patients had a PVL on echocardiographic examination.

In total, two of our patients died in the early postoperative period (30-day mortality). The first patient was a 65-year-old male who had a history of coronary artery bypass grafting (CABG) and lung bullectomy. This patient also experienced chronic renal failure and was receiving dialysis. Additionally, the patient had vertebrobasilar insufficiency, peripheral arterial disease, and chronic obstructive pulmonary disease (under inhaler therapy). The patient's ejection fraction was 35%, with severe aortic regurgitation caused by a destructured valve but without any evidence of vegetative-obstructive material. Blood cultures revealed the presence of *Staphylococcus epidermidis* and *Staphylococcus lentus*. The patient's EuroSCORE II was 70.8%, indicating an extremely high risk of mortality. An urgent redo procedure involving isolated Su-AVR (Perceval™-S XL) implantation was performed. The patient was discharged from the ICU on postoperative

Table 1
Demographic data of the patients

Characteristics	n	%	Mean±SD
Age (year)			61.5±17.7
Sex			
Male	4		
Female	6		
Body mass index			26.59±4.37
Carotid disease	6	60	
Peripheral arterial disease	1	10	
Preoperative stroke	2	20	
Arterial hypertension	4	40	
Pulmonary hypertension	8	80	
Ischemic cardiomyopathy	2	20	
Atrial fibrillation	2	20	
Conduction abnormality	0	0	
Chronic obstructive pulmonary disease	1	10	
Type 2 diabetes mellitus (insulin-dependent)	2	0	
Chronic renal failure*	2	20	
Dialysis	1	10	
Reop surgery	8	80	
Previous surgery			
CABG	1		
AVR	3		
AVR+MVR	3		
AVR+Ascending aorta replacement	1		
LV ejection fraction (%)			55.5±12.2
Type of aortic valve dysfunction			
Aortic regurgitation	5	50	
Severe	4	40	
Moderate	1	10	
Aortic stenosis	9	9	
Severe	7	7	
Moderate	2	20	
Peak aortic valve gradient (mmHg)			70.1±27.8
Mean aortic valve gradient (mmHg)			28.8±16.9
End systolic/end diastolic diameter (cm)			3.73±5.45
Native aortic valve/prosthetic aortic valve	3/7	30/70	
Types of bacteria in hemocultures			
Staphylococcus aureus	4	40	
Coagulase negative *Staphylococcus*	4	40	
Enterococcus	1	10	
Enterobactericia	1	10	
EuroSCORE II			23.85±20.4

SD: Standard deviation; CABG: Coronary artery bypass grafting; AVR: Aortic valve replacement; MVR: Mitral valve replacement; LV: Left ventricle; * Chronic kidney failure is defined as a glomerular filtration rate <60 mL/min/1.73 m^2.

Table 2
Intraoperative characteristics

Variables	n	%	Mean±SD
Urgent procedure	1	10	
Emergent procedure	0	0	
Concomitant procedures	5	50	
CABG	2	20	
MVR	2	20	
Aortic root patch repair	1	10	
Intraoperative findings			
Vegetation/thrombus	7	70	
Abscess	1	10	
Destruction of aortic valvular tissue	4	40	
Aortic root pseudoaneursym	1	10	
Perceval size			
S	4	40	
M	3	30	
L	1	10	
XL	2	20	
CPB time (min)			159.7±36.4
AXC time (min)			83±24.3
Intraoperative complication	1*		
Second AXC	1*		
Using a second sut-AVR valve	1*		
Use of inotropes or vasopressors			
Dobutamine	8	80	
Noradrenaline	5	50	
Adrenaline	2	20	
Milrinone	0	0	
Vasopressine	0	0	
ECMO	0	0	

SD: Standard deviation; CABG: Coronary artery bypass grafting; MVR: Mitral valve replacement; S: Small; M: Medium; L: Large; XL: X-large; CPB: Cardiopulmonary bypass; AXC: Arterial cross-clamp; ECMO: Extracorporeal membrane oxygenation; AVR: Aortic valve replacement; * Patient presented with an aortic root abscess and pseudoaneurysm; even though complete debridement was performed, sufficient aortic root tissue was present, so the Sut-AVR valve was implemented. However, after the removal of the AXC and during weaning from CPB, a tear was detected at the aortic root. The surgical team was unable to control the bleeding, a second AXC was administered, and root repair with a pericardial patch was performed. The sutureless valve was removed to perform the procedure. The root was repaired successfully, and a second sutureless valve was deployed.

Day 4. However, the patient was readmitted to the ICU with dyspnea six days after being transferred to the ward and was electively reintubated. A chest X-ray revealed pulmonary infiltration and pleural effusion. Although extubation was attempted several times during follow-up, the patient had weak muscle strength and poor respiratory effort and was unable to tolerate it, leading to a tracheostomy being performed at three weeks. Due to inadequate oral intake, a percutaneous endoscopic gastrostomy (PEG) was placed on postoperative Day 55. After Day 60, the patient developed hemodynamic instability and sepsis. On Day 65, the patient progressed to septic shock, and despite all interventions, the patient was lost on postoperative Day 74.

The second patient was an 80-year-old female with a history of a bioprosthesis AVR. The patient presented with two large vegetations (13×7 mm and 5×4 mm) on her prosthesis. The patient also had mild pulmonary hypertension (57 mmHg)

Table 3
Postoperative outcomes

Variables	n	%	Mean±SD
Re-exploration for bleeding	1	10	
Stroke/transient ischemic attack	0/0	0/0	
Transient ischemic attack	0	0	
Erythrocyte concentrate transfusion (mean unit per patient)			5±2.7
Sepsis	3	30	
Pneumonia	3	30	
Myocardial infarction	0	0	
Atrial fibrillation	3	30	
Pacemaker (permanent/transitory)	0	0	
Acute kidney failure (need for transitory CRRT)	1	10	
Chronic kidney failure (A new onset/worsening in CKD stage)	0	0	
Paravalvular leakage	0	0	
Peak/mean transaortic gradient (mmHg)			26.3±12.7/13.8±5.6
Time on ventilator (h)			17±9.2
Inotrope or vasopressors (mean administration duration in days)			
Dobutamine (day)	8	4.2	
Noradrenaline (day)	5	3.6	
Adrenaline (day)	3	4	
Milrinone	0	0	
Vasopressine (day)	2	0.8	
ICU stay (day)			5±1.4
Postoperative in-hospital stay (day)			15.5±4.2
In-hospital mortality	20		

SD: Standard deviation; CRRT: Continuous renal replacement therapy; ICU: Intensive care unit; CKD: Chronic kidney disease.

Table 4
One-year follow-up outcomes

Variables	n	%	Mean±SD
Peak gradient of the aortic valve (mmHg)			25.3±11.3
Mean gradient of the aortic valve (mmHg)			13.7±6.3
Paravalvular leak (total)	2		
Mild	2		
Moderate	None		
Severe	None		
Reintervention	10*	1	
Infective endocarditis	1.0**	10	
Transient ischemic attack	0	0	
Stroke	0	0	
Survival	70	7	

SD: Standard deviation; * Reintervention was due to Infective Endocarditis in the mitral valve, which was not present in the first case; ** The same bacteria were isolated from the hemocultures, which was considered a relapse of the infection.

caused by severe mitral regurgitation. The patient underwent a redo Su-AVR (Perceval™-S, M) and mitral ring annuloplasty. The patient developed systemic inflammatory response syndrome and acute kidney failure postoperatively. The patient was unresponsive to the treatment and inotropes and died on postoperative Day 3.

The mean follow-up was 13.4±8.7 months. Table 4 outlines the one-year follow-up outcomes of the cohort. The mean peak gradient of the aortic valve during follow-up was 25.3±11.3 mmHg. Although intraoperative TEE and early postoperative TTE revealed no PVL, PVL was present in these two patients at follow-up after discharge. Both instances of PVL were mild, and intervention was deemed unnecessary. One of the patients in whom PVL was detected previously underwent a concomitant aortic root repair procedure. The PVL was identified post-discharge and was classified as mild, with no associated hemodynamic complications or hemolysis. The patients remain alive and continue to attend routine follow-ups every six months.

Readmission was necessary in one case. This patient was diagnosed with IE with the Duke criteria (1 major: a common causative microorganism was isolated in three separate blood cultures; 2 minor: history of IE, fever greater than 38°C). There was no vegetation or valvular dysfunction present. The patient received six weeks of antibiotic therapy, and there was no sign of infection afterward. Transient ischemic attack (TIA) or stroke was not observed in any patient within one year.

On follow-up, we lost a 37-year-old female with a previous history of concomitant aortic and mitral valve replacement and who was discharged from the hospital on postoperative Day 10. With this patient and the two patients who were lost during the early postoperative period, our overall one-year survival rate was 70%.

DISCUSSION

In this study, we present our experience with the use of Su-AVR for IE at the aortic valve. A total of 10 high-risk patients with a mean EuroSCORE II of 23.85±20.4% underwent Su-AVR. Our study results showed that Su-AVR could be a an alternative and technically feasible option for selected patients with IE at aortic valve.

Table 5
Studies evaluating Su-AVR in IE

Study	Year	Number of patients	EuroSCORE II (mean)	Valve type	Stroke	PVL discharge (%)	PPM (%)	Postoperative mortality (%)	Follow up time/ mortality %
Mosquera, et al.[7]	2023	36	24.9	Perceval	5	8 Trivial-mild	8	13.9	1 year 27.9 5 year 38.6
Zubarevich, et al.[6]	2022	13	28.7	Perceval	0	0	0	23.1	6 month 46.2
Roselló-Díez, et al.[13]	2017	9	16.3	Perceval	NA	33.3 Trivial-mild	11.1	22.2	6 month 22.2
Weymann, et al.[10]	2017	9	(median) 29.5	Perceval	0	0	0	0	(median) 7 months 11.1
Lio, et al.[17]	2015	5	25.8	Perceval	0	NA	0	20	NA

AVR: Aortic valve replacement; IE: Infective endocarditis; PVL: Paravalvular leak; PPM: Permanent pacemaker; NA: Not applicable.

Infective endocarditis is a unique pathology in the vast world of cardiac surgery. Most valvular pathologies have specific symptoms and a predictable course of development. How they affect cardiac physiology and hemodynamics is predictable. The effects of valvular pathologies on other organ systems are also highly predictable. However, the ability of IE to influence different valves with different pathologies and its ability to spread not only in cardiac structures, but also in other organ systems makes it highly challenging to manage.[2-6] Radical excision of the valvular structure and debridement of the surrounding structure are the main steps of IE surgery. This debridement process and the possibility of the involvement of other cardiac structures make IE surgery a high-risk procedure, and its results are highly dependent on the surgeon's experience and how complicated the pathology is. In addition to the complexity of the surgery, other existing end-organ impairments, either dependent on or independent of IE, increase the in-hospital mortality rates to 15 to 30%.[6]

As a clinical approach, for non-IE patients, we may prefer Su-AVR to achieve better valve hemodynamics and ease of surgery in some patients who are considered to be at high risk and have a narrowed aortic annulus. For IE patients, we resect infected tissues diligently and carefully to avoid complicated situations such as reinfection and abscess formation. Our strategy is usually to use a bioprosthetic valve in IE patients. After the aortic annulus is examined and the damaged valvular apparatus and vegetation are resected, a bioprosthetic valve, a sutureless valve or sometimes a change in the whole aortic root, such as the Bentall operation, can be performed.

In cases where the aortic annulus is severely damaged or where an abscess develops, the annulus may need to be reconstructed. In such cases, after massive debridement, deformities in the aortic root may lead to complete changes in the aortic root. Additionally, placing single or pledgeted sutures and a stented valve may become challenging in cases where the annulus has been reconstructed. Zubarevich et al.[7] and Mosquera et al.[8] reported that 15.3% and 44% of patients, respectively required pericardial patch repair. In our series, a pericardial patch was utilized in only one patient (10%).

The reason for mortality in two patients was unrelated to the prosthesis used, but rather to the complexity of the procedures and multimorbidity of the patients. Many of our patients also presented with prosthesis endocarditis (70%). Prothesis endocarditis has a high mortality rate compared with non-endocarditis valvular surgery.[9] In the current literature, prosthesis endocarditis has an estimated mortality rate of approximately 20 to 80%.[10] In-hospital mortality rates for patients with IE undergoing Su-AVR range from 0 to 23.2%.[7,11] Differences in mortality rates may vary depending on the patient's clinical condition, deformities in terms of the severity of destruction at the aortic annulus and aortic root, and comorbidities.

As previously discussed, PVE has significantly higher mortality than native valvular endocarditis. Glaser et al.[12] conducted the most robust studies on PVE after SAVR. In this study, PVE occurred in 3.53% of the patients; however, mortality rates were not reported. Andrade et al.[10] also published their results on PVE after SAVR. The percentage of PVE after SAVR was 3.7%, similar to that reported by Glaser et al.[12] In the study of Andrade et al.,[10] 40.6% of the PVEs occurred in the aortic position. One-year mortality was 22% in patients with endocarditis in all valvular positions after SAVR. In another study, Sepehripour et al.[13] published the results of the Su-AVR in its early stages. In the aforementioned study, PVE was seen at a rate of 2.1 to 3.1% after Su-AVR. This result was also reported for non-endocarditis patients. In our study, only one patient (10%) was diagnosed with IE after Su-AVR. However, the diagnosis was based on the Duke criteria (the patient had positive hemocultures, persistent fever >38°C, a prosthetic valve and underwent surgery due to IE during the first operation), and no vegetation was found on the prosthesis or other cardiac structures.

In our study group, no cases of PVL were observed at the time of discharge. However, during the follow-up period, two patients were found to have mild-to-trace PVL, which did not require intervention. In the literature, Zubarevich et al.[7] and Weymann et al.[11] reported no cases of PVL before discharge in their series. On the other hand, Roselló-Díez et al.[14] and Mosquera et al.[8] reported pre-discharge PVL rates of 33.2% and 8%, respectively, in their series of IE patients who underwent Su-AVR, none of whom required intervention or experienced progression. Considering this complicated patient group, we believe that

this non-progressive, mild paravalvular leak is acceptable in this patient group given the very good hemodynamic performance of the valves.

Conduction problems are common in aortic valvular surgeries. Although the need for PPM implantation is uncommon, it leads to a longer hospital stay, a need for additional invasive procedures, and an increase in the number of foreign bodies, which increases the risk for future infections. The reported postoperative PPM implementation for SAVR varies between 3% and 10%. Clemence et al.[15] reported that the need for PPM implementation was significantly greater in patients with aortic valvular endocarditis. Vogt et al.[16] reported that Su-AVR has an increased risk of needing PPM: 8.1% for Su-AVR and 2.7% for SAVR. Robich et al.[17] reported a need for PPM implementation after SAVR increased over time. Although it is not entirely clear, one possible reason might be patients' advanced age and comorbidities. However, they also reported that Su-AVR had lower rates of needing PPM, when concomitant mitral valve surgery was performed than when concomitant SAVR and mitral valve surgery were performed. However, a greater risk for a PPM-dependent AV block has been reported in both endocarditis patients and in Su-AVR patients. In the aortic valve endocarditis series in which Su-AVR was implanted, the rates of PPM varied between 0 and 11.2%.[14,18] Zubarevich et al.[7] reported that none of their patients needed PPM implementation. Our study shows a similar result. None of our patients required PPM implementation. Postoperative tachyarrhythmia rates are also similar, with a slightly lower incidence in our study (53.8% in Zubarevich et al., 30% in our study). The pre, peri-, and postoperative findings of recent studies of Su-AVR in patients with aortic valve IE are summarized in Table 5.

As previously mentioned, sutureless aortic valves are not routinely preferred in endocarditis surgery; however, they represent an alternative valve type that can be utilized in complex cases. Although the absence of sutures or pledgets in sutureless valves may appear advantageous in terms of reducing the risk of infection, it is crucial to acknowledge the potential for undesirable outcomes due to paravalvular leaks that may occur when these valves are implanted in a destructed annulus. Therefore, while sutureless valves may not be routinely employed in cases of infectious endocarditis, they can be considered as an alternative approach particularly in cases where annular area is suitable for sutureless valve implantation easily and suturing in the annular region is problematic.

The main limitations to this study are that it is a single-center, retrospective study with a relatively small sample size and no randomization. Due to the small cohort size, no specific statistical analyses were able to be performed. Additionally, the follow-up time was relatively short. The safety and efficiency of this approach can be validated with prospective studies with larger cohorts and long-term follow-up.

In conclusion, the standard surgical approach for IE at the aortic valve is AVR with a bioprosthetic valve. In cases of IE where radical resection leaves no suture area available, Su-AVR may serve as a rapid, reliable, and technically feasible option. Additionally, it may be preferred in selected high-risk patients with elevated comorbidities due to IE owing to its ability to provide short durations of CPB and cross-clamping. Our study demonstrated that Su-AVR resulted in low PVL rates and favorable hemodynamic outcomes. Additionally, there were no major adverse events related to the sutureless valve during follow-up after Su-AVR in IE patients. Taken together, we believe that Su-AVR can be recognized as an alternative approach in the management of IE in selected cases with anatomical suitability by surgeons, and positive results can be achieved when this procedure is carried out meticulously and with expertise.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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