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Editorial

Prosthetic Valve Endocarditis: Upcoming Rising Issue in Increased Transcatheter Heart Valve Procedure Era

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▸ See the article "Comparative Surgical Outcomes of Prosthetic and Native Valve Endocarditis" in volume 51 on page 504.

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Despite improvements in medical and surgical treatment, infective endocarditis (IE) remains a serious disease that carries considerable mortality and morbidity.[1] Prosthetic valve endocarditis (PVE) is a serious, life-threatening complication of valve replacement accounting for 10–30% of all cases of IE with an incidence of 0.3–1.2% per patient per year.[2] Unfortunately, the incidence of IE has been reported to be increasing, and is strongly associated with increasing number of cardiac procedures with implanted prosthetic material,[3] so PVE is inevitable upcoming issue in recent era.

Due to treatment advances, the mortality rate of PVE has dramatically decreased over time, however, mortality remains still high and the reason is that complications are more frequent due to specific pathogenesis, *Staphylococcus aureus*[4] and technical complexity from extensive anatomical destruction during removal of previous prosthesis.

In this issue of *Korean Circulation Journal*, Pyo et al.[5] reported comparative surgical outcomes of PVE and native infective endocarditis (NVE). They concluded that PVE carried significant perioperative risks (the early mortality rates:14.3%), and was an independent risk factor of overall mortality. In detail, PVE patients were older, more commonly had aorto-mitral curtain involvement with abscess formation, higher incidences of low cardiac output syndrome (mechanical support, 12.5%), newly initiated dialysis (19.6%), reoperation for bleeding (14.3%) and early permanent pacemaker implantation (12.5%) compared to NVE group. As we know very well, these conclusions similarly accord with previous studies about PVE and can easily agree with authors' suggestions.

PVE operation consists of three challenging steps, the first is a safe exposure of heart from adhesive condition due to previous operation, the second is a complete extraction pf previous infected prosthesis including debridement of infected native tissue, and the third is an implantation of new prosthesis in healthy tissue after reconstruction of using autologous or bovine pericardium if needed. Every step needs more procedural times, which unavoidably induce prolonged cardiopulmonary bypass time, in consequence these are strongly related with more postoperative morbidities.

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Survival with regard to location of valve implantation for PVE have shown a superiority in aortic position from many studies. Hetzer et al.[6] suggested that the survival was significantly different after aortic valve replacement (AVR) compared to mitral valve replacement (MVR): the 30-day, 1- and 5-year survival for the AVR group was 80±4.8%, 73.7±5.3% and 53±7.2% compared to 67.2±6.0%, 50.7±6.4% and 36.9±6.7% for the MVR group (p=0.023) from their 22-year single-center experience.

The causative agents in PVE are also predicting factors for surgical result and they are some different according to onset time after initial valve implantation. The most common microorganisms causing early PVE (within two months of implantation) are *S. aureus* (36%), coagulase negative staphylococci (CNS) (17%), and fungi. In PVE occurring later, the incidence of *S. aureus* and CNS decreases (18–20%) in favor of the enterococci and Streptococcus viridans (10–13%). Of them, patients with PVE caused by *S. aureus* represent a unique subgroup characterized by increased risk of complications and higher mortality[7] and PVE caused by Candida species is a rare but catastrophic disease with mortality rates reaching 37–62.5%,[8] and Hetzer et al.[6] also suggested that *S. aureus* (18.1%) was the most frequent causative micro-organism and it is strong predictor for in-hospital mortality.

In recent transcatheter aortic valve replacement (TAVR) era, TAVR IE is a rising issue and its surgical or medical treatment is a key debate in field of PVE IE. Adnan Khan reported a systematic review using 11 studies about TAVR IE and the incidence of post IE varied from 0–14.3% (3.25%). Enterococci were the most common causative organism isolated from 25.9% of cases followed by *S. aureus* (16.1%) and CNS species (14.7%). The mean in-hospital mortality and mortality at follow-up was 29.5% and 29.9%, and the septic shock occurred in 10% and 27.7% TAVR IE patients according to 2 studies. The surgical intervention and valve-in-valve procedure were reported in 11.4% and 6.4% cases, respectively.[9] Until now, surgical results for TAVR IE are still unclear because almost patients underwent TAVR initially don't want to get surgical AVR and they hesitated or refused for surgical therapy although their clinical conditions were very poor from infection. So, only a minority of them (10%) have undergone treatment with surgical explantation of the infected prosthesis. Unfortunately, the precise role and timing of cardiac surgery in TAVR IE is yet to be defined, with a lack of clear evidence to help identify which patients should be offered surgical intervention. Some reports were published as a small case series for surgery of TAVR IE and all cases were very complicated and challenging in terms of technical complexity and patients' clinical status.

P. G. Malvindi retrieved surgical treatment of TAVR IE, focusing on pre- and intraoperative characteristics and early outcome. 37 articles provided information on 107 patients. Their mean±standard deviation (SD) age was 76±8 years and 72% were male. The mean ± SD time interval between the TAVR procedure and reoperation was 10±10 months. Annular abscess formation was described in 34% of cases and MV involvement in 31%. All patients underwent TAVR prosthesis explantation and surgical AVR. They suggested that surgical explantation of infected TAVR prostheses was associated with a high postoperative mortality, although these initial experiences included elderly and high-risk patients. Considering the expansion of TAVR recommendation for younger and lower-risk patients, surgical treatment of TAVR IE may represent the best option for a life-saving complete procedure.[10]

Now, PVE becomes a rising issue in recent increased heart valve procedure era and we have to understand completely the clinical characteristics of PVE, from this lesson, set the precise

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guideline for treatment of PVE, especially transcatheter prosthesis infection which can induce hazard complications.

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