Editor-in-Chief, Professor Ruchika Meel
Sandton Mediclinic, Bryanston, Johannesburg, South Africa
University of the Witwatersrand, Johannesburg, South Africa

Valvular heart disease and its growing impact in South Africa

Valvular heart disease (VHD) remains a major health concern worldwide,[1] but in sub-Saharan Africa, it presents a unique and complex challenge.[2-4] VHD encompasses a range of conditions affecting the heart valves, and its impact is felt across a diverse spectrum of patients, from those with congenital defects to those with acquired diseases. A combination of long-standing rheumatic heart disease (RHD), the growing burden of infective endocarditis (IE), and the increasing recognition of secondary tricuspid regurgitation (TR), and congenital heart disease (CHD) highlights the multifaceted nature of valvular disease in the South African setting. The studies featured in the current issue of the Journal highlight the need for a more personalised approach to the diagnosis, treatment, and long-term management of these conditions.

One of the most concerning aspects of VHD in South Africa is the enduring prevalence of RHD, which remains a significant cause of mortality and morbidity, particularly among younger populations.[3,4] A study conducted in KwaZulu-Natal by Naidoo, revealed a strikingly high mortality rate of 20.1%, with younger patients, especially those under 20 years of age, experiencing the worst outcomes. In these patients, heart failure often manifests as a direct result of ongoing carditis, with mitral regurgitation being the most common valve lesion. Despite progress in surgical techniques and valve replacement, managing this condition remains a significant challenge in Africa,[5] with factors such as severe disease in younger patients and the requirement for double valve replacements serving as predictors of mortality, as highlighted by Naidoo.

The high mortality rate linked to IE adds to the already significant burden of valvular disease in South Africa.[6,7,8] In a retrospective study by Poerstamper, et al. comprising a cohort of 75 patients, the 6-month mortality rate was a staggering 34.7%, with cerebral embolism being the most common complication. While the role of RHD as a risk factor for IE persists,[6,8] there is a notable shift towards Staphylococcal infections, resembling trends seen in high-income countries. Additionally, the high incidence of blood culture-negative IE presents a significant diagnostic challenge, potentially contributing to the poor outcomes observed in these patients. These findings highlight the urgent need for improved diagnostic techniques and tailored therapeutic strategies to mitigate the impact of IE on South African patients.

Secondary TR is more prevalent than primary TR, accounting for over 90% of cases in recent studies.[9] Secondary TR is another significant concern, particularly in patients undergoing surgery

for left-sided heart valve disease. Naidoo, et al. evaluated outcomes in 83 patients with mild or greater TR who underwent surgery for left-sided valvopathy found that a multidisciplinary, guideline-directed approach resulted in good short-term outcomes. Sixty seven percent of patients were free from significant TR at 6 months, and 86.7% were alive at follow-up. Despite these positive results, predictors of recurrent TR included female gender, rheumatic valvopathy, and elevated right ventricular systolic pressure. Interestingly, there were no significant differences in primary outcomes between patients who underwent tricuspid valve repair and those managed conservatively.

This study suggests that while tricuspid valve repair may not provide a clear advantage over conservative management in the short term, the management of secondary TR requires careful consideration of individual risk factors and a multidisciplinary approach. Further long-term studies are needed to determine the best treatment strategy for secondary TR, particularly in the context of RHD, which is still prevalent in South Africa.

The occurrence of clinically significant TR in patients undergoing de novo implantation of cardiovascular implantable electronic devices (CIEDs) has been reported to be as high as 39%, and it serves as a predictor for TR progression.[9] The overall prevalence of CIED-related TR remains challenging to determine, with estimates ranging from 0.5% - 5%. In a prospective study by Du Toit, et al. on lead-induced TR following permanent endocardial lead implantation for cardiac pacemakers sheds light on this facet of secondary TR. It included 30 adult patients who underwent pacemaker implantation. TR was evaluated using 2-dimensional echocardiography before implantation, at 6 weeks, and again at 9 - 16 months post-implantation. The study found that TR grade worsened in 46% of patients over the follow-up period. However, despite this progression, the TR did not become clinically significant (moderate or severe). Right ventricular (RV) function, RV dimensions, and right atrial area remained normal, and there was minimal correlation between baseline TR and the post-implantation measurements of RV function and size. This suggests that while the development of TR is a common occur-rence following pacemaker implantation, it does not typically result in clinically significant dis-ease. However, this was a small study and quantitative echocardiographic assessment of TR was not done.

Severe TR is linked to reduced survival rates.[9,10] Secondary TR, especially when associated with underlying heart conditions like left-sided valvular disease or pacemaker implantation, necessitates careful monitoring, long-term follow-up, and management by a heart team.

Severe aortic stenosis (AS) is another important aspect of valvular heart disease in South Africa, where delayed diagnosis often leads to significant myocardial damage. For patients with severe AS, early detection and intervention are critical.[11] Timely aortic valve replacement (AVR) can improve outcomes, but the underlying myocardial changes must be addressed to prevent irreversible damage. A narrative review by Rajah, et al. on the myocardial changes associated with aortic stenosis (AS) emphasised that AS is not merely a valve disorder but a condition that involves maladaptive remodelling of the myocardium. Left ventricular hypertrophy, interstitial fibrosis, and subendocardial fibrosis due to ischemia contribute to the worsening of left ventric-ular systolic dysfunction, even after AVR. The review emphasises the need to differentiate

Editor-in-Chief,
Ruchika Meel

between afterload mismatch and true contractile dysfunction to optimise management and improve outcomes. Further research is needed to better understand the molecular mechanisms of maladaptive remodelling and to develop new therapies that could prevent or mitigate these changes before AVR.[11]

Pulmonary stenosis (PS) is predominantly a congenital condition. Isolated PS is rare, affecting about 1 in 2 000 live births globally, and constitutes approximately 8% of all CHD cases.[12] The study at hand by Raphulu, et al. conducted over 3 decades at a tertiary institution, examined patients who underwent percutaneous balloon pulmonary valvuloplasty (PBPV) between 1985 and 2019. It offers valuable insights into the long-term outcomes of PBPV in patients with moderate to severe PS. A total of 68 patients were included in this retrospective, descriptive analysis, all of whom underwent balloon valvuloplasty after meeting specific echocardiographic criteria. The results of the study are promising, with a significant reduction in the peak instantaneous gradient from 79mmHg before the procedure to 33mmHg afterward ($p<0.001$). This marked improvement in haemodynamics speaks to the efficacy of PBPV in relieving the pressure load on the RV and improving overall circulatory function.

The study reports a success rate of 88%, a testament to the high effectiveness of this intervention. However, as with any medical procedure, complications are a consideration. In this cohort, 11.7% of patients experienced complications, with 1 procedural death. While complications were rare, they highlight the importance of a well-planned approach to the procedure and vigilant management of any arising issues. When conducted by skilled practitioners, the risks associated with PBPV are minimal, and the benefits far outweigh the potential drawbacks. As the treatment of congenital PS continues to evolve, PBPV remains a critical intervention in managing valvular heart disease, with promising results for both paediatric and adult populations.

In conclusion, valvular heart disease in South Africa remains a critical health issue, with diverse and complex challenges. A multidisciplinary, guideline-driven approach to the management of valvular disease, coupled with ongoing research, is essential to improve patient outcomes. Only through these efforts can we hope to mitigate the significant burden of valvular heart disease in South Africa and ultimately improve the quality of life and survival rates for affected patients.

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