



## Editorial

## Right-sided infective endocarditis: Insights into the forgotten valve

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There is a rising trend in incidence of infective endocarditis [1,2]. The injection drug use (IDU) epidemic and the aging population with associated use of intracardiac implantable electronic devices are contributing factors. The 2007 American Heart Association, 2008 National Institute for Health and Clinical Excellence (UK) and 2009 European Society of Cardiology restricted the antibiotic prophylaxis guidelines to high-risk patients and to certain invasive procedures. This may also have had an impact, although there is conflicting data to support this notion [1,3]. Compared with left-sided IE, there is relatively little data on surgery for right-sided IE with few clinical practice guidelines (Table 1) [4,5].

Di Mauro and colleagues' [6] data on the clinical outcomes of 157 patients undergoing surgery for tricuspid valve infective endocarditis (TVIE) in the Italian Registry for Surgical Treatment of Native or Prosthetic Valve Infective Endocarditis is therefore timely. They demonstrated that 1) TVIE was associated with IDU in 38% and cardiac implantable electronic device leads in 21%; 2) patients with history of IDU were younger ( $36 \pm 8$  vs.  $54 \pm 17$ ), had lower repair rates (42% vs. 54%) and less early deaths (7% vs. 13%) than non-IDU patients; 3) survival rates were acceptable (66% and 60% at 10 and 20 years); and 4) risk factors for mortality were IDU (HR 4.9), infected prosthesis replacement (HR: 4.4), then mycotic TVIE (HR: 4.2).

The finding of a high mortality with IDU-associated TVIE is an important one. Patients who inject drugs are typically younger with comorbidities including HIV, Hepatitis B & C, alcohol abuse, and mental health conditions [7]. Such patients often have limited social supports and inadequate primary health care. The median survival for a patient abusing drugs is 3 years [7]. As these patients are young with few chronic illnesses, they have a relatively low operative mortality despite often presenting in significant hemodynamic compromise. In this study, there was indeed a lower operative mortality in the IDU-population but the long-term outcomes were not reported separately. Data from a large study of the National Readmissions Database found a high risk of readmission for sepsis (15.6% vs. 5.2%;  $p < 0.001$ ) and recurrent drug abuse (7.3% vs. 0.9%;  $p < 0.001$ ) in the IDU population [8]. Of patients with IDU, 12% in this study underwent mechanical tricuspid valve replacement. As a rule, we do not use of mechanical valves for patients with IDU history given the risk of bleeding and thrombosis on poorly managed oral anticoagulation.

The early mortality for all TVIE in this study was 11% [6]. From a technical standpoint, tricuspid surgery is straightforward and can even be performed on a beating heart. However, outcomes of surgery for tricuspid regurgitation are worse than what is seen for mitral or aortic valves. Surgical mortality may be adversely impacted by the practice of delaying operative interventions, thereby allowing for the development of RV dysfunction and secondary hepatic dysfunction as well as multiorgan dysfunction due to sepsis.

Interestingly, there was no difference in outcomes between TV repair and replacement in this study [6]. This differs from our systematic review and meta-analysis of 12 retrospective observational studies with 1165 patients [9]. In that analysis, valve repair was associated with lower rates recurrent IE (RR: 0.17, 95% CI: 0.05–0.57,  $p = 0.004$ ) reoperation (RR: 0.26, 95% CI: 0.07–0.92,  $p = 0.04$ ) and permanent pacemaker implantation (RR: 0.20, 95% CI: 0.11–0.35,  $p < 0.001$ ). Data from the Nationwide Inpatient Sample of 28,726 patients (all-comers) that underwent tricuspid valve surgery also report a mortality benefit for repair over replacement [10].

What is missing in this paper and from most surgical reports of IDU-IE is the aspect of addictions counselling. Surgical team are generally very good at repairing or replacing the tricuspid valve and treating the end organ cardiac manifestation of IDU but often miss

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**Table 1**  
Guidelines for surgery on right-sided infective endocarditis.

| 2015 AHA Guidelines Infective Endocarditis in Adults AHA (2015) | 2015 ESC Guidelines for the management of infective endocarditis                      |
|---|---|
| Surgery for patients with complications (Class IIa; LOE C)      | Surgery for right heart failure and severe tricuspid regurgitation (Class IIa, LOE C) |
| Valve repair over replacement (Class I; LOE C)                  | Surgery for fastidious organisms or bacteraemia >7 days (Class IIa, LOE C)            |
| Individualized choice of valve prosthesis (Class IIa; LOE C)    | Surgery for vegetations >20 mm and recurrent pulmonary emboli (Class IIa, LOE C)      |
| Avoid surgery when possible in IDU patients (Class IIa; LOE C)  |   |

AHA, American Heart Association; ESC, European Society of Cardiology; IE, infective endocarditis; IDU, injection drug use; LOE, level of evidence.

the chance to involve social work and psychiatry, ethicists and addiction medicine specialist for longitudinal treatment preoperatively and following hospital discharge. These patients are often admitted under a surgical service for several weeks post operatively – a golden opportunity for a multidisciplinary team effort. Like others, we have struggled with high short term post-operative mortality from recurrent drug use in our patients. Involving a multidisciplinary mental health team to assist these patients in the development of the skills necessary to overcome or deal with the challenges of addiction will surely result in improved outcomes. Most centers offer an initial psychiatric consult (an addictions specialist is ideal). Post-operatively we offer ongoing drug rehabilitation follow-up with our psychiatric team and classes; however, attendance remains low and over half still re-present with a subsequent drug overdose or recurrent infection (unpublished observations). We advocate for the establishment of a multidisciplinary Endocarditis Team with input from surgery, cardiology, infectious disease, psychiatry/addictions service, ethics/social work and other services as necessary to better manage these high-risk patients especially from their chronic addiction illness [7]. Involvement and “engagement” from the patient and family supports are integral for success. It will remain to be seen whether the results of these efforts will move the dial for this vulnerable and highly stigmatized patient population.

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None.

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