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THE PRESENT AND FUTURE

REVIEW TOPIC OF THE WEEK

Transcatheter Therapies for Treating Tricuspid Regurgitation

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CME Objective for This Article: At the end of this activity the reader should be able to: 1) discuss the main mechanisms of tricuspid regurgitation; 2) describe the imaging (mainly echocardiographic) features for grading the severity of tricuspid regurgitation; 3) discuss prognosis and surgical management of isolated tricuspid regurgitation; and 4) discuss the main catheter based therapies that are emerging as an alternative treatment for isolated severe tricuspid regurgitation.

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Transcatheter Therapies for Treating Tricuspid Regurgitation

ABSTRACT

Tricuspid valve (TV) disease has been relatively neglected, despite the known association between severe tricuspid regurgitation (TR) and mortality. Few patients undergo isolated tricuspid surgery, which remains associated with high in-hospital mortality rates, particularly in patients with prior left-sided valve surgery. Patients with severe TR are often managed medically for years before TV repair or replacement. Current guidelines recommend TV repair in the presence of a dilated tricuspid annulus at the time of a left-sided valve surgical intervention, even if regurgitation is mild. This proposed algorithm aims to prevent the inevitable progression to severe TR and the need for a second surgical intervention. Recently, novel transcatheter treatment options were developed for treating patients with severe TR and right heart failure with prohibitive surgical risk. Here we describe currently available transcatheter treatment options for severe TR implanted at different levels: the junction between vena cavae and right atrium; the tricuspid annulus; or between TV leaflets, improving coaptation. (J Am Coll Cardiol 2016;67:1829–45) © 2016 by the American College of Cardiology Foundation.

Given the possibility of a prolonged clinical latency period, the true prevalence of moderate or severe tricuspid regurgitation (TR) is difficult to gauge, but was estimated by Stuge et al. (1) to affect 1.6 million people in the United States. In a large echocardiographic series of 5,223 veterans, at least moderate TR was found in nearly 16% of subjects (2). However, no prospective evaluations of the incidence of severe TR using strict echocardiographic criteria were undertaken.

The etiology of TR can be divided into primary and secondary causes. Unlike left-sided valve disease, primary tricuspid valve (TV) disease represents only 25% of TR. Primary TR may be due to congenital, rheumatic, neoplastic, traumatic, infective endocarditis, endomyocardial fibrosis, or iatrogenic (following pacemaker lead implantation or right ventricular [RV] biopsy) causes (3) (**Table 1**).

TR most commonly arises from RV annular dilation following RV pressure or volume overload. Significant functional TR may appear in the context of left-sided heart disease causing pulmonary arterial hypertension (PAH), or in pre-capillary PAH. Functional TR may also arise following RV myocardial infarction and subsequent RV dilation (**Table 1**). In patients with severe mitral regurgitation and normal left ventricular ejection fraction, the prevalence of at least moderate TR was 24% (4). Following mitral valve surgery, nearly 50% of the population demonstrated an increase in TR severity of more than 2 grades (5).

Right heart catheterization is important for determining the etiology of secondary TR and ruling out the presence of pre-capillary pulmonary hypertension. Evaluating both the degree and origin of PAH (pre-capillary, isolated post-capillary, or combined pre- and post-capillary) (6) is key when deciding whether or not to treat severe TR. Interventions for reducing the degree of TR in the context of pre-capillary PAH or severe PAH may be associated with major negative clinical effects secondary to critical RV failure. Similarly, an early post-operative RV dysfunction after tricuspid surgery has been associated with a negative clinical impact (7).

Significant secondary TR is frequently well tolerated in its early stages, yet progressive dilation of the tricuspid annulus and RV remodeling invariably results in right heart failure. Progressive RV dilation and dysfunction may lead to irreversible RV damage, a common reason for the poor outcomes following late TV surgery.

Several observational studies have reported that moderate-to-severe TR is associated with excess mortality at follow-up, independent of RV function (2,8). In patients with functional TR, it is important to optimize medical therapy of the underlying condition according to guidelines. However, the use of pulmonary vasodilator therapies in post-capillary PAH is controversial. Despite the encouraging results of some single-center studies showing improvements in hemodynamics, symptoms, or exercise capacity, there is not enough evidence of its long-term effectiveness and safety (9). Therefore, the 2015 European guidelines for PAH do not recommend these therapies in patients with PAH secondary to left heart disease (6).