Transcatheter Mitral Valve Replacement (TMVR) – Why so few?

Monika Halas, MD1, Jane Kruse BSN1, Adin-Cristian Andrei PhD2, Christian Elenbaas, MS1, S. Christopher Malaisrie, MD1, James L. Cox, MD1, Patrick M. McCarthy MD1

1Division of Cardiac Surgery, Northwestern University Feinberg School of Medicine and Northwestern Memorial Hospital, Chicago, IL, 2Division of Biostatistics, Department of Preventive Medicine, Northwestern University, Chicago, IL

Background

Mitral Regurgitation (MR), the most prevalent form of valvular heart disease, remains a formidable public health care problem. Non-surgical interventional treatment is based on important arguments, such as the poor prognosis if left untreated and the reluctance for open surgery in elderly patients with severe comorbidities. Fortunately, there are several new options available. Transcatheter mitral valve replacement (TMVR) has emerged as a compelling possibility after successful implementation of transcatheter aortic valve replacement interventions.

Research Objectives

Despite the advancement in technology, progress of TMVR therapy remains slow and feasible only for selected patients. We sought to determine the relative frequency of interventional MR treatment options, with a focus on the use of TMVR.

Methods

From 9/1/2015 (when TMVR first became available in our institution) until 12/31/2019, 732 patients underwent a mitral interventional approach or evaluation for TMVR. Inclusion criteria used for analysis was TMVR, MitraClip, and surgical MV repair or replacement procedures. Data was collected from our prospective STS database and TVT Registry. Patients with prior mitral replacement surgery, bacterial endocarditis, concomitant aortic valve replacement, aneurysm > 5.0 cm, MV repair or replacement procedures. Data was collected from our prospective

Figure 1. TMVR Exclusion Criteria

Figure 2. MR Etiology

Figure 3. Screen Fail Analysis

Figure 4. Screen Fail Follow-up Analysis

Results

Of these 732 mitral interventions, 412 patients underwent mitral valve repair (56%); 88 had surgical MVR (12%); 180 had MitraClip (25%); 47 MVV (6.4%); 5 TMVR (1%). TMVR screening identified 81 patients. Only 5 (6%) qualified for TMVR, whereas 76 (94%) failed the screening process due to: inadequate medical condition (32%; n=24/76); valvular technical implant difficulties such as size of the annulus (30%, n=23/76); anticipated ventricular problems such as neo-LVOT risk (25%; n=19/76); and withdrawal from TMVR therapy (13%; n=10/76). For alternative treatment choice medical management was the most prevalent (50%, n=38/76), followed by surgical MV replacement (16%, n=12/76), MitraClip (13%, n=10/76), and other (11% unknown) (n=8/76). In medically managed patients 30-day and 1-year mortality were 2% (n=2/13) and 13% (n=5/38), respectively.

Conclusions

TMVR theoretically is a valuable option for patients requiring mitral intervention. However, its application is limited by current technology, primarily due to anatomical limitations in patients. Survival for medically managed screen failures remains lower than desirable. Hence, there is still an unmet need for technical improvements in TMVR devices.