

Transcatheter mitral valve intervention as a bridge to transplant: *A fructibus cognoscitur arbor*

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Approximately 3000 heart transplants (HTs) are performed in the United States each year [1]. Overall 1-, 3-, and 5-year survival for adult patients who underwent HT in 2010–2012 was 90.5%, 84.1%, and 79.1%, respectively. However, mortality of those awaiting an HT remains high, as high as 11 deaths per 100 waitlist years. In an effort to optimize the utilization of scarce donor hearts, the United Network for Organ Sharing (UNOS) revised the heart allocation policy in the United States, and has accorded patients on non-dischargeable MCS, including ECMO, the highest priority for cardiac transplant on the waitlist as of October 18, 2018 [2].

I read with interest the manuscript by Godino et al. on MitraClip in patients who are (potential) candidates for heart transplantation [3]. The MitraBridge is the first international, multicenter (17 centers) registry reporting data on 119 consecutive advanced HF patients with significant secondary mitral regurgitation treated with MitraClip as a bridge-to-transplant (BTT) strategy.

The topic is very intriguing, especially because this strategy has not been previously investigated as a bridge to heart transplantation.

A fructibus cognoscitur arbor (for the fruit, we can know the tree), a Latin expression that invite us to reflect about the consequences of our acts, particularly when the origin of our behavior and /or ideas is questionable and controversial. At the end, the facts are the ones that should drive the lessons,

recognizing what do we need to change and what do we need to accept.

This maze is more complicated since MitraBridge registry enrolled heterogeneous patients, highly selected and without a control group, with several selection bias; namely, 80% of them were formally ineligible for Mitra-Clip procedure (based on the COAPT trial criteria). Most importantly, only 71% had left ventricular ejection fraction <30%, and more than 40% were in INTERMACS profile 5-6, these data reflect a group in no need or with a low priority profile for heart transplantation.

Apparently, the procedure was shown to be feasible and safe in the short term with no 30-day mortality. But interestingly, 54% of patients were treated with 2 clips, and 12.5% of patients were treated with 3 clips.

Independently of this short-term success, it is imperative remember that the ring annuloplasty is an essential part of the edge-to-edge stitch in order to get a satisfactory and durable result [4].

This is in direct relation with the mechanism of mitral regurgitation in advanced heart failure. The mechanisms include the reduced contractile force that leads to sub-optimal closing of the leaflets; a spherical shape of the dilated ventricle that adversely alters the orientation, on the papillary muscles; the dilation of the mitral annulus (but more importantly the inability of the annulus to contract during systole) that causes reduced leaflet alignment; and finally, the dilation of the posterior wall of the left atrium that increases the tethering on the posterior leaflet [5].

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Ergo, the real therapeutic target should be the severe ventricular dysfunction, and its consequences [6], those approaches are also still controversial and with variable results. However, it is less helpful and limited just tackle the valve with a clip.

The median follow-up in this cohort was nearly 18 months, and during this period, nearly 40% of patients either died or underwent a durable left ventricular assist device (LVAD) or an urgent transplantation for clinical worsening.

Thus, on the surface, it seems that these patients likely did not benefit substantially, this is also supported for the fact that just 25% of the patients improved clinically to no longer require transplantation, just 15% were successfully bridge to transplant, and only one third decreased the pulmonary pressures.

Another challenge lies in defining those patients with advanced heart failure who may benefit from such a bridge strategy while reserving more advanced but already proved effective strategies such as an LVAD [7]. Also, many patients treated with MitraClip eventually require LVAD within a relatively short time. An average mitral valve area reduction of 50% to 60% is generally observed after MitraClip. This can potentially develop a high transvalvular gradient and compromise the inflow of the LVAD [8].

This is a critical fact, it is a highly technical challenge to explant a clip during the surgery, sometimes making necessary a valve replacement, situation that significantly increased the operative morbidity and mortality of the procedure. As a matter of fact, it has been mentioned that the presence of >2 clips should be regarded as a limitation for a successful LVAD [8]. In addition, the presence of a residual atrial septal defect (transeptal access) may cause arterial desaturation and/or worsening of right ventricular dysfunction after LVAD implantation.

In conclusion, with the available evidence, this data by Godino et al. [3] cannot be used as a definitive clinical guidance for which patients should be considered for a bridge to a more advance strategies in advanced heart failure.

Obviously, those are just assumptions; if MitraClip BTT strategy could preclude or not the optimal long-term results, it still remains a matter of discussion and therefore needs evidence in clinical practice. It is an interesting hypothesis that required to be evaluated in a larger cohort of patients.

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