

EDITORIAL COMMENT

A Mitral Cleft Treated by Clipping

Is That the Future?*



Didem Oguz, MD,^a Maurice Enriquez-Sarano, MD^b

Mitral regurgitation (MR) is the most common valvular disease worldwide and causes serious complications such as excess mortality and frequent heart failure for affected patients (1). MR standard treatment is surgical replacement or repair of the mitral valve, which are life-saving in many circumstances. Despite these successes, many patients (85%) diagnosed with MR in the community are not offered surgical treatment throughout their lifetime (2) and are left to incur the frequent untoward consequences of MR (Figure 1, top row). MR undertreatment, while predominant in functional MR, is considerable in all MR forms and has led to the development of transcatheter mitral valve therapies for those in whom mitral surgery is undesirable, risky, or simply not performed. Despite the complexity of the native mitral valve structure, the simple edge-to-edge mitral repair device, implanting a clip at the tip of the mitral leaflets to create a bridge between them, is the most used and most successful nonsurgical device to treat patients with MR. Recently, treatment of functional MR using this device has been proven in a randomized clinical trial to significantly reduce the recurrence of heart failure in patients with left ventricular dysfunction. In patients with organic MR (i.e., with intrinsic mitral valve lesions causing the MR), the proof of benefit is

much weaker but has gained Food and Drug Administration approval in patients at prohibitive risk for surgery.

In this issue of *JACC: Case Reports*, Russo et al. (3) report a very unusual case of organic MR, with very unusual utilization of the MitraClip (Abbott Laboratories, Menlo Park, California) to treat the MR. What were the circumstances, what was the therapy and what lessons can we learn? Russo et al. (3) discussed a patient with ostium primum atrial septal defect and congenital anterior mitral cleft previously treated by surgery, with success on the shunt but less success on the mitral valve with residual MR post-surgical repair due to a persistent cleft, and who was treated transcatheter by MitraClip implantation with success.

The first question arising pertains to “the cleft.” This wording is often poorly used. One should distinguish the real clefts that are congenital, are located at the central long axis of the anterior leaflet and much more exceptionally of the posterior leaflet and due to improper development of endocardial cushions with most often an ostium primum atrial septal defect. In patients with complex congenital heart disease, the cleft is often associated with malposition of chordae and is difficult to correct. Even in isolated cleft leaflets, the fibrosis affecting the lip of the cleft borders makes the correction difficult, and residual MR may be present with notable clinical complications. The congenital clefts should be distinguished from cleft-like indentations. These indentations separate the scallops of the posterior leaflet (the anterior leaflet is not scalloped) and can be deep, mostly visible in single-scallop prolapse of the posterior leaflet (4) and potentially may cause recurrent MR post-repair of the prolapse.

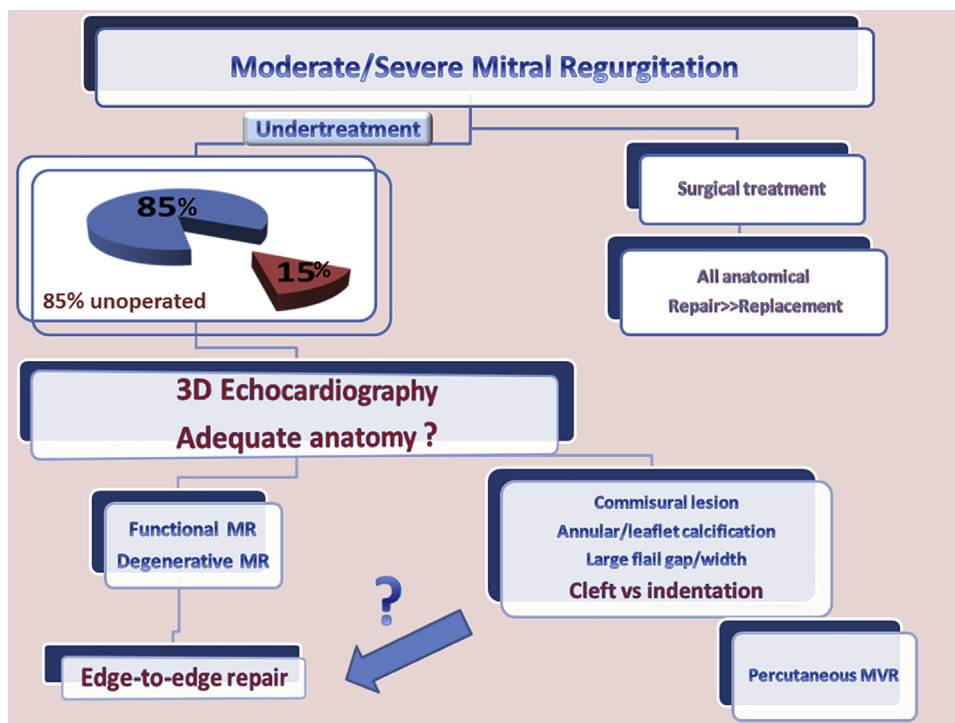
An important issue regards imaging of the lesions, as both true clefts and indentations are difficult to diagnose by 2-dimensional echocardiography, emphasizing the central role (Figure 1) of

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From the ^aDepartment of Cardiovascular Medicine, Mayo Clinic, Rochester, Minnesota; and the ^bDepartment of Cardiovascular Medicine, Minneapolis Heart Institute, Minneapolis, Minnesota.

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FIGURE 1 Schema Showing Diagnosis and Treatment Options for Moderate-to-Severe MR



After diagnosis of moderate/severe mitral regurgitation, avoiding the MR serious undertreatment requires imaging the MR cause/mechanisms with a particular emphasis on 3D transesophageal echocardiography if the lesions are unusual or poorly seen. Mitral surgery is the standard of treatment but mitral transcatheter therapies are increasingly performed whenever surgery is risky or with poor probability of success. Whether atypical lesions (right lower cartouche) will become more accessible to interventions remains to be determined. 3D = 3-dimensional; MR = mitral regurgitation; MVR = mitral valve replacement.

3-dimensional transesophageal echocardiography (TEE) in the difficult anatomic evaluation of patients with MR of unclear mechanism. 3D TEE is central to selecting the most appropriate treatment modality of patients who cannot undergo surgery. During surgery, the surgeon has a direct view of the lesions and their location, which is not available with transcatheter treatment. This fundamental difference, whereby all evaluations for transcatheter therapies with no direct visualization of lesions, requires imaging, mostly with 3D TEE not only to direct the intervention, but also to select the most appropriate intervention (5,6). The increasing use of 3D TEE allows more cases to be diagnosed before surgical or percutaneous intervention (7).

The second question regards the intervention selected. Mitral surgery and now percutaneous interventions involve a wide array of single-action procedures (e.g., implantation of artificial chordae or edge-to-edge attachment) that respond to the

lesions uncovered and allow correction of the MR. The MitraClip approximates anterior and posterior leaflet, preventing a prolapse or a gap due to tenting and was considered contraindicated when the leaflets were too separated, the lesions too commissural, or when a cleft or indentation was present. The large experience accumulated over the years has shown that wider separation can be addressed with clips of longer arms or that commissural lesions can in fact be collapsed by clipping (Figure 1, lower part). However, a cleft has remained a contraindication to clipping the mitral valve because in its classic positioning it cannot address the discontinuity of the leaflet affected. Rare case reports have mentioned clipping both sides of the cleft. In the present case, the authors used an atypical positioning across the cleft, with success including appropriate control of the MR. The fact that this implantation was successful does not resolve whether this case (and the few others published) will remain anecdotic or whether atypical

implantation of clips will become more widespread and will demonstrate durability.

In summary, the paramount consideration in patients with MR is the MR volume (or orifice size), which in all MR types, organic or functional, directly determines the excess mortality incurred by patients and requires MR quantitation. Next, in evaluating patients with MR, we aim at avoiding undertreatment and, if possible, at eliminating the MR by surgery or intervention, and for that purpose, understanding cause and mechanisms by appropriate imaging is essential. Although we are still far from the goal of eliminating MR undertreatment, new transcatheter therapies offer an array of choices supplemental to mitral surgery that may fulfill this goal in the future.

Irrespectively, our cardiology community needs to remain attentive to distinguish and separate the toys for interventionalists from the legitimate new ways of treating MR.

AUTHOR RELATIONSHIP WITH INDUSTRY

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ADDRESS FOR CORRESPONDENCE: Dr. Maurice Enriquez-Sarano, Minneapolis Heart Institute, 800 East 28th Street, Minneapolis, Minnesota 55407. E-mail: sarano.maurice@gmail.com.

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