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Do we need new devices for surgical mitral valve repair?

Ludwig Müller  *

Department of Cardiac Surgery, Medical University Innsbruck, Innsbruck, Austria

* Corresponding author. Department of Cardiac Surgery, Medical University Innsbruck, Anichstraße 35, 6020 Innsbruck, Austria. Tel: 0043-512-504-22501; fax: 0043-512-504-22502; e-mail: ludwig.mueller@i-med.ac.at (L. Müller).

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In their article 'Usability, performance and safety of a new device for degenerative mitral regurgitation: in vivo chronic evaluation', Zeitani *et al.* [1] present 3-month results of a chronic sheep model using a novel annuloplasty device with an intraventricular bridge for anchoring premeasured artificial chordae to facilitate mitral valve repair. The authors are to be congratulated for their innovative work and the promising short- to mid-term results of the new device.

TWO QUESTIONS ARISE

First: will the new device fulfil the expectation of a perfect and durable mitral valve repair also in the clinical setting? At this stage, it is not clear if the experimental results obtained in healthy animals, i.e. normal mitral valves, can be achieved also in man with complex mitral valve pathologies. Will the greater ease of mitral valve repair come true in the clinical application as claimed by the authors? Will the fixation of artificial chordae on a rigid intraventricular bridge fulfil the expectations of longer durability of the repair as reverse remodelling would not play a role? The argument brought into the discussion that reverse remodelling would lead to relatively too long chordae is true for transapical chordae but to my knowledge has not been demonstrated after fixation of artificial chords on the tip of the papillary muscle. The pathophysiology of mitral valve function during systole would be totally altered as the interconnection of the valve leaflet with the ventricular wall via the papillary muscle would not exist anymore.

Will anticoagulation be required with this intraventricular device? At autopsy, the authors found neither thrombus formation nor calcification (not to be expected after 3 months) at the device. But will that be sufficient proof to avoid anticoagulation? If not, a significant benefit of surgical valve repair would be sacrificed. So a number of technical issues still have to be addressed.

What may be more important, however, is the question if this device really would lead to an increased number of successful

valve repairs due to its facile use. I personally think that mitral repair is a relatively complex procedure which can be learned and trained and needs practice—a lot of it admittedly. But this is not due to extraordinary technical skills which might be required but to the whole complex of mitral repair. Any repair begins with evaluation of the valve starting with the surgical interpretation of all available imaging, primarily TEE, but also computed tomography, magnetic resonance imaging and other advanced technologies using digital image processing. The most important role, however, still plays surgical valve analysis. Only by correct valve analysis and interpretation a strategy for valve repair can be developed. Measuring the required length of artificial chordae is just a part of valve analysis not the single most important step in valve repair. The use of artificial chordae has facilitated valve repair especially with minimally invasive approaches and possibly can improve long-term results, which still has to be proven. But still, other techniques for repair must be at hand if a high repair rate is aimed for. In experienced hands, a nearly 100% repair rate and a very low rate of serious complications and excellent long-term results is feasible nowadays and gives prove that mitral valve repair is the treatment of choice in degenerative mitral valve disease. I do not argue against innovation, but a cautious approach for introduction of this or other devices is recommended. The benchmark is set high and must not be compromised by uncritical use of perceived facilitating technology. Success in mitral valve repair is not mainly depending on technology but on an excellent understanding of valve pathology which must be acquired through excellent teaching, training and experience.

REFERENCE

- [1] Zeitani J, Chiariello GA, Shofti R, Bruno P, Massetti M, Alfieri O. Usability, performance and safety of a new device for degenerative mitral regurgitation: in vivo chronic evaluation. *Interact CardioVasc Thorac Surg*. 2022. <https://doi.org/10.1093/icvts/ivac067>.