Commentary: We can do it, but do we need to?

Donald D. Glower, MD

From the Division of Cardiothoracic Surgery, Department of Surgery, Duke University Medical Center, Durham, NC.

Disclosures: Author has nothing to disclose with regard to commercial support.

Received for publication April 15, 2019; accepted for publication April 16, 2019; available ahead of print May 23, 2019.

Address for reprints: Donald D. Glower, MD, Duke University Medical Center, Box 3851, Durham, NC 27710 (E-mail: d.glower@dm.duke.edu).

J Thorac Cardiovasc Surg 2019;158:758

0022-5223/\$36.00

Copyright © 2019 Published by Elsevier Inc. on behalf of The American Association for Thoracic Surgery

<https://doi.org/10.1016/j.jtcvs.2019.04.056>

Grinberg and colleagues¹ present dynamic NeoChord (NeoChord Inc, St Louis Park, Minn) tension data from 7 human patients undergoing mitral repair with the NeoChord procedure.² The authors conclude that the tension applied on chordae during transapical implantation of NeoChords for degenerative mitral regurgitation can be measured, providing original data about the objective consequences of mitral repair on the mitral apparatus.

Several aspects of this study are new and unique. The dynamic measurement of NeoChord tension in a beating human heart is new. Also new is the demonstration that total NeoChord tension falls when valve competence and leaflet co-optation are obtained. The authors suggest that this reduction in total tension in the competent versus the incompetent valve could result from the funneling effect of blood toward the incompetent chords, from a keystone effect of abutting leaflets in the competent valve, or by restoration of normal intraventricular blood flow out the left ventricular outflow tract and not into the left atrium. Furthermore, the authors hypothesize that the direct measurement of chordal tension could facilitate optimizing chordal length without substantially adding to procedure time over the use of transesophageal echocardiography alone. The authors admit that additional studies are needed to validate these hypotheses.

Despite the authors' enthusiasm, it seems unlikely that routine measurement of NeoChord tension with a force sensor will become standard practice when routinely available transesophageal echocardiography could accomplish the goal of assessing optimal cord length. The major contribution of this study is that it provides further insight into the pathophysiology of mitral prolapse. Specifically, loss of co-optation increases chordal tension, which could further augment prolapse with further reduced co-optation until

The sum chordal tension before and after correcting mitral regurgitation (MR) ($P = .018$).

Central Message

Mitral chordal tension is reduced when coaptation is obtained, but the value of intraoperative chordal tension measurement remains to be demonstrated.

See Article page 746.

the chords rupture or the valve is repaired. Based on in vitro data from human chordal tissue, the authors suggest that forces on chords in a normal valve are insufficient to cause chordal lengthening or rupture. Thus, those mitral valves destined to develop prolapse must have an underlying substrate of the defective chordal strength and/or structure. The operating surgeon should therefore not only correct prolapsed chords, but ideally should also replace or resect those abnormal chords likely to become prolapsed the future.

Grinberg and colleagues¹ provide new insight into the pathophysiology of mitral prolapse in some patients. Other evidence will be needed to establish any value to routinely using NeoChord tension to adjust chordal length in the operating room. We can measure NeoChord tension in the operating room, but it is not yet clear that we need to.

References

1. Grinberg D, Cottinet P-J, Thivolet S, Audigier D, Capsal J-F, Le M-Q, et al. Measuring chordae tension during transapical neochordae implantation: toward understanding objective consequences of mitral valve repair. *J Thorac Cardiovasc Surg*. 2019;158:746-55.
2. Jensen H, Jensen MO, Waziri F, Honge JL, Sloth E, Fenger-Gron M, et al. Transapical neochord implantation: is tension of artificial chordae tendineae dependent on the insertion site? *J Thorac Cardiovasc Surg*. 2014;148:138-43.