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COMMENTARY & PERSPECTIVE

Commentary on an article by Nathan A. Mall, MD, et al.: “Symptomatic Progression of Asymptomatic Rotator Cuff Tears: A Prospective Study of Clinical and Sonographic Variables”

By Peter J. Millett, MD, MSc

The study by Mall et al. is an important, clinically relevant investigation that highlights the natural history of rotator cuff disease and specifically looks at the progression of asymptomatic tears and the factors associated with this progression.

While rotator cuff disease is one of the most common orthopaedic conditions, little is known about its natural history¹. The purposes of this study were to identify what happens when an asymptomatic tear becomes symptomatic and to determine what factors are associated with a tear becoming symptomatic. The authors studied a large prospective cohort of 195 patients with asymptomatic rotator cuff tears over a five-year period and found that 23% (forty-four) had pain develop after a relatively short time of approximately two years. The patients whose tears became symptomatic were compared with those who remained pain-free². The authors found that larger tears were more likely to become symptomatic and that tear progression was associated with increased tear size (both for full-thickness and partial-thickness tears), decreased American Shoulder and Elbow Surgeons (ASES) scores, decreased shoulder range of motion, and increased compensatory scapulothoracic motion. They did not find an association with shoulder external rotation strength or fatty infiltration on imaging studies. They concluded that pain development in shoulders with asymptomatic rotator cuff tears was associated with an increase in tear size and that larger asymptomatic tears were more likely to become symptomatic. A goal of this study was to help to identify patients who were at risk and, conversely, those who were not at risk so that the appropriate surgical or nonsurgical interventions could be recommended. As a clinician who routinely sees patients with rotator cuff tears, this study is very helpful from both patient and surgeon perspectives.

First, from a patient's point of view, there are several useful findings about the natural history of rotator cuff disease and the clinical course that asymptomatic rotator cuff tears follow. Patients with asymptomatic or minimally symptomatic tears frequently ask about tear progression and its risk. Questions such as “Will the tear progress?” or “Will I lose function?” or “Will it become irreparable?” are commonplace. While each of these important questions cannot be fully answered by this study, much valuable information can be gleaned from its findings.

The data clearly showed that over the course of this study most of the tears remained asymptomatic and did not progress. However, a clinically relevant percentage (23%; forty-four of 195) did become symptomatic within about two years. While the study did not show a causal relationship between tear progression and pain, it did reveal some interesting associations between tear progression and pain. Ten (23%) of the forty-four rotator cuff tears in the group that became symptomatic were larger than at baseline, while only two (4%) of the fifty-five tears in the group that remained asymptomatic had progressed. Another finding was that tears in the dominant shoulder were more likely to become symptomatic. While there was a slight increase in the number of tears with evidence of fatty infiltration in the muscles in the symptomatic group, the overall increase in the number of tears associated with fatty infiltration was similar in both symptomatic and asymptomatic groups.

Second, from the surgeons' point of view, there is a great deal of information about how tears progress and the clinical manifestations that accompany that progression. Pain was associated with tear progression, and the rate of progression was greater in those who were symptomatic. Tear progression was measured both as conversion of partial-thickness tears to full-thickness tears and as tear enlargement for full-thickness tears. The majority of newly symptomatic tears, however, did not have tear progression; therefore, other factors are also likely playing a role in the development of pain. Since larger tears were more likely to become symptomatic, size may be an important factor, and as the authors suggest, there may be a critical threshold for rotator cuff tear size that, once crossed, predisposes individuals to the development of symptoms. Hand dominance may also be a predisposing factor as asymptomatic tears were more likely to become painful if they were in the dominant shoulder. Shoulder function also decreased when tears became symptomatic, as evidenced by lower ASES scores in the symptomatic cohort. Glenohumeral kinematics did not change substantially when pain developed, except that more scapulothoracic substitution was found during abduction³.

There are several limitations to this study that the authors highlight in the article. These include whether the asymptomatic group is an appropriate comparison group, the short-term duration of the study, and the fact that all of these subjects had a painful

rotator cuff tear in the contralateral shoulder, so the findings may differ from those in patients with unilateral disease. Since the subjects were asymptomatic, the actual duration of the disease was unknown. The kinematic analysis was only a two-dimensional study, and the accuracy of ultrasonography for measuring fatty infiltration is unknown. Finally, the authors tested only external rotation strength and thus could have missed more subtle weakness of the supraspinatus.

The strengths of the study are numerous and include the prospective longitudinal design, the strict definition of pain, and the validated measurements (imaging and functional assessment).

The authors concluded that the short-term risk of progression for asymptomatic rotator cuff tears is substantial, shoulders that developed pain had larger tears at baseline and had a higher rate of progression, shoulder function and active range of motion deteriorate with symptoms, there is no change in external rotation strength or in fatty infiltration, and there is increased compensatory scapulothoracic motion once symptoms develop.

In summary, the authors should be congratulated for their work. Natural history studies such as this one are very helpful, and this is a novel study that highlights the natural history of a very prevalent orthopaedic condition. The study design is sound, with results that are interesting, new, and clinically relevant. This study will be noted when discussing the best course of action for a patient with no or minimal symptoms or for a patient who has recently become symptomatic with an atraumatic rotator cuff tear.

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