

ESSR Sports Imaging Subcommittee - The interesting Paper 2022 Q2

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Nonoperative or Surgical Treatment of Acute Achilles' Tendon Rupture

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Background:

The Achilles tendon receives an immense load stress during walking that is amplified by sporting activities such as running or jumping. Achilles tendon ruptures occur especially in the context of sudden and severe loads, with an increasing annual incidence between 5 and 50 events per 100,000 per year. There is an ongoing discussion among orthopedic surgeons whether surgical repair of an acute Achilles' tendon rupture by an open-repair or minimally invasive approach is associated with better outcomes than nonsurgical treatment. Previous studies showed, that surgical repair conveys a significantly lower risk of rerupture compared to non-operative treatment. On the contrary, surgery implicated a risk of infection and nerve injuries. Currently growing numbers of patients are treated by mini-invasive surgery.

Manuscript summary:

The study was published in the April 2022 issue of the New England Journal of Medicine. Myhrvold SB et al. initiated a multicenter (4 centers), randomized, controlled trial comparing the primary outcome parameter "change from baseline to 12 months follow-up in the Achilles' tendon Total Rupture Score" between the groups nonoperative, open-repair and minimally invasive in 526 patients (18-60 years). There was no significant difference in change of the score between the groups (-17 points versus -16.0 points versus -14.7 points). As a secondary outcome parameter, the number of reruptures was higher in the nonoperative group (6.2%) as compared to the open-repair (0.6%) and minimally invasive group (0.6%). There were more nerve injuries in the surgery groups, most in the minimally invasive group. The authors conclude that at 12 months after surgery the clinical outcome after Achilles tendon rupture is not better than after conservative treatment.

All patients received a similar immobilization therapy with decreasing heel wedges and weight bearing as tolerated. A clinically important difference in the assessed score was previously defined as 8 to 10 points and the minimal detectable change as 7 points. Additional scores were obtained at 3 and 6 months. SF-36 and physical performance (e.g. jumps, strength testing) was tested at 6 and 12

months. Questionnaires were accepted up to 2.2 years after event because according to the authors, literature suggests that changes after 11 year postinjury are minimal. The statistical analysis and correction for missing data is explained in detail in the manuscript and in the statistical analysis plan. According to the authors, results were similar with different analysis models. At 12 months, 492 questionnaires were analyzed (92% of the patients included).

A recent systematic review by Ochen Y et al. in BMJ 2019 (reference 8) also showed a higher risk of rerupture after nonoperative treatment, while surgical treatment was associated with complications (infections, nerve injuries). These findings are in line with the current observations of

In a letter to the author it was criticized by Uzoigwe CE and Kurup H, who state in their comment (N Engl J Med. 2022 Jul 7;387(1):90-91.doi: 10.1056/NEJMc2206333) that it is increasingly recognized that the wedges promote neither ankle equinus nor tendon apposition but rather tend to elicit flexion at the midfoot. This may account for the markedly high percentage of patients with repeat rupture in the group. The Myhrvold SB et al. respond, that the newer treatment options were introduced after the beginning of the trial.

Supplementary Material includes the Research Summary, the Protocol, the Supplementary Appendix, the Disclosure Forms and the Data Sharing Statement.

A brief video summarizing the study results can be found online

<https://www.nejm.org/doi/10.1056/NEJMdo006457/full/>

Plus:

- The study is much larger than previous randomized, controlled trials or observational studies.
- Thorough and complex statistical plan and analysis.
- Proper definition of primary and secondary outcomes.
- Straight forward study design.

Limitations:

- No Radiological findings, particularly the distance of the stump ends in flexion are not reported.
- A large number of patients did not agree to participate (1638 patients assessed, of 972 eligible patients 418 declined to participate, which is 43%)
- A decrease of the score between baseline and 12 months follow-up is confusing, since it can be assumed, that at presentation with Achilles tendon rupture the health status and function is

worse than a year after. Probably the health status at baseline means before injury, but this information is not provided.

- The exact diagnostic tools were not explained in the manuscript or in the additional documents. Therefore the role of Radiology remains unclear. Though it is stated in the study protocol that they also performed ultrasound grading of Achilles tendon, since previous studies suggested that treatment results may depend on the extension and type of the injury resulting in individualized treatment. In addition tendon elasticity measurements by ultrasound examinations were planned to assess healing process qualitatively.
- No information on the gap between the stump ends in the groups is therefore provided. It was reported earlier, that patients with a gap of 5 mm or more in equinus on ultrasound may receive surgery while those with a gap of less than 5 mm may receive nonoperative treatment to reduce rerupture rate and surgery risks.
- The authors also state in their manuscript, that no major improvement is expected after >12 months.
- Optimal treatment methods changed during acquisition of patients.

Comment:

The study on treatment of Achilles tendon ruptures was published in the NEJM. However proper diagnosis and the importance of imaging during the decision process for the treatment was neglected despite its importance in everyday practice. Most likely MSK Radiologists will need to wait for the publication of the ultrasound results to identify their value within the individual treatment decision. The results presented here are very broad and may only have impact on the treatment decision in borderline cases towards conservative treatment.