Underestimation of Sonographically-Diagnosed Complete Achilles Tendon Tears with Correlation of Surgical Results

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Objectives

- To assess the underestimation rates of sonographically-diagnosed complete Achilles tendon tears, with correlation to subsequent surgical findings.
- The sonographic characteristics of complete Achilles tendon tears will be evaluated.

Materials and Method

- Retrospective review of ultrasonography performed in two hospitals between 2010 to 2019 on all suspected cases of Achilles tendon tear referred from the orthopaedics team. The following patients were excluded:
  1) Patients with sonographic diagnosis other than Achilles tendon tear;
  2) Patients who underwent non-surgical treatment or with missing surgical record;
  3) The interval between ultrasound and surgery exceeded 14 days.
- The ultrasound findings were reviewed and correlated to subsequent surgical findings.

Results

No. of patients with suspicious Achilles tendon tear
54

↓

No. of patients included in the study after exclusion
24 (mean age : 46-year-old)

↓

Sonographic diagnosis

19 complete tears	5 partial tears

↓

All cases underwent surgery due to clinical finding of non-functioning Achilles tendons

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All cases were diagnosed with complete Achilles tendon tears intraoperatively

- All cases of ultrasound-diagnosed complete tears were proven surgically (n=19).
- The overall accuracy of detecting a complete Achilles tendon tear with ultrasonography was 79% (19/24).
- The underestimation rate of sonographically-diagnosed complete Achilles tendon tears was 21% (5/24).

Example of Complete Achilles Tear Underestimated by Ultrasound

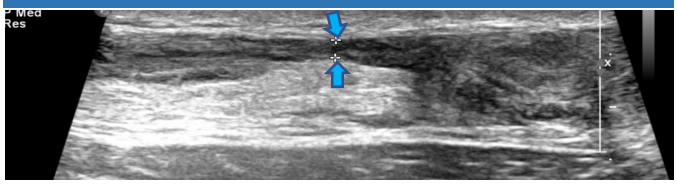

Figure 1. Longitudinal US image of one of the false-negative US cases. It was diagnosed at US as a partial Achilles tendon tear with apparent partially intact tendon fibres (arrows). Subsequent surgery revealed complete Achilles tendon tear.

Sonographic Features of Complete Achilles Tendon Tears

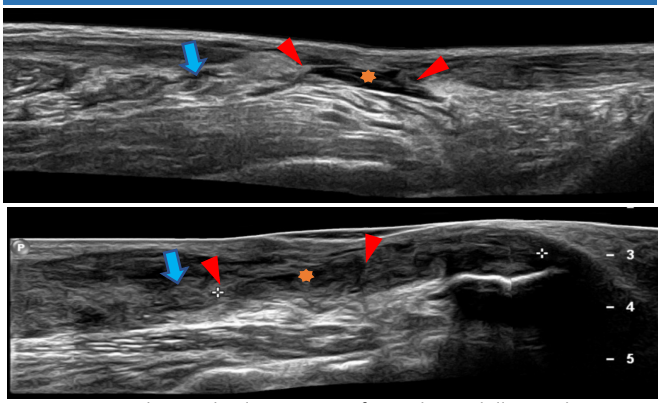

Figure 2. Two longitudinal US images of complete Achilles tendon tear. There is complete tendon interruption (arrowheads), presence of gap filled with local fluid collection/ haematoma (asterisks) and tendon retraction (arrows).

Discussion

- Ultrasound is considered as a reliable first-line imaging modality in evaluating Achilles tendon injury, with its easy assessibility being one of its main advantage over other modalities [1].
- In our selected cohort, we observed a tendency of underestimating complete Achilles tear with ultrasound evaluation.
- Our observed accuracy of 79% is comparable with the literature [2].
- Sub-analysis of the 5 false-negative cases (i.e. surgically-proven complete tears reported as partial tears on ultrasound) showed pseudo-continuation of the tendon fibers (Figure 1), probably mimicked by haemorrhage, fluid, debris or residual paratenon filling the torn tendon gap.
- We postulate the false-negative rate may be reduced by employing dynamic evaluation which may overcome pseudo-continuation [1].
- This is a retrospective study designed specifically to investigate the accuracy of ultrasound in differentiating between complete and partial Achilles tears against a surgical reference. As such, it was limited by the exclusion of cases that were conservatively-managed which may potentially influence the true accuracy of ultrasound.
- Due to the small sample size and lack of true partial tears (i.e. no "true-negative" or "false positive"), we felt it was preferable to present our results descriptively instead of in full diagnostic validity values.

Summary

- Ultrasound is generally reliable at detecting complete Achilles tendon tears with an overall accuracy of 79%.
- In case of sonographically-apparent partial tear, a high index of suspicion for complete Achilles tendon tear is advised when there are clinical findings of a non-functioning Achilles tendon.
- Sonographic underestimation of complete Achilles tendon tears could be attributed to pseudo-continuation of the torn tendon; dynamic evaluation may aid in reducing such error.

References:
1. Borg MA, El-Essawy S, El Sallab RM, Ezzat A, Abd El-Khalek AM. Role of ultrasonography in the evaluation of Achilles tendon disorders. Benha Med J 2016;33:54-9
2. Sheikh HE, Azzam W. Can ultrasonography distinguish between complete and partial rupture of the Achilles tendon? A sonographic operative correlation. Tanta Med J 2015;43:120-6