



Standardised virtual fracture clinic management of Achilles tendon ruptures is safe and reproducible



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ABSTRACT

Background: Traditional fracture clinics are some of the busiest clinics in a hospital, often with significant patient waiting times and delays. The use of virtual fracture clinic (VFC) for the management of certain injuries to reduce the workload on the traditional fracture clinic, in addition to reducing costs is growing in popularity. The tendoachilles is the most frequently ruptured tendon in the body but despite this, management remains a keenly debated topic.

Methods: All adult patients referred to the VFC with an actual or suspected Achilles tendon rupture were identified between January 2015 to October 2017.

Results: This study found that patient with and acute achilles tendon ruptures managed according to a standardised VFC protocol had a re-rupture rate of 3.82%.

Conclusions: One of the advantages of a VFC model that is standardised, initiated in the ED, is that it has no variation in outcome seen in our patient group.

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1. Introduction

Traditional fracture clinics are some of the busiest clinics in a hospital, often with significant patient waiting times and delays. They involve input from a large number of allied healthcare professionals orthopaedic surgeons, radiologists, physiotherapists and nurses who are tasked with delivering care to patients who present with a wide variety of musculoskeletal and soft tissue injuries. The majority of orthopaedic departments offer an open referral system for all injuries. However, with an increasing demand there is evidence that this is becoming less sustainable as less severe injuries are being referred [1]. The use of virtual fracture clinic (VFC) for the management of certain injuries to reduce the workload on the traditional fracture clinic, in addition to reducing costs is growing in popularity [2,3]. VFC also allows hospitals to meet the British Orthopaedic Association (BOA) standards [4] of patients being reviewed within 72 hours of referral and also by having standardised protocols for common

injuries allows accident and emergency departments to improve their performance with waiting times [1,5].

Despite the increasing popularity of VFC's, both healthcare professionals and healthcare management have concerns related to its safety, reproducibility and patient satisfaction. There is a growing body of evidence that for certain conditions where the natural history is predictable, such as with occult or minimally displaced radial head fractures, 5th metatarsal fractures and radiographically stable Weber B ankle fracture, that the use of a VFC model has led to safe, predictable and satisfactory outcomes [6–8].

The tendoachilles is the most frequently ruptured tendon in the body [9–13] but despite this, management remains a keenly debated topic. Recent meta-analyses have shown a similar re-rupture rate for those patients treated with surgery or with functional bracing [14]. Operative intervention is not without risk with specific concerns related to wound management and breakdown but also include sural nerve injury, changes in tendon morphology, venous thromboembolism, elongation of the tendon, complex regional pain syndrome, and compartment syndrome [15]. Some cases are felt unsuitable for conservative management such as those with a bony avulsion [16] or a large non-reducible gap on ultrasound scan however the majority have the potential for

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conservative management with functional bracing. The role of gap size in the decision making for tendoachilles rupture remains a controversial topic. Some authors suggest that gaps of 5 mm or greater in equinus should be managed operatively [17], whereas others suggest that gap size is not important [18].

Our unit is a level one trauma centre caring for a local population of 600,000 but providing tertiary level services to 1.5 million within the National Health Service, UK (public funding).

At our unit, patients diagnosed with a suspected or actual tendoachilles rupture in the Accident and Emergency Department (A & E) are managed according to a standardised protocol via a virtual fracture clinic;

- Rebound boot or, if unavailable, black boot with 5 wedges.
- Urgent outpatient USS to confirm diagnosis and size of gap. Non-weight bearing.
- Prophylactic Tinzaparin prescribed for 4 weeks.
- Referral to virtual fracture clinic.

The patient history is then reviewed the next working day in a VFC by a trained extended scope physiotherapist (ESP) and an orthopaedic consultant. Once the diagnosis is confirmed, patients have a VFC telephone consultation to confirm the diagnosis and exclude other injuries.

If a full tear is confirmed on USS the patient is instructed to remain non-weight bearing for 4 weeks and continue Tinzaparin. If a partial thickness tear is confirmed on USS the patient is instructed to weight bear as tolerated for 4 weeks and discontinue Tinzaparin. If on USS a gap size > 1.5 cm in equinus was identified consultation with foot and ankle surgeon offered to discuss surgical intervention.

Patients are sent a standardised shared care plan detailing their diagnosis, management plan, prognosis and VFC contact details and are encouraged to re-contact the VFC if they have any concerns or are not progressing according to the shared care plan. An outpatient appointment is made at 4 weeks post injury with a foot and ankle consultant. Progress is assessed and instructions for progressive removal of wedges sequentially can be reinforced to ensure understanding and compliance. A further appointment is made at 8–12 weeks for review. If a patient requests a face-face consultation in addition to an initial VFC phone consultation and shared care plan, then this can be facilitated.

2. Objective

The aim of this study was to evaluate the management of closed Achilles tendon ruptures using a standardised treatment protocol in a virtual fracture clinic setting, to assess safety, clinical outcomes and any complications.

3. Materials and methods

This study was a clinical audit of current practice; therefore, no research ethics committee approval was required.

Dates of the study were January 2015 to October 2017. Inclusion criteria were all adult patients referred to the VFC with an actual or suspected Achilles tendon rupture. Only acute Achilles tendon ruptures were included in the study, which we defined as those who presented less than 1 week from the time of injury.

Electronic patient records (EPRs) were used to collect patient demographics.

Patient letters and EPRs were interrogated to assess for evidence tendon healing, which was defined as discharge from clinic pain-free with no functional issues. All re-ruptures were noted through interrogating patient letters, electronic patient records (EPRs) and the hospital picture and archiving system

(PACS). Any complications including re-rupture or deep vein thrombosis (DVT) were also recorded.

4. Results

4.1. Demographics

256 were referred to the VFC with an actual or suspected tendoachilles rupture. The mean average age was 51.68 years. There were 120 males (75.47%) and 39 females (24.53%).

4.2. Outcomes

Of the 256 patients referred with with an actual or suspected tendoachilles rupture, 166 patients had an USS proven TA rupture with complete follow up. 21 patients either opted for private care (3), were from overseas (3), were lost to follow up (13) or refused treatment (2). 69 patients referred on the VFC TA pathway had other findings on the USS scan. The most common alternative findings are summarised in Table 1.

Of the 166 patients with an USS proven TA rupture with complete follow up, 158 underwent primary conservative treatment and 7 underwent primary surgical repair. The surgical group had an USS gap ranging from 2 cm to 4.3 cm. 152 patients were discharged from follow up pain-free with no functional issues after conservative management. There were 6 (3.82%) re-ruptures in the conservatively managed group. The outcome findings are summarised in Table 2.

There were no reported cases of deep vein thrombosis (DVT).

5. Discussion

This study found that patient with and acute achilles tendon ruptures managed according to a standardised VFC protocol had a re-rupture rate of 3.82%, which compares favourably with the re-rupture rate of conservatively managed TA ruptures published within recent meta-analyses published at 13%, and is comparable to that of recent studies to patients who have been treated surgically [19,20]. It is also similar to those quotes by other studies with the use of standardised protocols [21].

One of the advantages of a VFC model that is standardised, initiated in the ED, is that it has been used by multiple different consultants and ESPs with no variation in outcome seen in our

Table 1

Common alternative USS findings.

Gastrocnemius tear
Chronic tendonitis
Calf haematoma

Table 2

Outcomes of patients referred to VFC for suspected TA rupture.

Number of patients referred on TA pathway	256
Number of patients with USS proven TA rupture with complete follow-up	166
Number of patients with alternative findings on USS	69
Care transferred to private provider, other hospital or lost to follow-up	21
Number of patients discharged with painless weight bearing after conservative treatment	152
Number of patients with re-rupture	6
Number of Patients with primary surgical repair after consultation with foot and ankle surgeon (Gap > 1.5 cm)	7
Number of patients with delayed surgical repair after conservative treatment	1
Re-rupture rate	3.82%

patient group. As a result, this model would prove reproducible and it should be highly transferrable to other institutions.

A limitation of our study is that no patient recorded outcome measures (PROMs) or functional outcome measures were assessed during this study both of which would unquestionably add to the value of the study.

A second limitation is that patient satisfaction levels were not assessed. There will always be a patient group who prefer a formal face to face clinical assessment as per the traditional model. We do offer to facilitate this if requested by the patient but in our experience, patients treated with this model are satisfied with the VFC consultation, formulation of shared care plan and the open invitation to contact the VFC at any point during their treatment to request a face to face appointment. Since completion of this study we now routinely assess patient satisfaction and are developing methods to assess patient reported outcome measures (PROMs) for all patients treated via the VFC model.

6. Conclusion

This study supports the use of a virtual fracture clinic model that is standardised, initiated in the ED, and is safe and reproducible in the management of Achilles tendon ruptures.

Conflict of interest

The authors declare non conflict of interests.

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