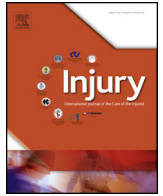




Contents lists available at ScienceDirect

Injury

journal homepage: www.elsevier.com/locate/injury



Twelve-month outcomes following surgical repair of the Achilles tendon

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ARTICLE INFO

Keywords:

Achilles tendon
Injury
Surgery
Outcomes
Extended Glasgow Outcome Scale
Return to work
Quality of life

ABSTRACT

Introduction: Incidence of Achilles tendon rupture (ATR) has increased over recent years, and debate regarding optimal management has been widely documented. Most papers have focused on surgical success, complications and short term region-specific outcomes. Inconsistent use of standardised outcome measures following surgical ATR repair has made it difficult to evaluate the impact of ATR on a patient's health status post-surgery, and to compare this to other injury types. This study aimed to report the frequency of surgical repairs of the Achilles tendon over a five-year period within an orthopaedic trauma registry, and to investigate return to work (RTW) status, health status and functional outcomes at 12 months post-surgical repair of the Achilles tendon.

Methods: Two hundred and four adults registered by the Victorian Orthopaedic Trauma Outcomes Registry (VOTOR) who underwent surgical repair of the Achilles tendon between July 2009 and June 2014 were included in this prospective cohort study. The Extended Glasgow Outcome Scale (GOS-E), 3-level European Quality of Life 5 Dimension measure (EQ-5D-3L), and RTW status 12 months following surgical ATR repair were collected through structured telephone interviews conducted by trained interviewers.

Results: At 12 months, 92% of patients were successfully followed up. Of those working prior to injury, 95% had returned to work. 42% of patients reported a full recovery on the GOS-E scale. The prevalence of problems on the EQ-5D-3L at 12 months was 0.5% for self-care, 11% for anxiety, 13% for mobility, 16% for activity, and 22% for pain. 16% of patients reported problems with more than one domain. The number of surgical repairs of the Achilles tendon within the VOTOR registry decreased by 68% over the five-year study period.

Conclusions: Overall, patients recover well following surgical repair of the Achilles tendon. However, in this study, deficits in function persisted for over half of patients at 12 months post-injury. The decreased incidence of surgical Achilles tendon repair may reflect a change in practice at VOTOR hospitals whereby surgery may be becoming less favoured for initial ATR management.

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Introduction

Achilles tendon rupture (ATR) is one of the most common sport-related injuries, causing sudden and severe disability [1]. Debate

regarding surgical versus conservative repair for the initial management of ATR is well documented [2,3], and surgical repair remains a common approach [4,5]. It is widely established that this injury occurs most commonly in men aged 30–50 years, and incidence appears to have increased across all age groups over recent decades [1,6]. Given the increasing incidence and the potential severe disability conferred by this injury, there is

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reasonable drive to investigate outcomes among surgical patients, using standardised measures.

Major long-term functional deficits have been found to persist following acute ATR, though large variations in recovery patterns have been observed between studies [7,8]. Commonly reported clinical measures following ATR include rates of re-rupture, as well as calf circumference, pain and post-operative complications [9,10]. However, there is a distinct lack of research investigating the practical consequences of reported clinical measures, and how these clinical measures relate to function. Where functional outcomes, such as heel raise tests, the Ankle Hind Foot Score and the Achilles Tendon Total Rupture Score (ATRS) have been reported they have been used inconsistently, making it difficult to compare findings between studies [11]. Furthermore, the use of injury or region specific measures, as opposed to generic patient-centred outcome measures limits the capacity to compare ATR patient outcomes to those of other injury types. Several studies have reported time to return to work (RTW) following ATR in an effort to evaluate treatment outcomes and investigate the practical implications of ATR recovery [8,9,12]. However, most studies have been restricted to smaller cohorts of less than 80 patients. Therefore, to clarify patient outcomes, studies of larger cohorts are required.

The aims of this study were to:

- i) report the frequency of surgical Achilles tendon repairs within an orthopaedic trauma registry over a five-year period; and
- ii) report patients' RTW status, health status, and functional outcomes at 12 months post-surgical repair of the Achilles tendon.

Methods

Setting

The Victorian Orthopaedic Trauma Outcomes Registry (VOTOR) is a monitoring system for orthopaedic trauma in Victoria, Australia. The registry records data relating to orthopaedic injuries, treatments and outcomes based on admission to four hospitals in Victoria, Australia: one metropolitan trauma centre, one regional trauma centre, and the two adult major (level one) trauma centres. All patients aged 16 years and above with an emergency admission >24 h for a new orthopaedic injury are included on the registry. Patients with a fracture related to metastatic disease are excluded. The opt-out rate for the registry is less than 2%, with approximately 5800 patients registered per year.

The complete VOTOR methodology has previously been described [13], and a brief outline is provided here. All patients registered by VOTOR are routinely followed-up at six and 12 months post-injury. Patients are contacted by trained telephone interviewers for collection of a range of outcomes relating to their physical function, pain, RTW status and health status. A patient's next of kin is contacted for follow-up telephone interviews in circumstances where contact with the patient is not possible, e.g., language other than English, cognitive impairment, etc. Ethical approval for the registry has been granted by the institutional ethics committees of each participating hospital, and the Monash University Human Research Ethics Committee.

To determine the coverage and representativeness of VOTOR data extracted for this study, population-level data on all Achilles tendon surgical repair cases were obtained from the Victorian Admitted Episodes Dataset (VAED). The VAED records admissions to all public and private acute hospitals, including day procedure

centres, in the state of Victoria. Victoria has a population of 5.9 million; 25% of the Australian population [14].

Participants

We included all patients registered by VOTOR with an Achilles tendon injury managed surgically from 1 July 2009 to 30 June 2014. Cases undergoing surgical repair of the Achilles tendon were identified using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) injury diagnosis code for Injury of Achilles tendon, "S860" combined with any relevant procedure code (Repair of Achilles tendon, "49718-01"; Secondary (delayed) repair of Achilles tendon, "49724-00"; Reconstruction of Achilles tendon, "49724-01"; or Other repair of tendon of ankle, "49718-00"). Cases undergoing surgical repair of the Achilles tendon were identified in the VAED dataset for the same age and date range using the same ICD and procedure codes. Transfers between hospitals and readmissions to the same hospital were excluded from the VAED dataset.

Procedure

The following data were extracted from the VOTOR registry for all eligible patients: year of injury, demographic details (age and gender), level of education, occupation, activity at the time of injury, pre-injury work status and pre-injury level of disability. Data extracted from the VAED for all eligible patients included year of hospital admission, age group and gender.

For all VOTOR patients, we analysed outcomes recorded at 12 months, including function, RTW status and health status. Function was reported using the Extended Glasgow Outcome Scale (GOS-E) which categorises patients according to the following eight outcomes: 0 = Dead, 1 = Vegetative State, 2 = Lower Severe Disability, 3 = Upper Severe Disability, 4 = Lower Moderate Disability, 5 = Upper Moderate Disability, 6 = Lower Good Recovery, and 7 = Upper Good Recovery [13]. Return to work status at 12 months (yes/no) was recorded for patients who were working for income prior to their injury. Those who had returned to work were also asked whether they had returned to the same organisation, and if so, whether they had returned to the same role within that organisation. Health status was reported using the 3-level European Quality of Life-5 Dimensions (EQ-5D-3L) measure [15]. This is a standardised questionnaire that asks patients to describe their health status. The dimensions assessed are Mobility, Activity, Pain, Anxiety and Self-care, with three scoring levels per dimension: 'No Problems', 'Some Problems' and 'Severe Problems'.

Analysis

Descriptive statistics were used to summarise the characteristics and outcomes of the sample. Chi-square analyses were used to compare the demographics of VOTOR and VAED patients. For the purpose of this analysis and to aid interpretation, we dichotomised GOS-E response categories into two outcome categories: 'Fully Recovered' (score of 7, corresponding to Upper Good Recovery) and 'Not Fully Recovered' (<7). The EQ-5D-3L responses were dichotomised into 'No Problems' and 'Some Problems'. The EQ-5D summary score was also calculated, providing a single score summarising all five domains. The EQ-5D summary score is normalised to population scores, ranging from -0.59 to 1, with scores <0 = health state worse than death, 0 = equivalent to death, and 1 = perfect health [15]. All analyses were performed using Stata Version 13 and significance was set at $p < 0.05$.

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