

Management of acute Achilles Tendon Ruptures: Challenges and Future



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Received:  July 27, 2018; Published:  August 03, 2018

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Abstract

The incidence of Achilles tendon rupture (ATR) has continue to increase in the last decade. A successful management of ATR is based on both the treatment intervention as well as rehabilitation regimens. Treatments for the Achilles tendon ruptures can be divided into conventional treatment, minimally invasive surgery and open surgery. The rehabilitation protocols are highly diverse but can be classified as early immobilization and accelerated rehabilitation. The relative benefits of all managements remain a subject of debate due to the constantly changing effectiveness standard for ATR repair. Complications incidence is a universal measure that could be explored to comparing different managements. The reported incidence of major complications is controversial and different managements demonstrate a disparate complication spectrum. In the future, efforts should be made in exploring more the optimal treatment and rehabilitation protocol. The ideal surgical intervention would be both minimally invasive to reduce complications and strong enough to withstand accelerated rehabilitation.

Mini Review

Achilles tendon is the thickest and strongest tendon in human body. It is also the tendon that most vulnerable to rupture. The incidence of Achilles tendon rupture (ATR) has continue to increase in the last decade [1]. In Denmark, the annual incidence was 55.2 and 14.7 (all member per 10,000) for the males and the females respectively in 2012, with a 22% rise comparing to 2001 [2]. A palpable gape and positive Thompson test as well as Ultrasonography and magnetic resonance image is applied to the diagnosis of ATR. A successful management of ATR is based on both the treatment intervention as well as rehabilitation regimens. Treatments for the Achilles tendon ruptures can be divided into conventional treatment, minimally invasive surgery and open surgery [3-5]. The rehabilitation protocols are highly diverse but can be classified as early immobilization and accelerated rehabilitation [6-11].

Unlike the former one that features on long time of immobilization of injured ankle, the accelerated rehabilitation is aim to achieve an enhanced tendon healing and eventually a shorted return to work time for patients by using a variety of methods like early mobilization, early weight bearing etc. The relative benefits of all managements remain a subject of debate. One of the reasons for failure to reach a consensus is because the effectiveness standard for ATR repair is constantly changing. In the early day functional measures such as Rang of Motion (ROM) were in the center of interest. Later on, several comprehensive score systems that concern not only objective measures but also patients' subjective

satisfaction have introduced and widely accepted [12,13]. In recent days, measures that focused on patient's life quality have been given more and more attention, such as return to work time and activity restoration [8].

This shit in effectiveness standard represents the changing idea for the optimal management of ATR repair. It also prevents the overall comparisons between different managements. But there is a universal measure that could be explored to comparing different managements----complications. Complications after ATR could be minor like skin related complications (adhesion, superficial infection, etc.), tendon related complications (elongation, contracture), pain and sural nerve disturbance. Though these minor complications would prolong the healing process, the negative effect is reversible. But major complications such as re-rupture, deep infection and DVT would result in a surgical intervention, prolonged hospital time or even life threatening leading to a total failure of management. The gravity of major complications makes them paramount in treatment as well as recovery. The reported incidence of major complications is controversial and different managements demonstrate a disparate complication spectrum [8,14-17].

Conservative treatment is often associated with a higher re-rupture rate. Deng discovered that re-rupture occurred in 3.7% surgically treated patients and 9.8% nonsurgical treated patients with statistical significance [18]. In another meta-analysis, Amendola found that the pooled rate of tendon reruptures was

lower in those treated surgically, 3.6%, compared with 8.8% for patients managed nonoperatively [19]. Wilkins has pointed out that Open repair was associated with a significantly lower rerupture rate compared with nonoperative treatment (3.6% vs 8.8%) [20]. As for open surgery and minimally invasive surgery, more and more studies have pointed out that MIS is better than open surgery. It would not only reduce complication incidence [3], but also show superiority in clinical outcomes than open surgery [21]. However, due to its limited incision and poor exposure, MIS is reported to associate with sural nerve injury, especially in percutaneous repair. In a study of 31 ATR patients who underwent percutaneous repair, a total of five sural nerve injuries (16%) have been detected. But the symptoms resolved in 6 to 9 months [22].

For rehabilitation regimens, numerous studies have demonstrated that accelerated rehabilitation promotes early healing and contributes to functional recovery [23-25]. It would also lead to a shorter return to sports time and a higher patient satisfaction [26]. Accelerated rehabilitation also facilitates tendon repair by allowing ankle to move. Studies have also shown that mesenchymal stem cells play a key role in tendon healing and physical stimulation has a major impact on them [27-30]. More important, providing patients with an enhanced recovery and shorter return to normal life time is becoming a common goal for all sports medicine doctors.

In the future, efforts should be made in exploring more the optimal treatment and rehabilitation protocol. The detailed standardization rehabilitation protocols should be established instead of present diverse regimens. The key is about early motion of the injury ankle to facilitate tendon healing. Therefore, the ideal surgical intervention would be both minimally invasive to reduce complications and strong enough to withstand accelerated rehabilitation. The emerging novel MIS called Panda Rope Bridge Technique is one example. Further researches on the function of different arguments, sutures and mechanism of Achilles tendon repair are also needed [27,31-33].

Funding

This article was supported by research grants from the Chongqing science and Technology Commission social and people's livelihood project (cstc2018jcsx-msybX0088).

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ISSN: 2574-1241

DOI: [10.26717/BJSTR.2018.07.001526](https://doi.org/10.26717/BJSTR.2018.07.001526)

Liangjun Yin Biomed J Sci & Tech Res



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