Repair of Achilles Tendon Rupture Under Endoscopic Control

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Purpose: To evaluate the functional outcomes and complications after endoscopically assisted percutaneous repair of Achilles tendon rupture. **Methods:** An arthroscopically assisted percutaneous repair was performed in 20 patients between the ages of 28 and 47 years. Two patients were suffering from a long-standing rupture. Follow-up was 2.5 years. Evaluation entailed Merkel's scale for pain, functional load (weight) bearing capacity, and the heel raise test. For statistical analysis, a random effects Poisson regression model was used. **Results:** All patients achieved good to excellent outcomes. The median score on Merkel's scale was 600. All patients were able to stand on the tiptoe of the operated leg and none had limitations placed on their daily activities. A 12% decrease in maximum torque and 16.5% decrease in work performance of the injured side were noted. There was no statistical significant difference in the heel raise test between the operated and non-operated leg. No wound problems, re-ruptures, or infections were reported. Two patients (10%) had sural neuralgia; in 1 case, it subsided without further treatment. **Conclusions:** Endoscopy in percutaneous Achilles tendon repair is useful in determining the initial gap and providing adequate apposition of the tendon ends. It is a safe technique with good outcomes and minimal complications. Despite its promising results, potential problems include sural neuralgia and some decrease in strength. **Level of Evidence:** Level IV, therapeutic case series. **Key Words:** Achilles tendon rupture—Endoscopy—Percutaneous repair.

Approximately 75% of all Achilles tendon ruptures occur during recreational activities. There is a trend towards a higher incidence of ruptures because of the increasing popularity of sport activities among "weekend warriors," many of whom are 30 to 40 years of age.[1] The current treatments can be classified as either nonoperative (casting or functional bracing) or operative,[2] which includes open repair, percutaneous techniques, and endoscopically assisted percutaneous repair.[3] Some authors advocate conservative treatment[4,5] while others strongly recommend surgery.[6-9] In general, operative management offers a lower re-rupture rate, early functional treatment, less calf atrophy, and stronger push off.[7,9,10] Nevertheless, it is associated with a significant number of wound complications.[8,11-14]

In 1977, Ma and Griffith[15] described a technique of percutaneous repair, decreasing the complication rates of open surgery. This study was followed by several reports with similar results.[13,16,17] However, this technique is regarded to place the sural nerve at danger, causes misalignment of the stumps, decreases the strength of the repaired site, and leads to a higher re-rupture rate.[3,6,10] A meta-analysis of 12 trials involving 800 patients confirmed that open surgery results in a lower re-rupture rate but a higher risk of overall complications when compared to conservative treatment. The same study showed that percutaneous repair and the use of a functional brace postoperatively were associated with a lower complication rate.[9] According to Goren et al.,[18] the biomechanical outcomes of open surgery and percutaneous repair are both effective in functional terms.

Treatment results are determined not only by the method of repair but also by the early postoperative functional rehabilitation.[19] The best option should not rely solely on the re-rupture and wound complication

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rate but also on the utility that the patient has for these outcomes.[11] In general, the studies reporting Achilles tendon rupture and mode of management are increasing, while the complication rates are decreasing.[7]

An endoscopically assisted percutaneous repair seems to overcome certain problems of previous techniques.[20] Direct visualization of the rupture site using an endoscope increases repair precision and minimizes wound complications. The aim of the present study was to evaluate the results of endoscopically assisted percutaneous repair of Achilles tendon rupture. Our hypothesis was that the technique would prove to be safe, with both good outcomes and minimal complications.

METHODS

This prospective study was conducted at a level I trauma center. Twenty patients (18 males and 2 females) 28 to 47 years of age (mean, 36.75 years) underwent operations to repair an Achilles tendon rupture between 1998 and 2003. There were 10 right-sided and 10 left-sided ruptures (Table 1). All except 1 were amateur athletes, and 2 had sustained the rupture 3 weeks before examination. Patients with re-rupture, open rupture, previous Achilles tendinopathy, previous local steroid injection, systemic corticosteroid treatment, diabetes mellitus, and autoimmune diseases were excluded. Study inclusion criteria were limited to patients younger than 60 years, compliant to surgical and postoperative cast treatment. The mechanisms of trauma included sports-related activites (soccer, basketball, jogging, tennis, volleyball, and aerobics), fall from a height, and missing a stair in a staircase. Diagnosis was based on clinical examination, existence of a palpable gap in the area of rupture, and a positive Thompson's test result. All patients were operated upon by the same orthopedic consultant.

Under general anesthesia and using a tourniquet, the patient was placed in the prone position. After marking the site of the gap on the skin, one arthroscopic portal of entry was made medially and another dorsolaterally to the rupture site. Two accessory working accesses were made on the dorsal surface of the tendon, one proximally and one distally to the gap. Thirty-degree and 0° scopes were used. Under continuous irrigation using a pump, the paratenon and the rupture ends (Fig 1) were identified. The suture was passed through needles under endoscopic control to ensure passing through the lips of both ends. After tightening the first suture, a remaining gap was inspected under direct visualization, especially in the ventral and lateral parts (Figs 2 and 3). Additional sutures were performed until the torn ends were satisfactorily closed and aligned (Fig 4). To avoid sural nerve entrapment, no sutures in the ventral portion were placed. The knots were buried underneath the skin and all remaining wounds were left open. No drainage was used.

TABLE 1. *Demographic Data and Merkel Score Results on Achilles Rupture Patients*

Gender	Age (y)	Side	Height (cm)	Weight (kg)	Trauma	Complications	Modified Merkel Scale
M	32	L	192	115	Basketball	–	641
M	32	R	184	78	Soccer	Sural neuralgia	547
M	46	R	165	85	Stairs	–	576
M	44	L	180	92	Fall	–	577
F	32	R	170	76	Aerobics	–	662
M	35	L	182	98	Soccer	–	631
F	36	L	178	70	Tennis	–	621
M	46	L	173	76	Soccer	–	562
M	37	R	176	84	Basketball	–	641
M	47	R	185	85	Soccer	–	655
M	29	L	182	80	Jogging	–	581
M	39	R	179	75	Soccer	–	641
M	43	L	182	80	Soccer	Sural neuralgia	571
M	33	L	163	68	Jogging	–	566
M	35	R	170	74	Soccer	–	641
M	39	L	175	80	Basketball	–	631
M	28	R	173	76	Tennis	–	579
M	41	L	183	87	Soccer	–	618
M	28	R	178	85	Soccer	–	557
M	33	R	186	87	Volleyball	–	582

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