Reconstruction of Chronic Achilles Tendon Rupture by V-Y Gastrocnemius Flap and Peroneus Brevis Transfer

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Abstract

Purpose: Reporting the outcome of the modified peroneus brevis (PB) transfertechnique in treating 26 patients with chronic rupture of Achilles tendon (AT).

Methods: The diagnosis was neglected acute AT rupture in ten patients, ten with achronic rupture, re-rupture of the tendon in four cases, and Achilles xanthoma in two cases. The gap after debridement was 6 cm in average (range 4-8). The technique was V-Y gastrocnemius flaps of the ruptured AT in addition to peroneus brevis transfer. AOFAS score and isokinetic evaluation were used for functional assessment of ankle plantar flexion torque deficit in average 36 months follow up period (range 24-54 months).

Results: Significant improvement of the AOFAS score at latest follow up. No re-rupture nor major complication, particularly of wound healing, was observed, isokinetic testing at 30 degrees/second and 120 degrees/second revealed a significant average decrease of 28 ± 11% and 36 ± 4%, respectively, in plantar flexion peak torque. Although strength deficit persisted at latest follow up, functional improvement was significant without morbidity due to (PB) harvesting.

Conclusion: The surgical technique of V-Y myotendinous advancement of gastrosoleus tendon augmented by modified PB transfer for the treatment of chronic or neglected ruptures of AT with a gap of 6 cm length or more is a successful technique leading to high percentage of repair site healing and achieved excellent functional outcome.

Introduction

HXe incidence of tendo-achilles rupture in the patients 30-40 years of age is increased specially in athletics to reach 75% of all cases [1]. HXe tendon rupture is called neglected when the treatment is delayed more than four weeks from the date of injury [2]. HXe percentage of misdiagnosis of Achilles tendon ruptures may reach 20% [3]. HXe delay in treatment of AT ruptures results in soн tissue retraction with degeneration of the tendon Ẑlling the gap between the ruptured ends with Ẑbrotic scar tissue which leads to marked functional disability [4]. In neglected or chronic ruptures of Achilles Tendon (AT), the retraction and atrophy of the tendon ends create a gap Ẑlled with scar tissue and Ẑbrosis which make the reconstruction diẌcult. HXe extent of the gap and the potential recovery of the muscle are factors that aẉect the repair aнer reconstruction [5-7].

In the literature, the V-Y myotendinous advancement of the (AT) augmented by multiple transfers like gastrocnemius soleus complex [1], Bosworth [7] technique (a “turndown" of proximal tissue of the (AT)). In the study of Us et al. [8], they reported 23% reduction in peak torque of the tendon aнer a V-Y lengthening technique for neglected A T ruptures. HXerefore, tendon transfer for augmentation of the V-Y ad

HXe mean pre-operative American orthopedic foot and ankle

of the paratenon, and then carful skin closure was done to avoid necrosis.

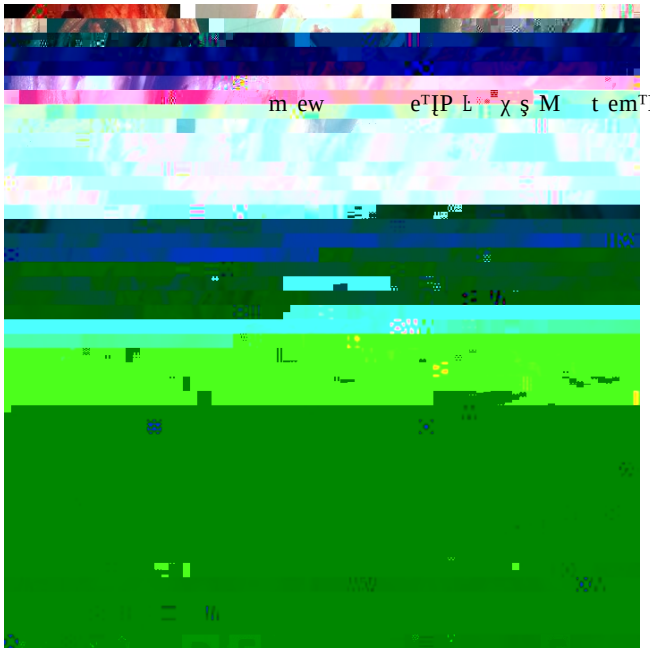

Figure 2: Multiple sutures augmenting the repair and the tendon transfer done using absorbable sutures.

HXe test begins with the patients in the prone position. HXe patient put his extended legs on the footplate. HXe lateral malleolus midpoint was aligned with the mechanical axis of the dynamometer and taken as a Ît axis of the ankle. HXe reference position of the foot is painless range from 90 degrees to maximum planter îexion and from 90 degree to a maximal dorsiîexion for recording the range of motion comparing the normal to awected legs.

HXe test was done in two angular velocities, 30 (deg /sec) with Îve repetitions, and 120 (deg/sec) with five

91	93.4	35.6	35.6	38	50	22.8	22.8
84	93.4	35.6	35.6	43	50	22.8	22.8
86	93.4	35.6	35.6	42	50	22.8	22.8
92	93.4	35.6	35.6	40	50	22.8	22.8
93	93.4	35.6	35.6	36	50	22.8	22.8
90	93.4	35.6	35.6	43	50	22.8	22.8
91	93.4	35.6	35.6	38	50	22.8	22.8
93	93.4	35.6	35.6	36	50	22.8	22.8
86	93.4	35.6	35.6	40	50	22.8	22.8
86	93.4	35.6	35.6	40	50	22.8	22.8
88	93.4	35.6	35.6	42	50	22.8	22.8
90	93.4	35.6	35.6	43	50	22.8	22.8

Table 2: Isokinetic test results in comparison to normal side in 2 test speeds.

HXe overall rate of complications in this study was 23% and found in [illegible] ruptures. HXey recorded a decrease in plantar ẑexion strength by 7% aner an average of fourteen months follow-up. HXe test was performed at high speed (120 deg/sec) without recording the peak torque [20]. HXe diẉerences in the results of this study may be due to PB transfer augmentation using V-Y myotendinous advancement of the ruptured AT.

six patients. Four cases had superẐcial infection treated by dressing and intravenous cephalosporin. Reẑex sympathetic dystrophy was diagnosed in two patients two months postoperative but improved at the end of the follow up. None of the patients has re-rupture through the follow-up period. HXe time elapsed postoperative for patients to return to work ranged from 2 to 6 months with a mean of 4 months, and recovery to sports was ranged from 4 to eight months with a mean of 6 months. Comparing the ability of patients to participate in sports to the level before injury, all patients have lower level of sports activity at the end of follow up period.

Compared to FHL and FDL, the PB is a stronger in plantar ẑexion, this may owe n sports was ranged from 4 to eight m[illegible] t m[illegible] co

Discussion

In this work 26 patients with Tendo-Achilles chronic rupture were treated with V-Y advancement augmented by a Peroneus Brevis (PB) transfer. HXe clinical outcome and function of the ankle were recorded in a mean follow-up of 36 months. HXe AOFAS was used to evaluate the all functional outcome with signiẐcant improvement of 34 points at the end of follow up. HXese results are comparable to other results in the literature [8,12,17-20].

Iso-kinetic assessment was recommended to be reliable in previous studies [14,15]. In this series, the peak torque value of planter ẑexion was signiẐcantly decreased (10%) in the aẉected ankle in relation to the non-aẉected one with the test at 30 deg/sec. Wapner et al. [17] using the same test recorded an average decrease in plantar ẑexion peak torque (41.8%). Hahn et al. [21] in a cohort study on 13 patients recorded a decrease in plantar ẑexion peak torque of 35% from normal side with the test at 60 deg/sec. HXey had ten patients with chronic ruptures of AT and three of them with tendinopathies followed up for average (46.5) months [21]. HXe same results were reported in another two studies on patients with chronic tendo-achilles rupture with some limitations [20,22]. Monroe et al. [23] have report on a small series of seven patients and had a decrease of (28%) in the peak torque with the iso-kinetic test at velocity of 30 deg/sec, 19 months aner surgery. Wilcox et al. [20] in their study of 20 patients seventeen of them had tendinopathies, and the other three had chronic tendo-achilles

patient treated by PB transfer to augment the V-Y myotendinous advancement. All cases were diagnosed after 4 weeks of injury and classified chronic rupture of AT with main follow-up of 30 months which can be considered a long period compared to other studies in literature [8,32]. The limitation of this study may be in lack of control group.

Conclusion

The surgical technique of V-Y myotendinous advancement of