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Surgical treatment of chronic Achilles tendon rupture functional and anatomical outcomes over a mean follow-up period of two years

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Abstract
Background: The aim of this paper was to report the functional and clinical results of subcutaneous Achilles tendon rupture repairs through two surgical plasty techniques, with a mean follow-up of 2 years.
Patients and methods: This study carries out a retrospective analysis of 27 patients presenting a subcutaneous rupture of Achilles tendon who enderwent surgical treatment between January 2012 and December 2016. Surgical treatment was carried out using the Chigot-Lynn technique for 19 patients and the Bosworth-Lynn technique for the remaining 8 patients. Functional and clinical results were evaluated according to McComis criteria and patient satisfaction.
Results: Clinical measurement of the of ankle motion range revealed average flexion of 15 ° and an average extension of 40 °. Amyotrophy of the triceps surae muscle was found in all patients, with an average 2 cm. Residual pain was found in four patients. Average sick leave was 4 months. 8 patients had resumed sport at their previous level of training, 3 patients had returned to lower levels of sport, and one patient had abandoned their sporting activity. The results were considered highly satisfactory or satisfactory by 24 patients, good by two patients and poor by one patient.
Conclusion: Chronic ruptures of the Achilles tendon remain a therapeutic challenge for the orthopaedic surgeon. Surgery with a reinforcement plasty must be proposed to patients who are active or have sports activities. Surgical repair reduce iterative ruptures and ensure the best functional recovery.

Keywords: Achilles tendon rupture, surgical plasty, functional outcome, Togo

Introduction
Achilles tendon rupture is a rupture involving all or part of its width. The Achilles tendon is the strongest tendon in the body, and its rupture is frequently linked to the physical demands in sports activities [1, 2]. A Finnish study [3] shows a constant increase in the overall incidence per 100 000 person-years, from 2.1 in 1979 to 21.5 in 2011. Rupture of the Achilles tendon most often involves men aged 30 to 50 years, causing a sudden interruption of physical activity [4-6]. Although there are no statistics about the incidence of this pathology in Togo, we have observed a marked increase due to the practice of competitive and recreational sport. The aim of this paper was to report the functional and clinical results of subcutaneous Achilles tendon rupture repairs through two surgical plasty techniques, with a mean follow-up of 2 years.

Patients and methods
This study carries out a retrospective analysis of 27 patients presenting for a subcutaneous rupture of the Achilles tendon resulting from sports activity (12 patients) or through other causes (15 patients). Surgical treatment for all patients was carried out in the Traumatology-Orthopedics Department of the Sylvanus Olympio Hospital in Lomé between January 2012 and December 2016. There were 24 men and 3 women, i.e. a sex ratio of 8. The average patient age was 39 years [21-52 years]. Surgical treatment was carried out using the Chigot-Lynn technique for 19 patients [Figure 1] and the Bosworth-Lynn technique for the remaining 8 patients [Figure 2]. The ankle remained immobilized with the foot in an equinous position for three weeks following surgery [Figure3], followed by walking exercises, protected by a

heel pad, for a further 3 weeks. Patients were then evaluated at 3 weeks, 6 weeks, 2 months, 6 months, then 1 and 2 years post-surgery. Functional and clinical results were evaluated according to McComis criteria [7], including pain, ankle extension and flexion, circumference of the calf measured 10 cm below the knee compared to the healthy leg, single-limb heel-rise test, resumption of sports activity, complaints during normal activities and patient satisfaction

Results

All patients were reviewed at a final control occuring an average 2 years after surgery [1 to 5 years]. At the time of rupture, twelve of the patients had regular sports activities, and two were involved in competitive sport. The Achilles tendon rupture was consequent to sports accidents in 10 patients and was due to other causes in 17 patients. A history of corticoid infiltration for tendinitis was reported in 4 patients. The Thompson test was negative in all patients at the final control. No iterative rupture was found. Clinical measurement of the of ankle motion range revealed average flexion of 15 ° [10 ° - 20 °] and an average extension of 40 ° [35 ° - 45 °]. Amyotrophy of the triceps surae muscle was found in all patients, with an average 2 cm [0.5 - 5 cm] difference beween calf measurements on the two legs [Figure 4]. Residual pain (algodystrophy) was found in four patients. There was no evidence of retractile scars. Average sick leave was 4 months [3 to 8 months]. Among the 12 patients who had sporting activities prior to surgery, 8 patients had resumed sport at their previous level of training, 3 patients had returned to lower levels of sport, and one patient had abandoned their sporting activity. Patients resumed their sporting activity an average of 8 months [6-12 months] after surgery. The complications noted were 3 cases of disunion suture (11%), which had evolved well with local wound care. The results were considered highly satisfactory or satisfactory by 24 patients, good by two patients and poor by one patient.

Discussion

We considered any untreated rupture beyond 4 weeks after the onset of symptoms to be chronic Achilles tendon rupture. The diagnosis was based on the identification of classic clinical signs using the Brunet-Guedj and Simmonds-Thompson tests. Although additional examinations were not systematically carried out before diagnosing the rupture of the Achilles tendon in this study, ultrasound can be used to confirm the possibility of percutaneous suture. Ultrasound is a first-line examination in the event of Achilles tendon rupture, due to its ease of use, the ability to visualize the dynamic function of the tendon and finally its cost [8-10]. Other tests such as MRI and standard radiography can be used in the initial assessment of this pathology in addition to clinical diagnosis [11, 12]. Several therapeutic methods are proposed for the treatment of an Achilles tendon rupture: conservative treatment by plaster immobilization, functional rehabilitation, classical surgical treatment and percutaneous or endoscopic suture [13-16]. Patients in this study all had surgical treatment, returning to work 4 to 6 months after surgery. The choice of surgical technique was made intraoperatively and depended on the presence of the plantaris muscle tendon. The Chigot-Lynn technique was used if the plantaris muscle was found, and the Bosworth-Lynn technique was used for all other cases. The plantaris muscle is a musculo-tendinous unit found close to the Achilles tendon, and is absent in 8% of people [17]. Recent literature is in favor of surgical treatment for Achilles tendon ruptures due to a higher rate of iterative ruptures following conservative treatment [18-20]. However, open surgery frequently exposes patients to skin, infectious and nervous complications [15]. In this series, suture disunion was found in three patients on the removal of the plaster three weeks post-surgery. This complication could lead to infection if it is not diagnosed early enough. Skin complications are more frequent in conventional surgery compared to percutaneous or minimally invasive methods [9, 18, 21]. Amyotrophy was present in all patients and can be explained by the duration of immobilization, which was an average of 6 weeks. The rate of amyotrophy is comparable to the series reported recently by Guclu [22]. A low incidence of amyotrophy is reported in endoscopic and minimally invasive techniques [9, 21, 23]. The therapeutic future of this pathology is, therefore, clearly oriented towards minimally invasive techniques, even in the absence of consensus that the latter could reduce the risk of complication skin.

Figure and legend

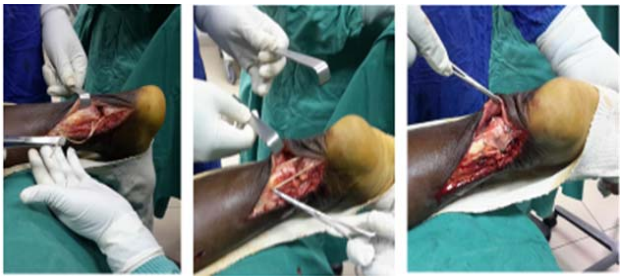

Fig 1: Technique of Chigot-Lynn

Fig 2: Technique of Bosworth

Fig 3: Equine angle immobilisation

Fig 4: Amyotrophy of the triceps surae muscle, right leg

Conclusion

Chronic ruptures of the Achilles tendon remain a therapeutic challenge for the orthopaedic surgeon. To date, the literature has not defined the most appropriate therapeutic choice. The diagnosis of Achilles tendon rupture is clinical and often occurs long after the rupture occurs. Surgery with a reinforcement plasty must be proposed to patients who are active or have sports activities. Surgical repair, whatever the technique, is the only means that can significantly reduce iterative ruptures and ensure the best functional recovery. However, the debate remains as to the primacy of classic open surgery or percutaneous and minimally invasive techniques.

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