Endoscopic repair of partial-thickness undersurface tears of the gluteus medius tendon

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Summary Partial-thickness tear of the gluteus medius and minimus muscles has recently been recognized as a cause of chronic trochanteric pain resistant to medical treatment. The present article reports an original endoscopic technique of identification and repair. It uses a standard arthroscope at 30°, with the patient in lateral decubitus, without fluoroscopy. In case of partial-thickness undersurface tear, careful hook palpation followed by bursa exploration enables the pathological tendon to be diagnosed. A trans-tendinous approach then allows debridement, with systematic resection of the bone structures implicated in the impingement, followed by side-to-side tendon suture.

Level of evidence: Level IV (case series).

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Introduction

Trochanteric tendinobursitis has a frequency estimated at 1.8/1000 [1]. Resistant to medical treatment, they may be caused by overlooked lesions of the gluteus medius or minimus muscles [2]. The anterior and medial fibers of the gluteus medius contribute to abduction, the tensor fasciae latae being the main abductor of the hip [3]. Thus, in suspected partial tear of the gluteus medius or minimus, the two most important clinical signs are pain on ipsilateral unipodal weight-bearing, sometimes with a 30s delay, and reappearance of pain when external derotation is hindered on a hip in 90° flexion [2]. Any pathology relating to undersurface tendon disinsertion will show as more or less high-intensity T2-weighted signal, depending on the degree of inflammation [4]. Lequesne [2] suggested that surgery is indicated in case of four associated conditions: > 6 months’ chronicity, imaging aspect of tendinopathy, positive US-guided infiltration test, and absence of retraction or evolved fatty degeneration of the gluteus medius and minimus muscles. The present article reports an original and simplified technique, requiring no dedicated hip instrumentation for endoscopic repair of partial-thickness undersurface tear of the gluteus medius and minimus muscles.

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Surgical technique

Installation

The patient is positioned in lateral decubitus, with the hip in 20° abduction. The whole operated limb is included in the surgical field (Fig. 1). Instrumentation comprises a 30° arthroscope, an FMS Duo™ pump (Fluid Management System, DePuy Mitek Inc., Raynham, MA, USA), which can control inflow and outflow to maintain a constant pressure (set at 50 mmHg), and an electrocoagulation electrode.

Approach

Three approaches are routinely performed but supplementary approaches may be performed as required. The approach for the arthroscope is in the femoral axis, 5 cm distal to the summit of the greater trochanter. The instrumental approaches are proximal, so as to be able to position anchors perpendicular to the lateral aspect of the greater trochanter (Fig. 1). Needle palpation locates the summit of the greater trochanter and the opening of the fascia lata 5 cm proximally and distally to the summit of the greater trochanter, using a VAPR electrode (Depuy Mitek Inc., Raynham, Massachusetts) or an 11/10th scalpel blade. The subtrochanteric bursa is then resected by the shaver (4.5 mm) and a VAPR radiofrequency electrode.

Lesion location

The lesion is usually located at the junction between the thin lateral component of the gluteus medius tendon (lateral lamina) and the insertion of the gluteus minimus tendon, forming a conjoint tendon [2] (Fig. 2). Ischemic factors are implicated in these lesions (Fig. 3), aggravated by mechanical impingement (aggressive greater trochanter or osteophyte) [5] (Fig. 4). The main difficulty is due to the fact

Figure 1 Patient installation. A. The patient is positioned in lateral decubitus with an abduction cushion under the knee. We use a distal endoscope and two proximal instrumental approaches. B. The whole lower limb is included in the surgical field, to enable rotation so as to identify the lesion. C. We use cannulae and two proximal instrumental approaches, including one accessory portal.

Figure 2 Gluteus medius and minimus anatomy. A. The footprint includes the posterior gluteus medius tendon (2) which inserts to the posterosuperior part of the greater trochanter (A), the lateral gluteus medius lamina (3) on the lateral aspect of the greater trochanter (B) with the proximal bald zone, and the gluteus minimus tendon (4) which inserts to the anterior aspect of the greater trochanter (C). B. Serous bursa anatomy. The fascia lata (1) covers the gluteus maximus or trochanteric bursa (5). The gluteus medius bursa (6) and gluteus minimus bursa (7) are appended to their respective tendons.
that, unlike in the shoulder, the undersurface cannot be visualized without resorting to bursoscopy of the gluteus medius or minimus bursa, which would mean opening the apparently intact rotator cuff. When the tear is almost full-thickness (grade 3), the lesion is easily located by hook palpation, as the pathological fibers tear spontaneously. Very occasionally, they do not, and a blunt trocar needs to be used. If it can be introduced through the rotator cuff, the tendon is pathological (Video 1). In that case, a trans-tendinous approach [6] should be performed, opening the tendon with a scalpel along the grain of the fibers. The pathological degenerative undersurface part is then revealed (Fig. 5, Video 1).

**Preparation**

The pathological tissue should be removed by shaver, down to the healthy tissue. The greater trochanter is abraded using a motorized burr. This is an essential step, and all aggressive osteophytes must be removed and the bald zone of summit of the greater trochanter must be reduced, as a large majority of lesions are located on the deep side of the lateral lamina of the gluteus medius: presumably, the greater trochanter aggresses the tendon and is implicated in these partial-thickness lesions by a "wiper" effect during rotation.

**Repair**

Side-to-side repair uses an anchor (U-shaped, with 2 sutures), or two (U-shaped, 4 sutures) in case of incomplete closure. We use resorbable 6.5-mm screwed anchors (Healix BR, Depuy Mitek Inc., Raynham, Massachusetts). The bone of the greater trochanter is more dense than in the shoulder, and requires tapping before the anchor is introduced. Suturing uses straight bird-beak forceps or an automated Expressew suture-passer (Depuy Mitek Inc., Raynham, Massachusetts). No drainage is required.

![Endoscopic repair of partial tear of the gluteus medius](image)

Figure 3  A and B. Bursoscopic and histologic aspect of gluteus minimus tendon undersurface degeneration. Histology found an aspect of degenerative tendon associating a region of tear and partial necrosis with mucoid degeneration and cicatricial remodeling (HES, ×200).

![MRI and endoscopic aspect](image)

Figure 4  A and B. MRI and endoscopic aspect of right greater trochanter summit exostosis causing partial undersurface tear of the gluteus medius.

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Postoperative course and follow-up

Rehabilitation is initiated immediately, but weight-bearing is delayed for six weeks. Rehabilitation should avoid passive lateral rotation, passive adduction, active internal rotation and active abduction for the first 6 weeks. An abduction brace should be worn between sessions. Hip motion can be extended up to 90° flexion for the first 3 weeks. As of 6 weeks, weight-bearing is progressively resumed, along with muscle reinforcement. By 3 months, gait should be normal and painless. Outcome may be judged at the 6th postoperative month.

Results

Four hips (4 patients) were treated by this technique between September 2011 and January 2013. Mean age was 68.5 years (range, 64—79 years). Mean evolution was 3.2 years (range, 1—10 years). All patients had had at least one ultrasound-guided infiltration of Altim® (cortivazol) (mean = 1.8; range, 1—3), with failure of medical treatment. There were two partial undersurface tears of the lateral laminae of the gluteus medius and minimus and two partial tears of the posterior lateral lamina of the gluteus medius. There were no complications. Mean modified Harris score and NHAS (Non-Arthritic Hip Score) [7] rose respectively from 35.7 (range, 20—54) and 38.3 (21—52) preoperatively to 74 (46—84) and 83 (64—95) at 6 months’ follow-up.

Discussion

Greater trochanteric pain resistant to medical treatment is suggestive of underlying gluteus medius and/or minimus tendinopathy [2]. In France, rheumatologists are aware of this entity [2], but it is underestimated and insufficiently well known by orthopedic surgeons [8]. Diagnosis is clinical, founded on two signs: pain on unipodal weight-bearing, and resurgence of pain when external derotation is hindered on a flexed hip [2]. Clinical assessment should be given greater weight than imaging, as MRI sometimes fails to find tendon discontinuity even in proven full-thickness tear [4]. Even when no tear can be demonstrated on MRI, or ultrasound, in case of resistance or recurrence (pain enduring for more than 6 months despite adapted medical treatment), surgery is indicated if the clinical findings are suggestive, the targeted infiltration test is positive and gluteal muscle trophicity remains unimpaired [2]. As bursitis is usually contiguous to at least partial tear of the underlying tendon, simple bursectomy [9] is justified only if inspection of the tendon system finds no tear, even partial, or if repair is contraindicated: tendon retraction, fatty degeneration stage ≥ 3, very elderly patient (> 75 years).
Endoscopic repair of partial tear of the gluteus medius

or general health status precluding 6 weeks' non-weight-bearing.

Open repair surgery gives good results [2,10–12]. Two recent series of endoscopic repair in 10 and 15 patients respectively with full or partial-thickness tear (5 and 6 cases respectively) had comparable results [13,14]. Domb et al. [6] were the first to describe endoscopic repair of partial undersurface gluteus medius tear on a trans-tendinous approach, allowing visualization and repair of the lesion. The present technique has several originalities compared to Domb's. The patient is in lateral decubitus and no fluoroscopy or 70° endoscope is used, which simplifies the technique and makes it more accessible. Above all, unlike previously reported endoscopic repair procedures, we recommend systematic resection of the anterosuperior summit of the greater trochanter so as to reduce impingement with the tendon undersurface. Prospective studies with longer follow-up and larger series may confirm this attitude.

Conclusion

Trochanteric tendinobursitis resistant to medical treatment often involves overlooked partial gluteus medius and/or minimus tendon tear. Diagnosis is above all clinical. Endoscopic repair of partial undersurface tear on a trans-tendinous approach, without any specific ancillary and with the patient in lateral decubitus, seems to give satisfactory results, which remain to be confirmed by clinical studies.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article. Outside of the present study, Laurent Nové-Josserand is a consultant with DePuy Mitek and Romain Chatellard receives subsidies from the Amplitude company.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.otsr.2013.06.005.

References