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HIP

Non-surgical treatment as the first step to manage peritrochanteric space disorders

Oliver Marín-Pena[1] · Athanasios V. Papavasiliou[2] · Matteo Olivero[3] · Nikiforos Galanis[4] · Marc Tey-Pons[5] · Vikas Khanduja[6,7,8]

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Abstract

Purpose Greater trochanter pain syndrome (GTPS) or lateral hip pain terms include external snapping hip, trochanteric bursitis and gluteus medius or minimus pathology. The aim of this review is to update the most recent knowledge about non-surgical management of peritrochanteric disorders.

Methods A literature review was performed including articles most relevant in the last years that were focused in non-surgical treatment of peritrochanteric disorders.

Results Conservative treatment still has a place and includes activity modification, NSAIDs, analgesics, physiotherapy, home training, local corticosteroid injection (CSI) and shock wave therapy (SWT). These non-surgical alternatives have demonstrated good clinical results with low rate of complications.

Conclusion Most patients tend to resolve GTPS or lateral hip pain with non-surgical management in the mid-term but when everything failed, surgical options should be evaluated. The next frontier that will be a game changer is to determine an individualized treatment plan based on the exact pathology.

Level of evidence V.

Keywords Trochanter · Bursitis · Greater trochanter pain syndrome · Conservative treatment · Corticosteroid injection · Extracorporeal shock wave therapy · Physical therapy

Abbreviations

GTPS	Greater trochanteric pain syndrome
CSI	Corticosteroid injection
LNP	Localized neuropathic pain
US	Ultrasound
NSAIDs	Non-steroidal inflammatory drugs
SWT	Shock wave therapy
LBP	Low back pain

✉ Oliver Marín-Pena
olivermarin@yahoo.es

1 Hip Unit, Orthopedic and Traumatology Department, Hospital Universitario Infanta Leonor, Gran Via Del Este 80, 28031 Madrid, Spain

2 Arthroscopy Centre, Interbalkan European Medical Centre, Aristotle University of Thessaloniki, Thessaloniki, Greece

3 Centro Traumatológico Ortopédico (CTO), Turin, Italy

4 School of Medicine, Aristotle University of Thessaloniki, Thessaloniki, Greece

5 Hospital del Mar y la Esperanza, Barcelona, Spain

6 Addenbrooke's Hospital, Cambridge, UK

7 University of Cambridge, Cambridge, UK

8 The Bone and Joint Journal, Cambridge, UK

Introduction

Peritrochanteric or lateral hip pain is characterized by variable degrees of discomfort located at, or around the greater trochanter. It includes a broad spectrum of disorders: (A) external snapping hip—coxa saltans, (B) trochanteric bursitis and (C) gluteus medius or minimus pathology (enthesopathy, tearing or avulsion).

External snapping hip syndrome (A) results from thickening of the posterior third of the iliotibial [1]. Due to the easily reproducible symptoms, this diagnosis is usually made clinically without imaging and it is rarely painful. It is linked thought with the other two since it has been suggested that both trochanteric bursitis and abductor tendinopathy are secondary to frictional trauma caused by high iliotibial band tension [2].

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Trochanteric bursitis (B) refers to inflammation of at least one of the three trochanteric bursae and is thought to result from gait abnormalities, trauma, or repetitive activity [3].

The last group of disorders (C) include patients with recalcitrant trochanteric bursitis, gluteus medius and/or minimus tears as the most common underlying findings [4, 5]. The natural progression of bursitis is similar to the pathogenesis of degeneration elsewhere in the body with its progression to inflammation tendinitis, tendinopathy, partial-thickness tears and full-thickness tears [5]. Greater trochanteric pain syndrome (GTPS) is a term used to describe this evolving condition. GTPS is a relatively common clinical entity that is seen in 10–25% of the general population with an incidence of 1.82 and prevalence of 5.63 per 1000/year [6–8]. It seems to be more prevalent in certain groups, such as patients reporting low back pain (LBP), knee OA and middle-aged women (up to 90% of all cases) [5, 9–12].

The aim of the present study is to review the conservative management of GTPS based on the current evidence.

State of the current evidence of non-operative treatment

The initial treatment of GTPS is non-operative. The usual first-line management modalities include activity modification, pain-relief and anti-inflammatory medication, physiotherapy and home-based exercise programme, local corticosteroid injection and shock wave therapy (SWT).

Most patients tend to resolve with these conservative measures [13, 14]. Unfortunately, some patients do fail to improve with one of these treatment options and either require a combination of conservative treatments to improve the clinical symptoms or in some cases, a surgical intervention may need to be considered [3, 15, 16]. Symptomatic professional and semi-professional athletes need to adjust their training methods [17, 18]. In this specific group of high level athletes, it has been published that 66% of patients resumed at 3 months to their previous level of sport activities after conservative treatment with rest, physiotherapy, ultrasound, infiltrations and cold/heat but also, 83% returned to their previous high demand work [19].

Activity modification and orthotics

Mechanical overload seems to be an important factor involved in the initiation of an inflammatory response in GTPS. Mechanical overload in a form of combined compression with tensile forces plays an important factor in GTPS [20–23]. Load management by reducing compression has been shown to be beneficial in insertional tendinopathies. Therefore, minimizing positions or activities that involve sustained or repetitive compression in combination with high tensile loads of the tendon is recommended. Reducing the overload, can be achieved by means of patient education like avoidance of potentially aggravating activities such as lying on the affected side or avoiding hip-adducted positions like sitting with one's legs crossed. Recreational or sporting activity can be maintained provided the most provocative aspects of those activities are avoided or minimized [22]. Therefore, it is recommended to avoid walking up–down stairs, lifting heavy weights or walk on non-regular surfaces [20, 21, 23]. Use of orthotics as conservative treatment in GTPS was published but in combination with other treatment options with no real knowledge on the influence of these devices [24–26].

Ice, NSAIDs and analgesics

Since GTPS is supposed to involve an inflammatory component, it makes sense that non-steroidal inflammatory drug (NSAID) rest and ice may have a role in treatment regimens [14, 27]. Ice and rest could have a role during the acute phase [23]. NSAIDS has been shown to provide pain relief in the short term, but their effectiveness in the long term has not been demonstrated. Therefore, a short course of NSAIDs followed by physiotherapy, remains a reasonable first line of treatment [28]. However, it was widely described in the literature that GTPS is not linked to inflammation [29, 30]. This feature could support the use of other group of analgesic to treat GTPS. Furthermore, the well-known analgesic levels of treatment could be appropriated to be applied to GTPS. In a GTPS treatment RCT, when analgesics were used, 60% of the patients improved in VAS score at 1 year [31]. Analgesic treatment spectrum could range from non-opioid alternatives to minor opioids options [32]. Some publications consider GTPS as a cause of chronic pain syndrome and suggested it should be treated as localized neuropathic pain (LNP). As such, it was proposed to treat GTPS with antidepressants, local analgesics, anaesthetic topical drugs, tricyclic antidepressants and topical capsaicin [33–36]. Based on this approach, lidocaine patches and capsaicin patches could have a role in the treatment of GTPS when other analgesic treatments have failed, especially if injections or surgeries are contraindicated (high risk of local infection in diabetics or local bleeding in patients under anticoagulant medication). It should be advised the very limited role of opioid in the conservative treatment of GTPS. When non-opioid and adjuvant analgesic failed, it should be considered step 2 GTPS treatment options as injections or shock wave therapy.

Physiotherapy and home training

Physiotherapy is a common option in the treatment algorithm. Currently, there are no clear guidelines on the frequency or duration of physiotherapy and due to the different

systems and costs between countries, published data can be unreliable. It is the author's opinion that if physiotherapy is chosen, it should be continued for the duration that the patient reports a clear clinical benefit with the aim for the patient to advance to home exercise.

Interventions to improve function of the lumbar spine, hip and knee may be necessary to optimize movement control of the hip and pelvis, and, therefore, the loading environment of the gluteal tendons [23]. Exercises should include functional retraining, and targeted muscle strengthening, with a particular focus on the hip abductors and dynamic control of adduction during function. Both isometric and isotonic exercise programs appear to be effective in individuals with GTPS and should be considered in the loading management of patients with this condition [18, 37]. To enhance the physiotherapy program, phonophoresis and manual therapy could be introduced. In some publications, transcutaneous electrical nerve stimulation was mentioned as a second step in the physiotherapy program with clinical improvement [3, 38, 39]. For external snapping hip Tensor Fascia Lata (TFL) stretches should be included. Physiotherapy protocols should be personalized and are beyond the scope of this paper. Physiotherapy should advance to activities modifications and home training protocols.

Home training protocols demonstrated in one study, to reduced pain more than 1 year after intervention when compared with corticosteroid injections and shock wave therapy [40]. Patients should be advised about the need for maintenance for the prevention of new symptom relapse. The prevention program should include stretching and strengthening programs which avoid provocative activities that involve unidirectional movements, high impact activities on slopes or activities that cause hip compression on the affected side [20, 23, 41–43]. Eccentric exercise is usually recommended in many chronic tendinopathies but no evidence was found to support this recommendation in GTPS [6].

Corticosteroid and anaesthetic injection

When other non-operative measures fail or an early positive response is needed, a local corticosteroid injection (CSI) is regarded as the standard of care. Despite their common use, there is still no conclusive evidence on the dosage, type, way of administration and the long-term efficacy of these injections [44, 45]. However, in an observational study, three groups of patients were locally injected with 6, 12 and 24 mg betamethasone, respectively, mixed with 1% lidocaine. The authors found that the patients receiving higher doses were more likely to experience better pain relief. Nevertheless, many reports support the individualization of dosing for each patient [6, 46].

A recent randomized clinical trial compared the effects of a program of load management exercise, corticosteroid injection, and no pain treatment. Despite the initial response to the injection, in the long term, it showed that education plus exercise has better overall global improvement (function and quality of life) than the injection over the long term (52 weeks), but with no difference in pain intensity between the two groups [47].

Early response to CSI in patients with lateral hip pain is reported to be very good, with 70–75% of patients reporting a significant improvement at 1-month post-injection in a randomized clinical trial (RCT). However, at 3–4 months post-injection, researchers have reported only 41–55% positive response. At 12 months post-injection, one RCT showed no difference between a landmark-guided CSI and a group that adopted a wait and see policy [31, 40, 48]. When the first CSI clearly relieves the symptoms, a late recurrence of GTPS should be treated with a new CSI. Indeed, 33% of patients with one CSI will need a second CSI or more [49–51].

On the other hand, when there is a lack of response to first CSI, other sources of pain should be ruled out (lumbar spine, or deep gluteal syndrome). It is also important that the CSI was correctly and accurately administered to the painful trochanteric area [52, 53]. If partial relief occur with the first CSI, a second CSI can be administered at a time interval of 4–6 weeks [54]. Regarding the application of the CSI in the correct anatomic structure, injections into the greater trochanteric bursa seems to be more successful than injections into the subgluteus medius bursa [55]. In a multicentre double-blind randomized controlled trial, Cohen et al. assessed outcomes of two groups of patients who received corticosteroid injections with fluoroscopy and without (blind group). Fluoroscopically guided trochanteric bursa injections were not associated with superior outcomes compared to injections guided by anatomical landmarks alone and increased the treatment costs by more than 600% which may not justify the outcome [56]. In a small prospective study, hip ultrasound (US) was the means of evaluation and administration of the injection were 72% of the patients, showed a clinically and statistically significant improvement in pain level 1 month after treatment [48]. When US is used for the injection, it can verify the diagnosis prior to injection which may improve the patient's overall perception (Fig. 1). In two randomized double-blind studies, US-guided and anatomic landmark injection of the trochanteric bursa gave similar clinical outcomes. The US-guided injection was considerably more labour intensive and expensive; hence, the authors suggested that an anatomic landmark-guided injection remains the method of choice and US guidance should be reserved for cases involving obese patients or prior non-guided injection failure [31, 57, 58]. In contrast, some studies suggested that inaccuracy during CSI was not related to poor clinical results. These findings support the fact that a non-inflammatory process could be involved in

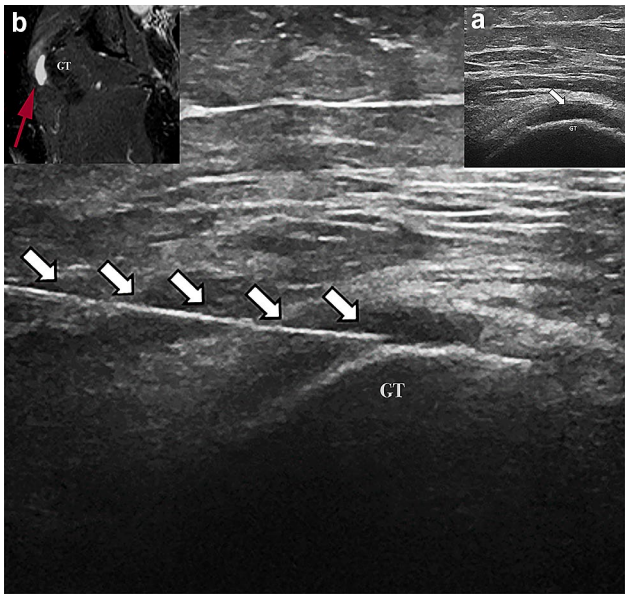

Fig. 1 US-guided CSI image. Injection needle (pointed by white wide arrows) is seen reaching great trochanter (GT). Upper right US image (**a**) where a trochanteric bursa inflammation is identified. Upper left MRI image (**b**) with a trochanteric bursa inflammation (red arrow)

GTPS [6, 11]. Thus, another important patient's concern is activity recommendation after CSI. It is generally accepted that patients should avoid pain-provoking activities up to 6 weeks after CSI. Sport activity restart should be allowed once near complete pain resolution is documented [40, 59].

Complications after CSI in GTPS are uncommon. Some patients may experience temporary increase of pain and skin redness but patients should be informed about risk of local infection after CSI [40, 60, 61]. In addition, recent investigations do mention the risk of further tendon degenerative rupture after CSI, but further investigations are needed to established level of this risk [6]. In summary, current evidence suggests that corticosteroids can provide temporary or short-term pain relief but not any established longer term benefit. The best indication would probably be to reduce pain in the short term to enable physiotherapy or home exercise programs [25].

Shock wave therapy (SWT) and radiotherapy

Shock wave therapy (SWT) has been used successfully since the late 1980s for the management of various musculoskeletal disorders. Treatment regimens for SWT vary dependent upon energy density, frequency of shock waves and number of sessions. The mechanism of how SWT has an effect on GTPS is unclear but it is considered to stimulate healing, possibly by stimulating cellular activity and increasing blood flow [14, 40]. In a recently published case–control study, Furia et al. compared outcomes of two groups of patients with chronic GT pain syndrome. Thirty-three patients with chronic GTPS received low-energy SWT. Outcomes for the entire population was evaluated and compared with a well-matched control group. At 1-, 3- and 12-month follow-up, patients fared better when undergoing SWT than other therapies [19]. In a quasi-randomized trial, Rompe et al. allocated 229 patients to home training corticosteroid injection and SWT [40]. One month from baseline, corticosteroid injection results were significantly better than those after home training or SWT. At 4 months, radial SWT led to significantly better results than the other two groups. Fifteen months from baseline, radial shock wave therapy and home training were equally successful with treatment failures and were significantly more effective than was the single-corticosteroid injection protocol. Home training had the lowest proportion of reported adverse effects and the highest rate of longer term success. This study demonstrates that all procedures were safe. Maintenance of satisfactory improvement was observed after home training and after shock wave treatment but not after corticosteroid injection. Furthermore, better results were achieved earlier after shock wave therapy than with the home training alone. SWT complications are typically related to dermal reactions (irritation, redness, bruising) but are temporary and are not associated with a need for further treatment [19, 62, 63].

The decision to recommend home training or to use radial shock wave therapy might depend on available resources because the relative difference was not significant in the long term, and the home training is less resource intensive [40]. The studies evaluating the effectiveness of SWT showed many variables including: wave type (focal or radial), intensity per shock wave, frequency of the shock waves, type of SWT generator and the overall treatment protocol. Guidelines of The National Institute for Clinical Excellence (NICE) only support the use of SWT in GTPS when other conservative options have failed [64]. Comparison of results is therefore difficult due to the variability in treatments and further investigations should be done regarding GTPS [6, 14, 65].

Finally, low-intensity radiotherapy is being postulated as a therapeutic option for those cases in which the most common physiotherapy and analgesia measures have failed. It is effective in treating pain but studies are needed that include a larger number of patients and with longer follow-up [66].

Approach proposal for conservative treatment

As we have observed in this review, conservative treatment should be the first treatment option in GTPS. We recommend the following conservative treatment sequence:

A. First step,

- Adaptation of your daily activities.
- Heat/cold-associated NSAIDs and/or first level analgesic.

B. Second step,

- Home therapy.
- Physiotherapy.
- Second level analgesic treatment (minor opioids, capsaicin, antidepressant and gabapentin,...).

C. Third step,

- Local anaesthetic patches (lidocaine and capsaicin,...).
- Local infiltrations (corticosteroid and local anaesthetic).
- Shock wave therapy.

Evidence and future directions

There are currently limited evidence-based protocols for the management of GTPS because of the cacophony on the definition of the syndrome and its causes. As a result, much of what we do and is considered as "common practice" in reality has passed unquestioned from one generation of orthopaedic surgeons to the next.

The problem is that available studies differ greatly in regards to design, protocol, application technique and length of follow-up. This heterogeneity in treatment modalities and outcome measures make it difficult for the practitioner to propose a 'best practice' approach.

Recent consideration of GTPS as localized neuropathic pain (LNP) introduces new conservative treatment options and could explain why one-third of the patients failed with standard therapies. Our further understanding of the structural pathology (abductor tendinopathy, gluteus medius and/or minimus tears) underlying GTPS will by default introduce biological treatments such as PRP and stem cells and further define the surgical indications.

The next frontier that will be a game changer is to determine an individualized treatment plan based on the exact pathology in each case.

Conclusion

Conservative treatment still has a place since it is common knowledge that the vast majority of GTPS cases resolve with a course of these "traditional" measures. CSI is associated with a recommendation Level I, and SWT with a recommendation level II to treat GTPS.

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Compliance with ethical standards

Conflict of interest All the authors have nothing to disclose that could have direct or potential influence or impart bias on the work.

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