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Greater trochanteric pain syndrome: a simplified MRI approach

Wessam Mohammad Amin*  and Amr Ai Abdelkerim

Abstract

Background: Greater trochanteric pain syndrome (GTPS) refers to pain and tenderness over the greater trochanter. It is a common entity of lateral hip pain that is usually related to the overuse or small injuries of the gluteus medius or minimus tendons and their surrounding bursae. MRI is the favored modality for evaluation of the hip region disorders. Treatment options ranges from conservative to surgical treatment.

Results: Trochanteric (sub-gluteal maximus) bursal fluid was the most common finding found in 55 hips (73%), followed by gluteal tendinosis (64%) and partial thickness gluteal tendon tear (29%). Full thickness tear of the gluteal tendons occurred in 10 hips (13%). The relation between gluteal tendinosis and greater trochanteric bursal fluid was statistically significant ($P < 0.05$) with sensitivity and specificity of 85% and 78% respectively.

Conclusion: MRI should be utilized in a simple systemized approach by MSK radiologist in order not to miss a finding that may influence the surgical outcome of the patient presenting with GTPS.

Keyword: Trochanteric-bursitis-gluteus

Background

Greater trochanteric pain syndrome (GTPS) refers to pain and tenderness over the greater trochanter. It is a common entity of lateral hip pain that is usually related to the overuse or small injuries of the gluteus medius or minimus tendons and their surrounding bursae [1]. It is more common in obese females over the age of 40 years [2]. The greater trochanter offers insertion for the gluteus minimus and medius muscles associated with surrounding three bursae in-between [3–5].

MRI is the favored modality for evaluation of the hip region disorders. Treatment options ranges from conservative as analgesic, physical therapy and local anaesthetic injection to surgical treatment in recurrent and persistent symptoms [6, 7].

This study aims to evaluate the role of MRI in assessment of the pathological changes at the greater

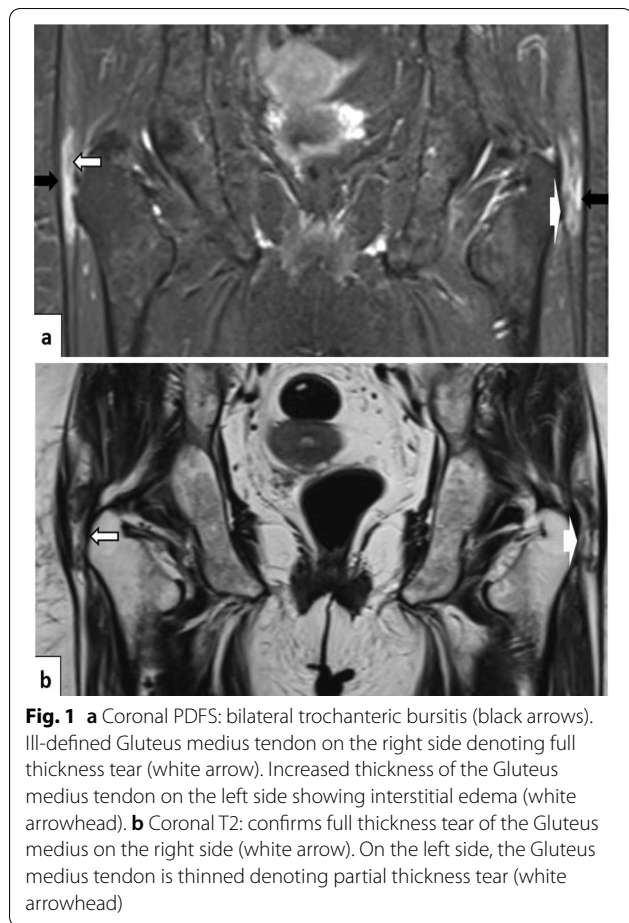
trochanter structures responsible for the clinical symptoms of the GTPS.

Methods

MRI (1.5 T Philips Achieva Gyroscan, Best, Netherlands) was performed on 65 patients with clinical diagnosis of lateral hip pain suspected to have greater trochanteric pain syndrome (GTPS) between Jan 2020 and Jan 2021. All the examinations included: standard MRI sequences; TSE: axial T1 (TR/TE 500/20 ms, flip angle 90°, acquisition voxel: 1.3 × 1.3 mm, slice thickness 4 mm), coronal T2 (TR/TE 4500/100 ms, flip angle 90°, acquisition voxel: 1.3 × 1.3 mm, slice thickness 4 mm) and Proton density fat suppression (PDFS) in the axial, coronal and sagittal planes (TR/TE 3500/35 ms, flip angle 90°, acquisition voxel: 1.3 × 1.3 mm, slice thickness 4 mm). Field of view (FOV): 320–360 mm, Number of acquisitions (NEX): 2, Band width (BW): 150 and echo-train length (ETL): 6.

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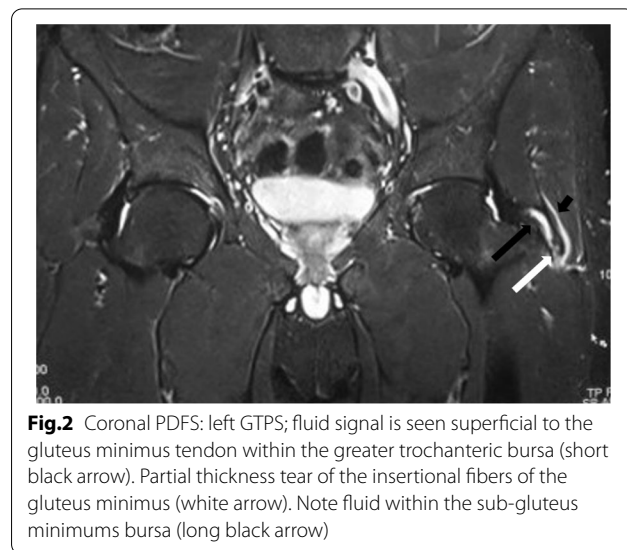
MRI sequences was assessed for the following findings:

- Gluteal tendinosis: increased tendon thickness and interstitial edema with preserved continuity.
- Partial thickness tear of the gluteal medius or minimus tendons: partial loss of tendon continuity.
- Full thickness tear of the gluteal tendons: retracted tendon ends with or without fluid gap.
- Bursal fluid within the trochanteric bursa: fluid is lying superficial to gluteal medius tendon.
- Bursal fluid within the subgluteal bursae: fluid is lying deep to either gluteal medius or minimus tendons.

MRI scan analysis for the above-described signs was done using Philips-EWS workstation by two radiologists (W.M and A.A) with experience of 10 years in this field (Figs. 1, 2, 3).

Statistical analysis

All data were stored on a spreadsheet (Excel 2020, Microsoft, USA) and analysis was performed using



SPSS software package (v. 20, Chicago, IL). Statistical analysis was expressed in terms of mean, standard deviation (SD), minimum, and maximum. The statistical significance of differences in sex and GTPS signs on MRI was calculated using the chi-square test.

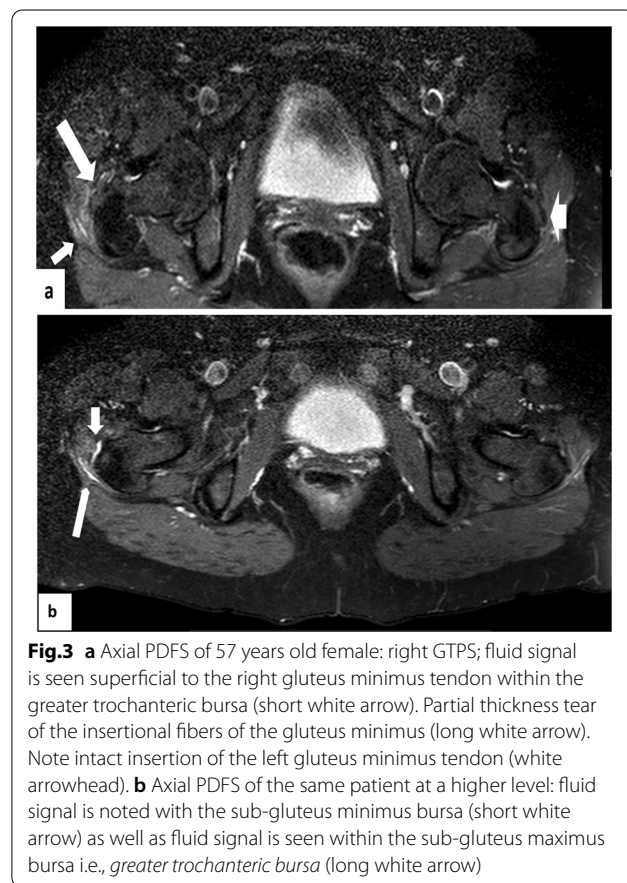


Table 1 age and sex distribution of this study

Age group (years)	Male	Female
30- < 40	1	4
40- < 50	2	14
50- < 60	5	24
60 < 70	1	3
70 < 80	1	0
Total	10	55

Table 2 MRI findings in this study

MR imaging findings	Number of hips	Percentage (%)
Gluteal tendinosis	48	64
Partial thickness tear of the gluteal tendons	17	23
Full thickness tear of the gluteal tendons	10	13
Bursal fluid within the trochanteric bursa	55	73
Bursal fluid within the subgluteal bursae	18	24

The inter-reader agreement about MR signs of GTPS was analyzed by the intraclass correlation coefficient (ICC) using the Pearson correlation test.

Results

MRI scans were done on 75 hip joints of 65 patients (10 patients with bilateral hips); 45 on the right hip and 30 on the left hip, of those patients 55 were females (85%) and 10 were males (15%). Their ages ranged from 34 to 74 years with mean age of 52 years (SD±8.2) (Table 1).

The right hip was involved in 40 hips (53%) and the left hip was involved in 35 hips (47%). Bilateral involvement occurred in 10 hips (8%). Trochanteric (sub-gluteal maximus) bursal fluid was the most common finding found in 55 hips (73%), followed by gluteal tendinosis (64%) and partial thickness gluteal tendon tear (29%). Full thickness tear of the gluteal tendons occurred in 10 hips (13%) (Table 2).

The relation between the female sex and GTPS MR findings of 1. Gluteal tendinosis, 2. partial thickness tear and 3. Greater trochanteric bursal fluid was statistically significant ($P < 0.05$).

Whereas the relation between male sex and those findings was statistically insignificant ($P > 0.05$).

The relation between gluteal tendinosis and greater trochanteric bursal fluid was statistically significant (P

< 0.05) with sensitivity and specificity of 85% and 78 % respectively, whereas the relation between gluteal tendons tears either partial or full and the presence of greater trochanteric bursal fluid was statistically significant ($P < 0.05$) with sensitivity and specificity of 95% and 84 % respectively.

The inter-reader agreement of ICC was 0.7 reflecting strong correlation.

Discussion

GTPS refers to lateral hip pain that is related to disorders of the located anatomical bursae and/or any of the gluteus minimus or gluteus medius tendons, that occurs more in old females [8]. In this study females were more commonly involved (85%) that was matching by the study conducted by McMahon SE et al [8] and Tortolani PJ [9] et al. as they showed that GTPS is more common in females. The mean age of GTPS in this study was 54 years that was of near value for the study done by Haliloglu N et al. that showed a mean age of 56 years [10].

Trochanteric bursal fluid was the most common finding in this study (73%), this was matching with the study conducted by Haliloglu N et al. that showed that trochanteric bursal fluid was present in 70% of patients [10]. Cvitanic et al. concluded that fluid signal superior to the greater trochanter was more frequent in hips showing abductor pathology associated with high sensitivity (73%) and specificity (95%). [11].

Tears of the gluteal tendons whether partial or complete was common in this study (42%), such finding was matching with Miyasaki MR et al. study where tears of the gluteus medius tendon was the most common. [12].

Conclusion

GTPS is a frequent hip disorder that is confused sometimes with other clinical conditions of the hips or spine, MRI should be utilized in a simple systemized approach by MSK radiologist in order not to miss a finding that may influence the surgical outcome of the patient.

Abbreviations

GTPS: Greater trochanteric pain syndrome; PDFS: Proton density fat suppression.

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Not applicable.

Authors' contributions

WM devised the project and the main conceptual ideas. WA and AA reviewed and analysed the image data. WM analysed the data. AA did the final revision and conclusion. All authors read and approved the final manuscript.

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Availability of data and materials

All the data that this work depended on to reach the conclusion are available and to be delivered when requested.

Declarations

Ethics approval and consent to participate

Approval of this retrospective research was obtained from the Alexandria medical school board review.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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