Turk J Phys Med Rehab 2024;70(1):145-148
DOI: 10.5606/tftrd.2023.11593
Available online at www.turkishjournalpmr.com

Case Report

An unusual clinical presentation of nontraumatic myositis ossificans: Leg length discrepancy

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ABSTRACT

Functional leg length discrepancy results from soft tissue tightness or weakness across any joint in the lower extremity or spine. Herein, we present a 23-year-old female patient with leg length discrepancy due to a nontraumatic myositis ossificans (MO). Interpretation of the imaging findings is quite decisive in diagnosing soft tissue pathologies. It is particularly valid for MO to differentiate from other malignant or infectious lesions. There is no consensus on the treatment of nontraumatic MO. Although there are studies stating the contrary, surgical interventions should be considered as second option for patients who failed with nonsurgical treatments such as physical therapy.

Keywords: Diagnostic imaging, leg length inequality, myositis ossificans.

Leg length discrepancy (LLD) is a common clinical entity with two main causes: anatomical and functional inequalities. Anatomical LLD, also known as structural or true LLD, results from a discrepancy in bony structures. In contrast, there is no inequality in bony structures in functional LLD. Functional LLD is the result of soft tissue tightness or weakness across any joint in the lower extremity or spine. Regarding its cause, some abnormalities may occur as a maladaptation process. One of them is gait abnormality, and it is observed in patients with a LLD of more than 2 cm.[1]

Myositis ossificans (MO) is a self-limiting, bone-forming process of soft tissues. It typically occurs after trauma and most commonly affects young adults.[2] However, patients may present atypically with unusual locations like fingers or chest wall and without a trauma history.[3] There may be an unnoticed minor muscle injury, which has to be investigated carefully. Typical clinical presentation is pain and stiffness longer than expected at affected joints and tissues with a trauma history. Many types of imaging can be used to contribute to diagnosis, including radiographs, magnetic resonance imaging (MRI), computed tomography (CT), and bone scintigraphy. Computed tomography is the best modality to show a zonal calcification pattern, which is typical for MO and can be diagnostic. Differential diagnosis may be challenging with atypical presentation. Malignancy must be considered in these patients, and biopsy may be required.[4] Treatment options depend on the underlying etiology and clinical stages, and they can be separated as surgical and nonsurgical interventions. This paper presents a patient with acute gait abnormality due to LLD as a rare clinical presentation of nontraumatic MO in the external obturator muscle with a one-year follow-up.

CASE REPORT

A 23-year-old female patient was referred to our outpatient clinic with the complaint of right buttock pain in February 2021. The patient had noticed the pain about one month ago. The severity of the pain increased, particularly with walking. Additionally,

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Received: August 24, 2022 **Accepted:** November 07, 2022 **Published online:** June 05, 2023

Cite this article as: Şirin A, Sarıfakıoğlu B, Ustaömer K, Yılmaz E. An unusual clinical presentation of nontraumatic myositis ossificans: Leg length discrepancy. Turk J Phys Med Rehab 2024;70(1):145-148. doi: 10.5606/tftrd.2023.11593.

Presented at the North-South Marmara (KGM) 2021 Rheumatology congress, October 01-03, 2021 (Online).

the patient also had recent night pain. The pain was radiating through the knee, and the patient had no concomitant neuropathic complaint. The Visual Analog Scale (VAS) score was 8/10. The patient had no history of trauma, previous fractures, and systemic or metabolic disorders. In the physical examination, it was noticed that the patient was limping and had pelvic obliquity during visual gait analysis. The patient declared that she had not noticed her gait abnormality before the examination. It was detected that the right lower extremity was 4 cm shorter than the left lower extremity in the measurement of the distance between the anterior superior iliac spine and medial malleolus. The symptoms were provoked by the FADIR (flexion-adduction-internal rotation) test and by the palpation of the right gluteal area on the level of external rotators of the hip. The pelvic radiograph did not show any remarkable pathology except pelvic obliquity (Figure 1). Laboratory tests, including acute phase reactants, hemogram parameters, and biomarkers of liver and kidney function, did not show any major abnormality in her first outpatient visit. In further evaluations, contrast-enhanced MRI of the pelvis revealed that the right external obturator muscle was markedly edematous, and bone marrow edema was detected in the anterior column of the right acetabulum (Figure 2). Contrast-enhanced CT imaging demonstrated a 2×1.5 cm calcified rim in the axial plane, with the center of the lesion isodense, in the right external obturator muscle, and any destruction of the bone structure was not observed (Figure 3). These findings corresponded to MO, and it was planned to follow the patient instead of making a biopsy to avoid traumatizing the tissue. Monthly follow-ups were planned.

The patient was treated with oral nonsteroid anti-inflammatory agents and encouraged to rest and use canes on both sides while walking during the acute painful phase. A cold pack was recommended at least five times a day with 10 to 15 min intervals. A moderate increase of C-reactive protein (CRP; 32 mg/L) was observed in the second outpatient visit, whereas CRP later decreased to the normal range. After the acute painful phase, a progressive physical treatment was planned. The patient started with range of motion, self-stretching, balance, and proprioception exercises. When the pain of the patient was significantly reduced and pelvic obliquity was decreased, the exercise program was extended to strengthen core and hip muscles. In the second outpatient visit, the VAS score was 5/10, and LLD was measured as 3 cm. The patient was still limping but slightly less than before during visual gait analysis. After five months, the VAS score was 3/10, LLD was measured as 1.5 cm, and limping was minimal during visual gait analysis.

Figure 1. Pelvic radiograph. Pelvic obliquity is seen on the image.

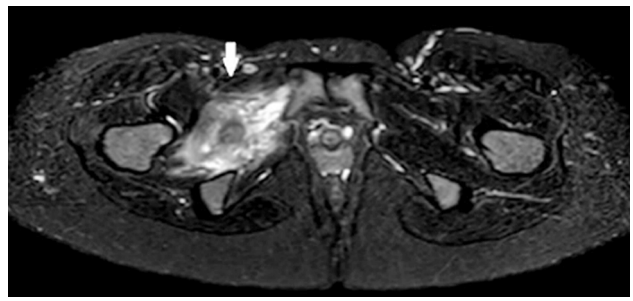

Figure 2. Pelvic magnetic resonance imaging. White arrow shows the intramuscular lesion in the right external obturator muscle and perilesional muscle edema.

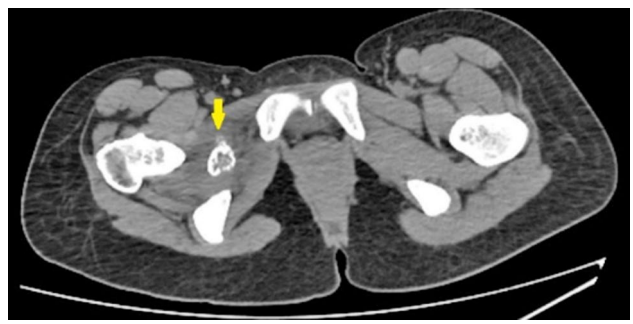

Figure 3. Contrast enhanced computed tomography of the pelvis. Yellow arrow shows the calcified rim in the external obturator muscle.

DISCUSSION

Clinical presentation of MO is mostly painful swelling and decreased range of motion at affected joints and tissues, and it commonly occurs following trauma. However, in the literature, the number of studies reporting nontraumatic MO is noteworthy, and there is a wide range of etiological factors. Neurological diseases are the main part of these factors, which include cerebral palsy, brain injury, stroke, and spinal cord injury.[5] Other factors are burns, infections, and genetic disorders, such as fibrodysplasia ossificans progressiva.[6] Our case is unique in presenting as functional LLD and gait abnormality without any aforementioned predisposing factors.

As a consequence of LLD, pelvic obliquity is one of the most commonly seen compensative mechanisms.[7] The compensation consists of a pelvic drop on the shorter side, which generates lateral bending in the lumbar spine and a lateral shift of the pelvis towards the longer side.[8] All of those compound mechanisms create a gait abnormality, as we simply called, limping. Underlying causes split into anatomical inequality and tightness/weakness of the soft tissue around the hip joint, which correspond to anatomical and functional LLD, respectively. In one study, functional LLD was described as a result of suprapelvic muscle hypertonicity.[9] Likewise, we observed that functional LLD was derived from the tightness of the inflamed muscle in our case.

Interpretation of the imaging findings is quite decisive in diagnosing soft tissue pathologies. It is particularly valid for MO to differentiate from other malignant or infectious lesions.[10] As Zubler et al.[11] mentioned in their study, the MRI finding that the extension of the perilesional muscle edema is more than double the size of the central lesion is a specific, but not pathognomonic, image for MO. Another typical radiological evidence was a peripheral calcified rim with an isodense central zone in CT images.[12] Even though the patient had an atypical presentation, both of these imaging findings were detected in our case and pointed to MO.

Primary and metastatic malignancies presenting as ossifying muscle mass may mimic MO. For instance, ossifying muscle metastases have been reported in mucinous adenocarcinomas.[13] Soft tissue malignancies, such as synovial and periosteal sarcomas, also have to be included in differential diagnosis owing to the presence of calcifications. On the other hand, Spinelli et al.[14] reported the malignant transformation as a rare complication of MO. Yet, there was no significant evidence that the origin of the transformed mass was MO. Considering all possibilities, we followed our patient for one year and did not see any clinical exacerbation or malignant symptoms.

There is no consensus on the treatment of nontraumatic MO. Although there are studies stating the contrary, surgical interventions should be considered as second option for patients who failed with nonsurgical treatments such as physical therapy.[15] This notion commonly arises from the self-limiting and self-resolving nature of MO. Thus, we preferred to treat the patient with nonsurgical interventions. In the early phase, we aimed to control the pain and the inflammation. After that, the priority of treatment was to reduce the LLD and rehabilitate the gait function. In our case, we could control the pain and substantially achieve normal gait function within the rehabilitation process.

In conclusion, nontraumatic MO is a benign condition with various clinical presentations, and our case is the first case in the literature presenting with functional LLD and gait abnormality without any predisposing factors. Differential diagnoses, particularly malignancies, must be considered before the decision on the treatment. Lastly, physical treatment must be considered as it is an effective treatment option for LLD and gait abnormality caused by MO.

Patient Consent for Publication: A written informed consent was obtained from the patient.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions: Contributed to the conception and design of the study, write of article, search of literature: A.Ş.; Contributed to the conception and design of the study, search of literature: B.S.; Analysis and the interpretation of data for the study: K.U.; Analysis and the interpretation of data for the study: E.Y.; All authors read and approved the final manuscript.

Conflict of Interest: The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding: The authors received no financial support for the research and/or authorship of this article.

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