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Case Report

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The Importance of Ultrasound-Guided Injections in the Differential Diagnosis of Low Back and Hip Pain

Bel Kalça ve Ağrısının Ayırıcı Tanısında Ultrason Eşliğinde Yapılan Enjeksiyonların Önemi

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ABSTRACT

Hip and lumbar spine problems may mimic one another. The differential diagnosis is important to give the proper treatment. Although physical examination, imaging and electrodiagnostic methods help to support diagnosis, it is not always easy to make a definite diagnosis between low back and hip pain. Ultrasound (US)-guided diagnostic injections are successfully used in the differential diagnosis of pain in the low back and hip region. Herein, we are presenting three cases with low back and hip pain, each differentially diagnosed with US-guided diagnostic injections.

Keywords: Diagnostic injection; differential diagnosis; hip pain; low back pain; ultrasound.

ÖZET

Kalça ve lomber vertebra problemleri birbirini taklit edebilmektedir. Doğru tedaviyi verebilmek için ayırıcı tanıyı doğru yapmak önemlidir. Fizik muayene, görüntüleme ve elektrodiagnostik metodlar tanıyı desteklemekte yardımcı olsa da bel kalça ağrısında kesin bir tanıya ulaşmak her zaman kolay değildir. Ultrason eşliğinde yapılan tanısal enjeksiyonlar bel ve kalça bölgesi ağrılarının ayırıcı tanısında başarı ile uygulanmaktadır. Burada, her biri Ultrason eşliğinde yapılan tanısal enjeksiyonlarla tanı almış bel-kalça ağrılı üç vakayı sunmaktayız.

Anahtar sözcükler: Ayırıcı tanı; bel ağrısı; ultrason; kalça ağrısı; tanısal enjeksiyon.

Low back pain (LBP) and hip pain are important clinical, social, economic, and public health problems affecting the population indiscriminately.[1,2] Hip and lumbar spine pathologies may mimic one another. The differential diagnosis of hip disorders and spine disorders is important to give the proper treatment. Although physical examination findings are guiding, it is not always easy to make a definite diagnosis between LBP and hip pain.[3,4]

In recent years, musculoskeletal ultrasonography has been widely used in locomotor system problems. US-guided diagnostic injections are successfully used in the differential diagnosis of pain in the low back and hip region.[5,6] US can be applied both as a diagnostic and interventional tools in enhancing the accuracy of injection to the target sites. It is relatively inexpensive compared with other imaging tools, is free of radiation, and enables the practitioner to repeat the examination numerous times. More notably, it provides dynamic and real-time imaging for visualizing the needle during examination and injection. The injectant can be clearly visualized by the US during the injection process. Hence, it is believed that US can maximize injection accuracy by guiding the injection needle to the target area.[7] Herein, we are presenting three cases

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with low back and hip pain, each differentially diagnosed with US-guided diagnostic injections.

Case Reports

Case 1 – A 61-year-old man was admitted to orthopedics and traumatology clinic with the left hip pain and difficulty in walking. As there were minimal signs of osteoarthritis in radiographic evaluation, hip osteoarthritis was diagnosed and referred to our clinic for treatment. During physical examination, he was not able to get up from crouch position. His left hip was painful in all movements. Flexion, abduction, external rotation, and extension of the hip and flexion, adduction, and internal rotation of the hip tests were positive. No painful point was detected in the greater trochanter region and hip muscles by palpation. He had no pathologic reflex and normal deep tendon reflexes. Straight leg raising test (SLRT) and femoral nerve stretch test were negative with normal sensation in the lower extremities. The left hip flexor muscle strength was 4/5, lower extremity manual muscle tests were otherwise normal. He scored his hip pain as 8 on visual analog scale (VAS) (on 0–10 scale). To make a differential diagnosis of the source of pain and to understand whether it is caused by a pathology in the hip joint, we performed US-guided local anesthetic – lidocaine 5 mg (Jetmonal; Adeka medical) injection to the left hip joint but there was no change in his pain. Due to the patient's difficulty in staying off the ground and weakness of the hip flexor muscles, we ordered electroneuromyography (ENMG) for the differential diagnosis of myopathy and radiculopathy. ENMG showed early L2-3-4 radiculopathy and magnetic resonance imaging (MRI) revealed a L3-4 disc herniation; the patient was diagnosed as lumbar radiculopathy presenting with hip pain. The patient's complaints completely resolved within 2 weeks after starting physical medicine and rehabilitation program with exercise and medical treatment including nonsteroidal anti-inflammatory drugs in our clinic.

Case 2 – A 29-year-old woman was admitted to our outpatient clinic with low back and left hip pain. She was given a 10-day intravenous pulse steroid treatment for her brain tumor 2 years ago. One year after the treatment, she started suffering from the left hip pain and computed tomography (CT) revealed osteonecrosis of femoral head for which decompression surgery was performed and her pain was revealed. One year after the surgery, she was reoperated to place an iliac graft for her recurrent pain. Her hip pain did not resolve after the second operation and had especially been aggravating after prolonged sitting and walking. She referred to our clinic for the evaluation of hip pain. On physical examination, SLRT was negative. Bilateral hip range of motion was normal. Sacroiliac joint (SIJ) pain provocation and mobility tests were positive on the left side with a VAS score of 8 (on a 0–10 scale). US-guided local anesthetic injection – lidocaine 5 mg (Jetmonal; Adeka medical) was applied to the left SIJ and significant pain reduction was achieved following the injection, VAS score of 1 (Fig. 1). She was diagnosed with sacroiliac joint dysfunction (SIJD). Daily life activities of the patient were evaluated. The patient's habit of crossing leg while sitting at the desk job and working condition was corrected. Strengthening and stretching exercises applied to the core stabilizers and muscles around the hips. After these interventions, she no longer complained of low back and hip pain.

Case 3 – A 64-year-old female patient was admitted to our clinic with pain in her low back and right hip for 6 years. Lumbar spine instrumentation was performed due to spondylolisthesis 6 years ago. However, she was not able to stand upright after the operation and she was walking with the aid of a walker with ongoing pain around the low back and right hip. She was reoperated a year ago and additional segmental stabilization was applied by the neurosurgeons for the residual symptoms (Fig. 2a). However, the symptoms persisted after the operation with aggravation in her

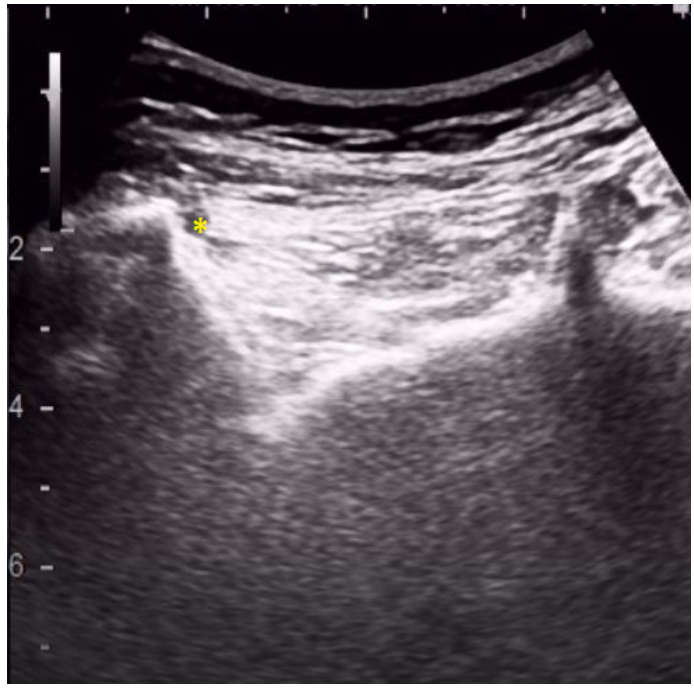

Figure 1. Ultrasound image of sacroiliac injection of case 2, yellow star shows the tip of the needle.

complaints. In her physical examination, she was not able to stand upright without leaning to her walker and walked in an inclined position only for a short distance. Neurological examination of the lower extremities including manual muscle testing was normal. Deep palpation in the right piriformis muscle territory elicited severe pain which she scored 9 in VAS. Fair, Freiberg, and Pace tests were positive on the right side. US-guided local anesthetic – lidocaine 5 mg (Jetmonal; Adeka medical) injection to the right piriformis muscle revealed her pain to a VAS score of 2, besides, she was able to stand upright for the 1st time after 6 years with a final diagnosis of piriformis syndrome (PS) (Fig. 2). The exercise program including stretching and strengthening exercises for muscles around the hip and piriformis, core stabilization exercises were started and physical medicine and rehabilitation methods applied to lumbar paraspinal and hip muscles. At the 4 years follow-up, she has been completely asymptomatic.

Discussion

Hip and lumbar spine pathologies may mimic one another so patients require additional diagnostic tests. However, there is no universally accepted gold standard for the differential diagnosis of LBP and hip pain.[1-3] Although physical examination findings can help to support diagnoses, it is not always easy to make a definite diagnosis between them.

When evaluating a case with hip pain, pain reflected from the lumbar region as well as primary pathologies of the hip joint should be considered. Pain from hip osteoarthritis can be localized to the groin, buttock, anterior thigh, and posterior thigh. Pain in joint movements during physical examination often suggests a pathology within the hip. On the other hand, numbness, weakness, positive SLRT, and femoral stretch test are more suggestive for lumbar spine pathology.[8] Despite the literature knowledge and daily experiences, physical examination findings and symptoms are not sufficient to lead us to the correct diagnosis as in our first case. In our first case, the only finding indicating lumbar disc hernia was the weakness of hip flexion, which we had difficulty in distinguishing whether it was due to pain or not. Moreover, the fact that hip joint movements were painful in all directions, direct us thinking of hip pathology first.

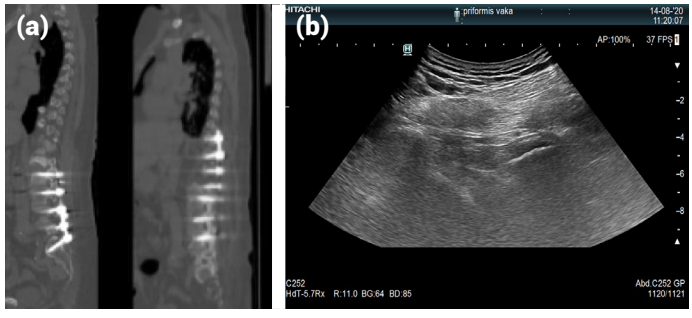

Figure 2. **(a)** Lumber spinal magnetic resonance imaging after 6 years of lumbar spine instrumentation. **(b)** Ultrasound image of piriformis muscle of case 3.

Although radiographic evaluation can be helpful in hip pathologies, the role of conventional radiography in the diagnosis of early osteoarthritis is limited. US-guided local anesthetic injections an important guide in the differential diagnosis of the hip joint pathologies. In our first case, we made a diagnosis of radiculopathy due to negative intra-articular hip injection test.[9]

Our second case was a patient who had been operated previously due to hip osteonecrosis. Hip osteonecrosis is a disease with collapse of the trabecular and subchondral bone in the femoral head, causing pain, loss of function, impairment, and long-term joint damage and coxofemoral joint functions can be preserved in early intervention.[10] In this case; due to the recurrent pain, it was thought that there was a situation related to osteonecrosis again, and surgical intervention was performed. The pain persisted and she was referred to us considering that there could be a different pathology. When we reevaluated the patient, clinical examination supports a diagnosis of SIJD. US-guided diagnostic injection confirmed the diagnosis of SIJD. Patients with recurrent hip pain always should be evaluated for lumbar radiculopathy, lesions of the other hip disease, SIJD, PS, and trochanteric bursitis, like in this case. The diagnosis of SIJD is made by a combination of positive patient history, tenderness in palpation, pain with compression over the sacroiliac joint, positive pain provocation and mobility tests, and diagnostic injections.[11] We made the diagnosis of SIJD by periarticular sacroiliac injection and prevent the patient from unnecessary surgery. PS defined as constellation of symptoms that include low back or buttock pain referred to the leg, and caused by the compression of the sciatic nerve (SN) and other structures under the piriformis muscle. It has been postulated that PS may be a contributing factor in up to 6–8% of patients with sciatica.[12-14]

Gluteal traumas long-term sitting, pregnancy, piriformis muscle hypertrophy and spasm, compression of the PM by the myofascial bands, space-occupying lesions, and predisposing anatomic variations were reported in the etiology of PS. Entrapment of the SN can cause pain and numbness at

the buttock which may radiate to the ipsilateral thigh and leg.[12,13] These findings are often confused with other pathologies originating from the lumbar region like our third case. Our case could not heal although he had undergone second operation for persistent low back and hip pain. Our patient was diagnosed as PS by diagnostic injection and treated with physiotherapy and rehabilitation program.

Patients with low back-hip pain may have poor treatment outcomes. As seen above, symptoms of these disorders mimic one another. Furthermore, symptoms of these disorders frequently are present in the same patient. About 10–15% of patients may have combined spinal and hip pathology causing a diagnostic dilemma.[9] Although history and physical examination may be helpful, clinical signs and radiological diagnosis may be inconclusive. In these situations, injection of local anesthetic is a valuable diagnostic tool to exclude or confirm the source of pain prior to the management. The recommended reference standards typically involve imaging methods and anesthetic or provocative injections to identify the source of LBP.[3]

US-guided injections to deep anatomical targets require more experience compared with superficial injections. Curvilinear transducer is needed to perform deep tissue US-guided injections.[8,9] US has shown to be a reliable imaging tool in guiding the injection needle in performing accurate SIJ, piriformis muscle, and hip joint injections.

In this case series, all of our patients admitted to our clinic with chronic low back and hip pain. Physical and neurologic examinations done. All X-ray, CT, and MRI are assessed. However, physical examination and X-ray/CT/MRI imaging may not always yield definitive results in musculoskeletal disorders. US is important for us to provide both simultaneous and dynamic imaging. In addition, US-guided diagnostic injections are very fast in determining the pain point of the patient. Main disadvantage of US is operator dependence.

With appropriate training, US-guided injection can be a safe, rapid, and reproducible technique that is highly recommended to be used for the treatment of musculoskeletal disorders.

Conclusion

Low back hip and lower limb pain mimic each other. Although physical examination, imaging and electrodiagnostic methods help to support diagnosis, US-guided injections have an important role to confirm the diagnosis and for the treatment.

Disclosures

Informed consent: Written informed consent was obtained from the patient for the publication of the case report and the accom- panying images.

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