Bursitis and Tendonitis

2

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Introduction

Synovial bursae are small fluid-filled sacs that serve as cushioning to decrease friction between bones, muscles, and tendons. Once irritated, the result is an inflammatory condition called "bursitis." Tendonitis refers to pain, inflammation, or dysfunction of the tendons. Bursitis and tendonitis are discussed together because of the close proximity of tendons and bursae, and also because bursitis is a common complication of tendonitis so they can present simultaneously. This chapter will focus on three common conditions in the hip: trochanteric bursitis,

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J. H. Harris et al. (eds.), *A Case-Based Approach to Hip Pain*,
https://doi.org/10.1007/978-3-031-17154-3_2

iliopsoas bursitis, and ischial bursitis, which occur in the lateral, anterior, and posterior hip regions, respectively (Fig. 2.1).

Greater Trochanteric Pain Syndrome (Trochanteric Bursitis)

Pathology

Trochanteric bursae are located between the abductor muscles of the hip (the gluteus muscles and iliotibial band (ITB)) [1]. Previously known as trochanteric bursitis, greater trochanteric pain syndrome (GTPS) is a more general and preferred term referring to localized lateral hip pain with focal tenderness over the greater trochanter that is a result of injury and/or irritation to the gluteal tendons and bursa [2, 3].

In order to better understand the pathology of GTPS, it is helpful to stratify the different bursae and tendons that are involved (Fig. 2.2):

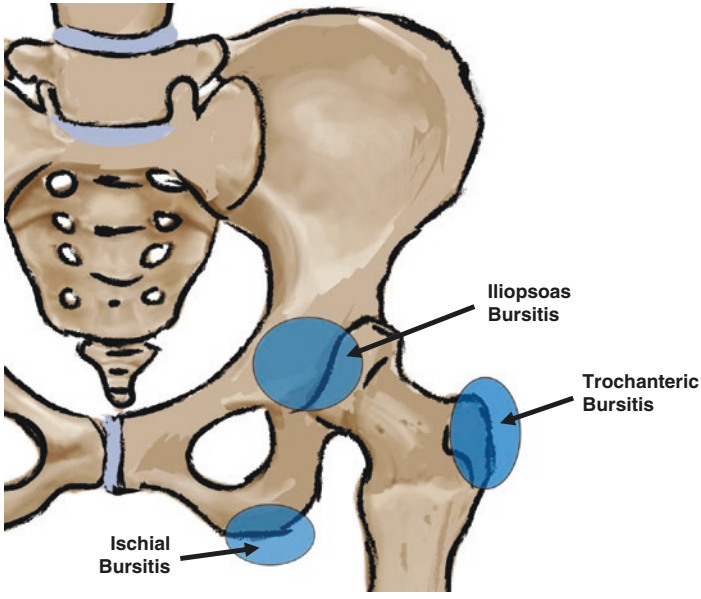

Fig. 2.1 Common locations of tendonitis/bursitis in the hip

- Subgluteus maximus bursae: located deep to the gluteus maximus muscle and ITB that crosses superficial to the gluteus medius. This is the largest bursae of the greater trochanter region and usually the bursa that is referred to when the term greater trochanteric bursa is used.

- Subgluteus medius bursae: located deep to the gluteus medius where it attaches to the lateral and superoposterior facets of the greater trochanter of the femur.
- Subgluteus minimus bursae: located deep to the gluteus minimus as it attaches to the anterior facet of the greater trochanter of the femur [4, 5].

While this pain has previously been thought to originate from trochanteric bursae alone, recent studies have shown that this is less common and often a secondary symptom. More common is an injury to the tendons of the gluteus medius and gluteus minimus muscles resulting in GTPS. There are also various mechanisms that lead to bursitis contributing to this pain syndrome. Bursitis can be triggered by direct trauma to the lateral hip such as a fall. Repetitive movements leading to increased friction between the gluteal tendons and the bursae can cause microtrauma to the area. The bursae can also become irritated due to compression by the adjacent mus-

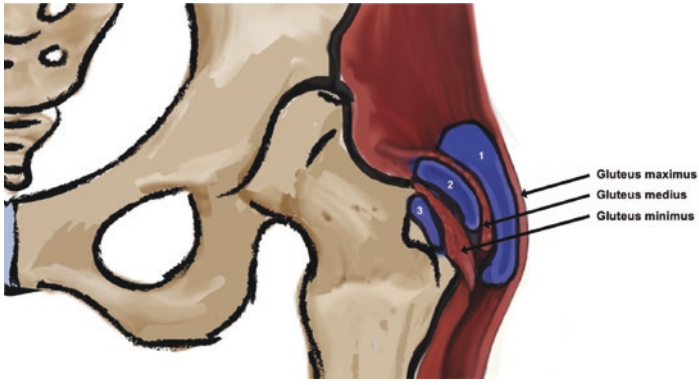

Fig. 2.2 Gluteus bursae. (1) Subgluteus maximus bursa; (2) subgluteus medius bursa; (3) subgluteus minimus bursa

cles. For example, a tightened ITB or tensor fascia lata, piriformis, or gluteus muscle compresses the bursae and causes pain. Additionally, positioning that requires hip flexion for an extended period of time such as sitting with legs crossed can lead to GTPS. A rarer cause is infection leading to septic trochanteric bursitis [2, 3].

While this condition is present in all demographics, the prevalence of this condition is the highest amongst women over the age of 50. It is estimated that unilateral GTPS affects about 15% of this group, and when the condition is bilateral it can affect 8.5% of women over age 50. In men over the age of 50, the prevalence was 6.6% and 1.8%, respectively [6].

In addition to gender and age, other risk factors for GTPS include obesity, arthritis, and/or a history of knee or lower back pain. Additionally, it may be found in those with leg-length discrepancies, osteoarthritis, or iliotibial band thickening [3].

Clinical Presentation

Symptoms of tendonitis and bursitis of the lateral hip can vary. Typically, one will present with unilateral hip pain that gradually worsens in severity. This is in contrast to a gluteal muscle or tendon tear which has similar symptoms but develops suddenly. Some other common complaints are pain that increases with activities such as walking, standing, or running. Patients may report lateral hip pain when sitting with their legs crossed or tenderness when lying on the affected side [7].

In the rarer case of septic trochanteric bursitis, patients can present with warmth, erythema, swelling, and pain over the lateral hip. They may also show more systemic symptoms like fevers or chills.

Physical Exam

Physical exam is the gold standard for the diagnosis of trochanteric bursitis or GTPS. On exam, there is tenderness just above the greater trochanter of the lateral hip; however, this test has low specificity. There can also be associated tenderness to palpation along the ITB.

According to one study, reproducing the lateral hip pain during a Flexion Abduction External Rotation (FABER) test on the affected side is the most sensitive and specific test for GTPS when combined with palpation of the greater trochanter [3]. Pain can also be reproducible with passive adduction as well as passive or active resisted abduction of the affected side. Sudden release of resistance during this abduction maneuver causes a significant increase in pain [5].

Positive Trendelenburg test has a low sensitivity and high specificity for GTPS. The patient stands on the affected leg, and the opposite side of the pelvis will drop indicating gluteal weakness on the affected side. This can also be positive in gluteal tendinopathy.

Diagnostic Exam

Imaging studies are often of little value in the diagnosis of trochanteric bursitis but may be useful to identify the specific cause and involved bursa of GTPS.

Ultrasound has several advantages including lower cost, patient comfort, and the ability to examine areas of tenderness in real time. Ultrasound can reveal distension specifically at three of the possible bursal spaces (subgluteus maximus bursa, subgluteus medius bursa, or subgluteus minimus bursa) consistent with bursitis. It can also demonstrate thickened gluteal tendons with loss of the typically smooth fibrillar pattern to suggest chronic tendinosis [8] (Fig. 2.3).

Plain radiographic films may reveal calcification of the bursae or tendons indicating chronic inflammation.

Magnetic resonance imaging (MRI) can show tendinopathy of the gluteus medius and/or minimus, including partial or complete tendon rupture. There may be associated edematous changes at the enthesis, where the tendon attaches to the greater trochanter [10].

If infection is a suspected cause, laboratory blood testing can be helpful to detect elevated White Blood Cell count (WBC) and Erythrocyte Sedimentation Rate (ESR). If there is sufficient bursal distention, fluid analysis can be done.

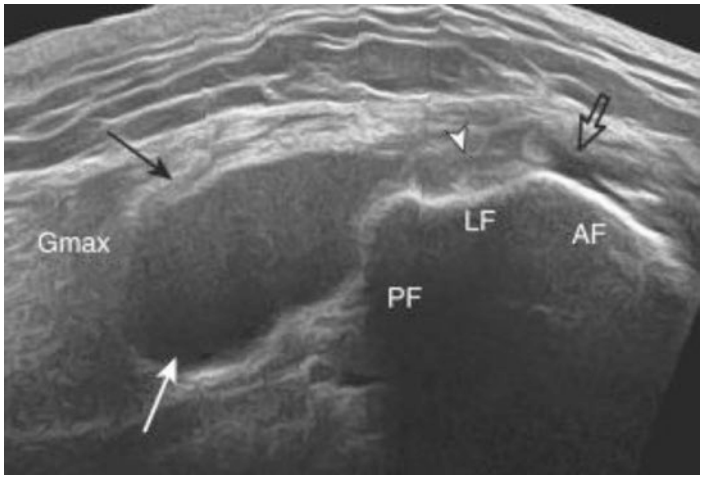

Fig. 2.3 Ultrasound image in short axis to the femur showing distension of the subgluteus maximus bursa (white and black arrow); tendinosis of the gluteus medius (arrowhead); tear of the gluteus minimus (open arrow). *Gmax* gluteus maximus, *AF* anterior facet of the greater trochanter, *LF* lateral facet, *PF* posterior facet. (Adapted from Jacobson, J 2018 [9])

Treatment

There is no defined protocol for the treatment of GTPS. Most patients improve with conservative measures such as rest, ice, non-steroidal anti-inflammatory drugs (NSAIDS), and physical therapy. Behavior modification can also be beneficial [8]. For example, if GTPS is due to how a patient is walking or running, then shoes that provide more support and prevent over inversion may be helpful. If patients lean on one hip when they stand, they should be counseled to distribute their weight evenly.

When patients are very active and develop GTPS from squatting, adjustments can be made to replace these exercises with isometric wall sits for example. If the cause is muscle tightening, then massaging the area surrounding the bursae can relax the muscle and take some pressure off of the bursae.

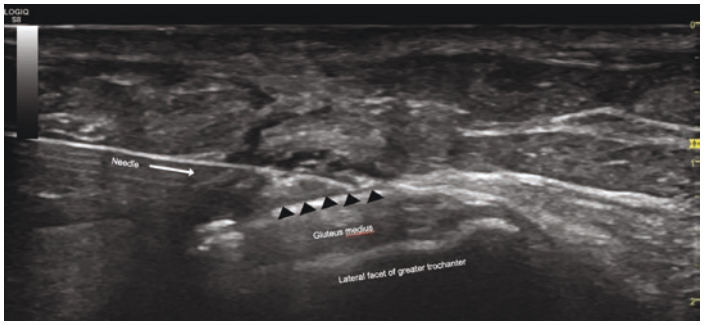

Fig. 2.4 Example of corticosteroid injection into subgluteus maximus bursa under ultrasound guidance. (Arrowheads) outline the distended subgluteus maximus bursa

Corticosteroid injections into the bursae under ultrasound guidance can be considered if pain persists despite initial conservative measures, or if the pain is so severe that patients may benefit from an injection to better tolerate exercises (Fig. 2.4).

Another more controversial option is platelet-rich plasma (PRP) injection. Most of the studies exploring this option are either inconclusive or have outcomes that cannot be compared to one another because of the different PRP formulations used. One study demonstrated that after 12 weeks, injection of platelet-rich plasma into the affected tendon resulted in greater clinical improvement than a glucocorticoid injection as determined by a pain and function assessment [11].

In cases of septic trochanteric bursitis, antibiotic therapy should be initiated.

It may take 6–9 months or sometimes longer to fully recover from greater trochanteric pain syndrome, or trochanteric bursitis. While GTPS is usually self-limiting, under rare circumstances, it can persist. These refractory cases may require surgical bursectomy, ITB lengthening or gluteal tendon repair [12].

Iliopsoas Bursitis

Pathology

The iliopsoas bursa, also known as the iliopectineal bursa, is the largest synovial bursa in the body. It is located between the iliopsoas muscle/tendon and the ilium or the anterior capsule of the hip. Its role is to reduce tendon friction over the hip joint during iliopsoas muscle activation and joint movement [13]. When irritation in this region occurs, the result is inflammation and distention of the iliopsoas bursa. Due to the bursa's close proximity to the tendon of the iliopsoas muscle, tendonitis of the area often coincides with the bursitis and is known as iliopsoas syndrome [13]. Iliopsoas syndrome is typically caused by trauma or overuse of the area. Some suggest extensive hip flexion and extension (especially in the setting of tight iliopsoas muscle) may be the most likely cause of the bursitis [14].

This condition is sometimes referred to as "internal" snapping hip syndrome due to the sensation of snapping or audible snapping noise while the iliopsoas tendon moves across the ilium or anterior hip capsule during activity. This should be distinguished from "external" snapping hip syndrome that occurs in the lateral hip, with snapping sensation occurring between the ITB and greater trochanter [15].

Iliopsoas syndrome is common particularly amongst female dancers, as approximately 9.2% of dancers may report a painful or painless snapping or clicking sensation upon flexion or extension of the hip compared to 3.2% of male dancers [16]. This often occurs due to the repetitive flexion of the externally rotated hip motion that is commonly involved in dance movements such as the "passé developpé" [16].

Risk factors include histories of osteoarthritis or rheumatological conditions (i.e., Gout or rheumatoid arthritis), as these can directly cause irritation at the iliopsoas tendon attachment site or bursa.

Clinical Presentation

Clinical presentation may be variable. While some may be asymptomatic, patients often present with anterior groin pain. Patients may also experience referred pain down the anterior thigh or even experience swelling of the lower extremity. Though typically gradual in onset due to overuse, this can occur more acutely after sports injuries or work-related trauma. Activities such as running uphill, track and field, and strength training may precipitate symptoms such as groin pain which may indicate iliopsoas bursitis [14].

Physical Exam

On exam, there can be tenderness to palpation in the anterior hip region below the inguinal ligament and lateral to the femoral artery [14]. Though rare, enlarged bursa can sometimes be palpated. Pain may also be provoked by both active and passive hip motions, especially during semicircular hip motion while the hip is flexed [13].

In rare cases where the bursal distention enlarges to compress the adjacent femoral nerve, there may be decreased sensation of the anteromedial thigh and medial lower leg as well as weakened and atrophic quadriceps muscles in later stages of development. The patellar reflex may also be lost [14]. However, if a patient presents with these symptoms, further investigation of lumbar spine pathology should be done first.

Diagnostic Exam

Diagnostic imaging has limited utility. However, utilization of ultrasound may be an efficient method to identify bursal distention (Figs. 2.4 and 2.5). Ultrasound can also detect snapping motion of

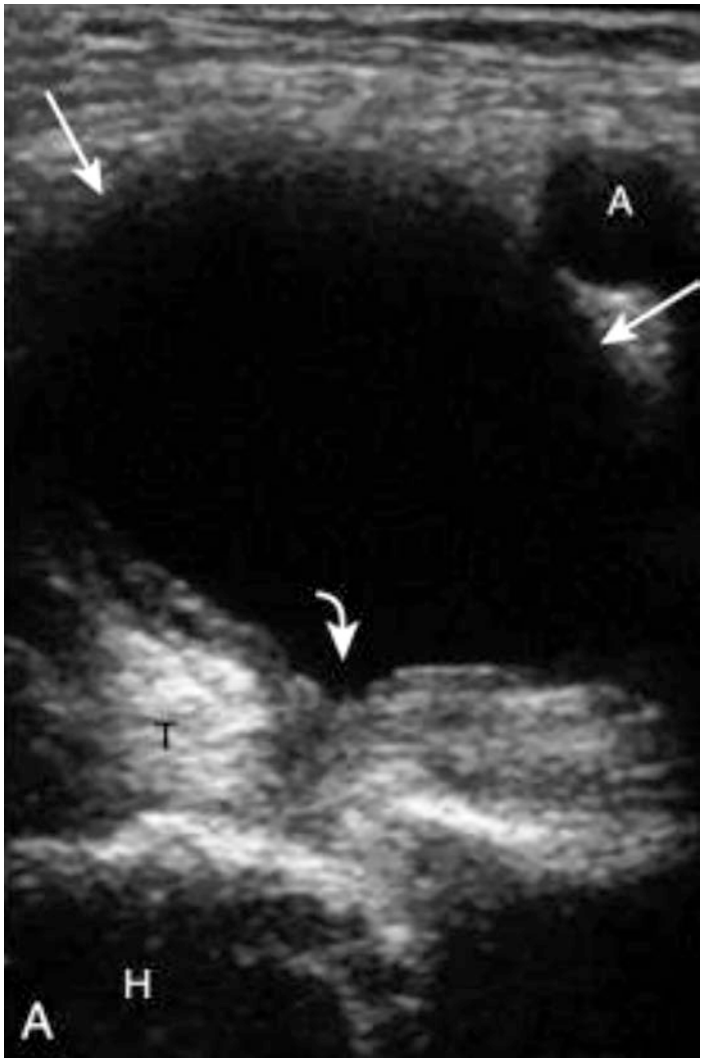

Fig. 2.5 Ultrasound image shows anechoic distention of the iliopsoas bursa as shown by the arrows. H = transverse of femoral head, T = psoas major tendon, A = femoral artery. (Adapted from Jacobson, J 2018 [9])

iliopsoas tendon with dynamic hip motion in the case of internal snapping hip syndrome [17]. Diagnostic ultrasound-guided injection of the iliopsoas bursa with local anesthetic may be useful [18].

Plain radiograph can be helpful to assess for advanced arthritic changes of the hip or other bony changes that may contribute to irritation of the iliopsoas tendon/bursa.

MRI of the pelvis and hip are reserved for more complex presentations [19]. It can be helpful mostly to rule out other pathologies such as tumors, femoral hernia, femoral artery aneurysm, or lymphadenopathy. However, in the case of iliopsoas syndrome that involves significant enlargement of the bursa, MRI may demonstrate retroperitoneal expansion, abdominal, or pelvic mass [14]. Melamad et al. proposed the triad of palpable mass, extrinsic pressure on adjacent structures, and radiographic changes of advanced arthritis of the hip for more complicated cases of iliopsoas bursitis involving retroperitoneal extension [14].

Treatment

Like trochanteric bursitis, treatment is typically conservative and does not require surgery unless the patient is not responsive to other non-invasive methods. This includes avoidance of aggravating activities, hip extension stretches for 6–8 weeks, and hip rotation strengthening exercises. Referral to injection therapy or surgery may follow if initial non-operative plans fail to show improvement of symptoms.

Johnston et al. proposed a specific rehabilitation program for iliopsoas syndrome which includes up to 2 weeks of hip rotation exercises with knees flexed, 2–4 weeks of external rotation and abduction exercises with knees flexed, then 4 weeks or more of mini squats, external rotation of the leg and gait retraining [15]. Johnston states that the rehab program targets both internal and external rotator muscle groups in the initial portion of the program. These exercises are performed while sitting with an elastic resistance band. If strength on the initial exam is observed to be weak in one direction in comparison to their sides, exercises were

prescribed in a 3–2 ratio with the weaker direction doing more exercises to regain strength over time [20].

It typically takes between 6 and 8 weeks with the aforementioned exercises though some patients may experience prolonged weakness in the hip rotator muscles which may lead to a decrease in hip stability.

Other treatment options include the use of ultrasound-guided iliopsoas peritendinous corticosteroid injection [21]. More recently, regenerative medicine techniques including injection of platelet-rich plasma, mesenchymal stem cells, and other products derived from amniotic tissue which are actively involved in the healing process have been used in treatment of iliopsoas bursitis [22].

Though rarely indicated, if refractory bursitis persists after 3 months of conservative treatment, surgical intervention may be introduced involving bursectomy and closure of the hip capsule [14]. Such procedures can also involve releasing or lengthening the iliopsoas tendon and show variable degrees of success in alleviating the pain associated with internal snapping hip [23].

Ischial Bursitis

Pathology

Ischial bursitis refers to the inflammation of the bursa which sits in between the ischial tuberosity and the hamstring tendons (semimembranosus tendon, and the conjoined tendons of semitendinosus and biceps femoris muscles). This may be one singular bursa or multiple segmented inflamed bursa.

This type of bursitis is often caused by chronic irritation of the leg in those who lead a more sedentary lifestyle. It may also occur as a result of sitting on hard surfaces such as bike riding or horseback riding for an extended period of time. Other risk factors include histories of rheumatological conditions including but not limited to gout, rheumatoid arthritis, systemic lupus erythematosus, ankylosing spondylitis, or Reiter's syndrome [24, 25].

Clinical Presentation

Pain related to ischial bursitis is often localized to the ischial tuberosity but may be referred down the posterior thigh. Pain can be provoked during hip or knee extension, or during sitting due to direct pressure on the bursa. Pain can also increase at night as patients frequently report difficulty sleeping on the affected side and report a sharp painful sensation on hip flexion and extension when waking up in the morning [24].

Physical Exam

On exam, pain may be provoked upon passive straight leg raising and active resistance of extension of the affected side due to activation or stretching of the involved hamstring muscles/tendons. There may also be an increase in pain upon release of the affected leg from active extension [24]. On inspection, the lower buttock region may appear erythematous and swollen over the ischial tuberosity in the case of septic bursitis though it may be too small to appreciate these findings [25].

Diagnostic Exam

As with the previously mentioned conditions, diagnostic imaging is not necessary. However, ultrasound can be useful to detect hypoechoic bursal distension surrounding the iliopsoas tendon at its attachment site on the ischial tuberosity.

Ultrasound and plain radiographs may also show calcification surrounding the hamstring tendons in chronic cases (Fig. 2.6) [24].

MRI may show irritation of the hamstring muscles, including partial or complete tendon rupture. There may be associated edematous changes at the enthesis, where the tendon attaches to the ischial tuberosity. It can also demonstrate associated bursal distention.

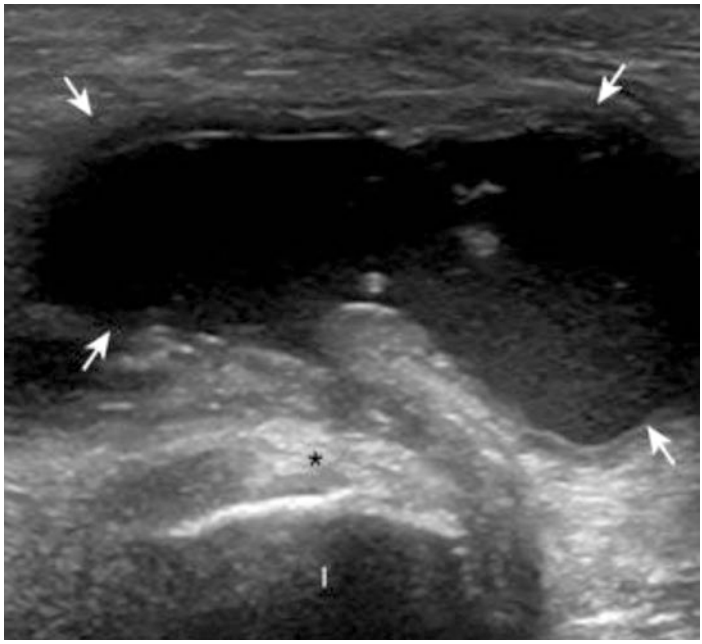

Fig. 2.6 Ultrasound image arrows show the transverse plane of the ischium with hypoechoic complex bursa distention predominantly. *I* = ischium. (Adapted from Jacobson, J 2018 [9])

Computed tomography (CT) or radionuclide bone scanning may be indicated in refractory cases or if there is concern for more severe disease such as cancer metastasis or occult fracture in the hip and pelvic region [24].

Treatment

As with other bursitis of the hip, treatment of ischial bursitis is often conservative consisting of initial rest, NSAIDS, physical therapy, and other modalities such as cold pack application as needed. In the acute phase, isometric hamstring exercises are encouraged with gradual progression to eccentric and concentric

activation exercises. Such exercises may involve the use of a treadmill in which the patient is instructed to face backwards, hold the rails with both hands, and place the stationary limb off of the belt. The patient will then extend the hip of the injured limb while extending the knee with the foot placed on the belt behind the patient and resist the force of the belt as it pulls the limb forward while maintaining proper pelvic posture [26].

It is also important to change lifestyle factors to prevent refractory cases of ischial bursitis. For example, if the patient has a history of a sedentary lifestyle, it would be beneficial to incorporate more physical activity after fully healing [24].

For refractory tendonitis, tenotomy with local anesthetic injection may be considered to promote blood flow and healing. For refractory bursitis, corticosteroid injection with ultrasound guidance may be helpful [27] (Fig. 2.7).

As with other cases of hip bursitis and tendonitis, regenerative medicine can also be applied for ischial bursitis. Platelet-rich plasma may be helpful in providing longer term pain relief or reducing rates of recurrence [28].

Overall, patients may improve within days to weeks without treatment with the exact timing being dependent on the severity of the bursitis [29].

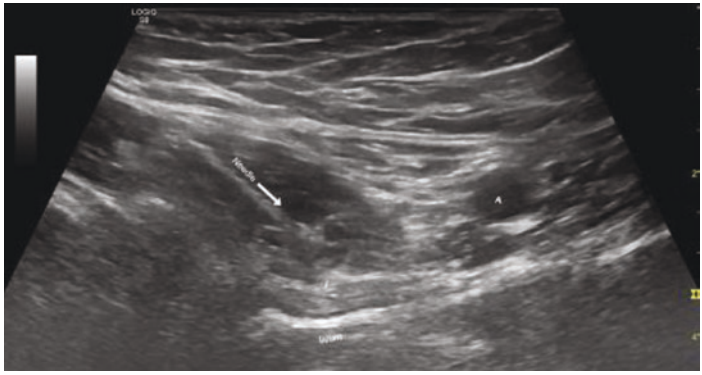

Fig. 2.7 Diagnostic iliopsoas bursa injection under ultrasound guidance. I = iliopsoas tendon; A = femoral artery

Conclusion

Bursitis and tendonitis are common pathologies of the hip that often occur simultaneously.

In three common pathologies of the hip, Greater Trochanteric Pain Syndrome, Iliopsoas Bursitis, and Ischial Bursitis, there is irritation or inflammation to surrounding tendons, muscles, and bursae that result in different manifestations of pain.

Diagnosis is made through patient history and physical exam maneuvers, while imaging such as US, CT, and MRI can provide supporting evidence.

Conservative measures along with behavior modifications and rehabilitation exercises are standard treatments. There are various exercises that target the areas of dysfunction that work to provide relief.

In severe or refractory cases, corticosteroid injections, platelet-rich plasma injections, or surgical intervention are considered. As the effect of these techniques continue to be studied, it is possible that these modalities will become more common practice for the management of bursitis and tendonitis of the hip.

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