Prevalence study of iliopsoas bursitis in a cohort of 860 patients affected by symptomatic hip osteoarthritis

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Purpose

The iliopsoas bursa is the human largest synovial bursa (Toohey et al. 1990). It is located between the iliopsoas muscle and the hip joint capsule, medial to femoral vessels and lateral to the femoral nerve. Inflammatory or degenerative hip diseases may be complicated by the development of iliopsoas bursitis (Toohey et al. 1990), although it may also represent an isolated primary pathology. In the latter occurrence, patients usually report a previous trauma (Van de Perre et al. 2005), or a sport-related overuse syndrome. Also, idiopathic bursitis is occasionally described (Salmeron et al. 1999).

The most frequent joint diseases which can be complicated by iliopsoas bursitis are rheumatoid arthritis (Generini et al. 1993; Kataoka et al. 1995; Wilkinson et al. 1991), polymyalgia rheumatica (Cantini et al. 2005; Tani et al. 2001), and osteoarthritis (Keen et al. 2009). Also, other pathologic conditions, such as villonodular synovitis, synovial chondromatosis, and septic arthritis (Guiral et al. 1999; Manueddu et al. 1991) may also primarily develop within the bursa.

Iliopsoas bursitis is often misdiagnosed due to its non-specific clinical features (Bierma-Zeinstra et al. 2000; Wunderbaldinger et al. 2002). However, this condition should be suspected when anterior hip pain emerges, either spontaneous or evoked, in patients with underlying osteo-articular pathology.

The purpose of our work was to use ultrasound (US) to evaluate iliopsoas bursitis prevalence in patients suffering from symptomatic hip osteoarthritis.

Methods and Materials

Study population

Institutional Review Board approval was obtained and patients' informed consent was waived. We included in our evaluation 860 patients suffering from symptomatic hip osteoarthritis according to the relevant American College of Rheumatology criteria (Altman et al. 1991) and eligible for intra-articular injection of hyaluronan products according to the Migliore-Tormenta technique (Migliore et al. 2003). Patients were 568 males and 292 females, aged 62 ± 7 years (mean ± standard deviation), recruited in an 18-month period from November 2009 to April 2011. To be included in the present study and to be admitted to injection treatment, patients should have a recent (<3 months) plain film evaluation, demonstrating osteoarthritis grade II, III, and IV according to Kellgren-Lawrence score (Gossec et al. 2007; Kellgren et al. 1957) with reported hip pain, and negative erythrocyte sedimentation rate, C-reactive protein, and uricaemia blood tests. Lequesne index (Lequesne 1997) and visual analogue scale (VAS) score were recorded.
for each patient. Lequesne score is an index of severity for osteoarthritis for the hip, including items that evaluate pain or discomfort, maximum distance walked, and activities of daily living. VAS consists of a 10-cm graduated scale from 0 (no pain) to 10 (unbearable pain): patients mark the point they feel to correspond to their pain.

**US evaluation**

Patients were examined while lying supine on a bed, with intra-rotated leg (almost 15-20°), using an US system (Aplio, Toshiba, Japan) equipped with either a multi-frequency convex 3.5-5 MHz or a linear 7.5-12 MHz high-resolution array transducer (Iagnocco et al. 2006). One radiologist with more than 15 years experience in musculoskeletal US scanned thoroughly the anterior hip before injection and electronically archived the most relevant images for each patient. He also measured the maximum length of iliopsoas bursitis, when detected. Afterwards, two different radiologists with more than 10 years experience in musculoskeletal US, blinded to each other, evaluated the stored images for the presence of iliopsoas bursitis, joint effusion, synovial hypertrophy, and the possible communication between bursa and articular space. Iliopsoas bursitis was diagnosed according to Wunderbaldinger criteria (2002), as a well-defined, thin-walled (< 2-mm wall thickness), homogeneously anechoic cystic lesion ventral to the hip joint; joint effusion was diagnosed according to Koski criteria (1990), as a capsule-to-cortex distance of 7-8 mm or more (Boutry N et al. 2007); synovial hypertrophy was diagnosed when presence of solid tissue or hyperechoic folds projecting inside the articular cavity was detected (Martinoli et al. 2009); communication between bursa and articular space was diagnosed when a thin linear hypo/anechoich image was seen connecting the enlarged bursa and the hip joint (Wunderbaldinger et al. 2002).

When iliopsoas bursitis was found, it was drained under US guidance, and the amount of drained fluid was recorded. Iliopsoas bursitis drainage was performed using a sterile technique under US guidance. A 3.5-5 MHz convex probe was aligned over the bursa on a sagittal plane and a 21G spinal needle connected to a 20-mL syringe was inserted in the bursa using a cranial-caudal approach. Then, 1 mL of metilprednisolone acetate 40 mg/mL (Depo-Medrol, Pfizer, Belgium) was injected in the bursa.

**Statistical analysis**

Descriptive statistics were used for demographics and image findings. Interobserver reproducibility for presence of iliopsoas bursitis, joint effusion, synovitis, and the eventual communication between bursa and intra-articular space was estimated using the unweighted Cohen’s #. Comparison between joint effusion and synovitis incidence in patients with or without iliopsoas bursitis was performed using the #^2 test. Comparison between VAS score in patients with or without iliopsoas bursitis was performed using the U Mann-Whitney test. For statistical analyses, software SPSS version 17 (SPSS,
Chicago, IL) was used. For overall comparisons, a $P$ value equal or lesser than 0.05 was considered as significant.

**Results**

On US evaluation, iliopsoas bursitis appeared as a well-defined, thin-walled, anechoic fluid collection anterior to the iliopsoas muscle (Fig. 1). Iliopsoas bursitis was found in 19/860 patients (2.2%). Among them, 4 had grade II hip osteoarthritis (21%), 9 had grade III (47%), and 6 had grade IV (32%). Demographics and clinical features of such patients are summarized in Table 1.

When detectable, the mean value of maximum length of the iliopsoas bursa was 2.9 ± 0.9 cm. We were able to drain a mean volume of 35 ± 34 mL of fluid from the iliopsoas bursae detected in our series. Joint effusion was found in 9/19 (47%) patients in whom iliopsoas bursitis was detected (Fig. 2), synovial hypertrophy in 6/19 (32%) patients (Fig. 3), and communication between bursa and joint space in 9/19 (47%) patients (Fig. 4). In 2/19 (11%) patients, association of joint effusion and synovial hypertrophy was detected.

Joint effusion was detected in 27/860 patients (3.1%) without iliopsoas bursitis and synovial hypertrophy in 25/860 (2.9%). These values are significantly lower ($P<0.001$ for all) compared to patients in which iliopsoas bursitis was detected. No significant difference was found between patient with or without iliopsoas bursitis regarding VAS score (5.1 ± 2.4 versus 5.6 ± 2.7; $P=0.468$) and Lequesne Index (6.9 ± 4.1 versus 7.1 ± 4.4; $P=0.614$).

Both observers agreed for all evaluations (unweighted Cohen's $\kappa=1$).

**Images for this section:**
Fig. 1: Fig. 1. Axial (a) and longitudinal (b) scan of the anterior hip demonstrating a large iliopsoas bursitis (asterisks); F=femur.

Fig. 2: Fig. 2. Longitudinal scan of the anterior hip demonstrating joint effusion (asterisks); F=femur.
**Fig. 3:** Fig. 3. Longitudinal scan of the anterior hip demonstrating synovial hypertrophy (arrowheads); F=femur.
Fig. 4: Fig. 4. Axial (a) and longitudinal (b) scan of the anterior hip demonstrating a large iliopsoas bursitis (asterisks). Communication between the bursa and the joint space (black arrowheads) can be seen; F=femur, FV= femoral vessels.
**Fig. 5:** Fig. 4. Axial (a) and longitudinal (b) scan of the anterior hip demonstrating a large iliopsoas bursitis (asterisks). Communication between the bursa and the joint space (black arrowheads) can be seen; F=femur, FV= femoral vessels.
Conclusion

The present report is the first one evaluating the prevalence of iliopsoas bursitis in a large cohort of patients suffering from symptomatic hip osteoarthritis. According to one of the most common hypotheses about iliopsoas bursitis development (Toohey et al. 1990), the presence of joint effusion may lead to an increase of intra-articular pressure with either capsular rupture into the bursa or fluid moving into the bursa through a physiological communication. Also, iliopsoas bursitis may develop from bursa synovial hypertrophy. Notably, the incidence of iliopsoas bursitis in our series of patients cannot be considered negligible. The presence of this finding modifies the therapeutic approach of patients eligible for intra-articular hyaluronic hip administration, as the bursa needs first to be drained and treated with steroid injection (Migliore et al. 2003).

Differential diagnosis of iliopsoas bursa includes soft tissue mass (e.g. sarcoma) or inguinal hernia. When the bursa is located more proximally than the usual anatomical site, it can be also misinterpreted as an adnexal mass (Roberts 2005).

Papers available in literature report the association between iliopsoas bursitis and a wide number of articular conditions, not providing any prevalence data about the different rheumatic pathologies (Toohey et al. 1990). Recently, Cantini et al. (2005) described the presence of iliopsoas bursitis in ten patients suffering from rheumatic polimyalgia, with associated inflammatory changes of synovial hip structures. Wurderbaldinger et al. (2002) reported that 90% of patients with iliopsoas bursitis detected at magnetic resonance imaging (MRI) showed joint effusion. In our series, we found joint effusion and synovial hypertrophy at US evaluation in 68% of iliopsoas bursitis. To our knowledge, no data about joint effusion and bursitis in patients suffering from hip osteoarthritis have been reported in literature. The only known literature data about hip osteoarthritis is the presence of a variable degree of synovial inflammation, which contributes to the progression of joint damage (Bierma-Zeinstra et al. 2000). Concerning this point, Bierma-Zeinstra et al. (2000) demonstrated a strong association between hip osteoarthritis and hip joint effusion detected using US, although the real prevalence of this finding in hip osteoarthritis is still ignored. In our series, synovial hypertrophy and joint effusion was present in a significantly lower number of patients without iliopsoas bursitis.

We detected a communication between iliopsoas bursa and joint space (see Fig. 4) in less than a half of patients in which bursitis was detected. In general population, this represents a gross anatomical finding only in 15% of adults (Toohey et al. 1990). Similarly, in a recent retrospective study on 18 patients suffering from hip osteoarthritis which underwent surgery for bursectomy or prosthesis, Wurderbaldinger et al. (2002) discovered a communication between iliopsoas bursa and joint space all cases, while computed tomography and US failed in detecting this communication in 40% and 44% of cases, respectively. MRI represents the most effective diagnostic examination to detect
any communications between iliopsoas bursa and the joint space (Meaney et al. 1992), being also able to detect associated joint effusion in almost 90% of cases.

No significant difference was detected between the group of patients with or without iliopsoas bursitis in terms of VAS score and Lequesne index. This means that neither pain intensity nor functional impairment allow for discovering the presence of iliopsoas bursitis. Also, imaging evaluation might be useful in patients with high-degree of hip osteoarthritis who develop a palpable inguinal mass. Some authors suggest the long duration of joint disease as an essential pre-requisite for iliopsoas bursa enlargement (Gossec et al. 2007). This is confirmed in our series, where hip osteoarthritis grade III and IV represent about 80% of cases.

Our findings have two main implications. First, hip pain in patients affected by osteoarthritis is usually thought to be generated by joint damage. However, iliopsoas bursitis may represent an additional source of pain in these patients. Thus, pain management should be also aimed to treat iliopsoas bursitis when present. Secondly, the presence of iliopsoas bursitis should be always looked for in patients undergoing hyaluronate hip injection. Being communication between joint and bursa quite common, hyaluronate injected in the hip joint could easily migrate within a distended bursa, thus potentially causing adverse reactions (Migliore et al. 2003).

In our series, we demonstrated a high reproducibility of two radiologists blinded to each other in detecting hip joint effusion, synovial hypertrophy, and iliopsoas bursitis on US images that were acquired by a third radiologist experienced in musculoskeletal US. We underline that this high value of interobserver reproducibility cannot be directly transferred to the ability of US in detecting iliopsoas bursitis, being so dependent on operator and scanning technique.

In our study, the main limitation is represented by the absence of a standard of reference that could confirm our US findings. This is particularly important for smaller iliopsoas bursitis that can be more reliably detected using MR (Wunderbaldinger et al. 2002). Also, no asymptomatic or low-degree osteoarthritis patients were included in our series. Thus, the real general incidence of iliopsoas bursitis may be underestimated. In addition, US evaluation was only performed on the hip that was planned to be injected. Therefore, no data are available about the incidence of iliopsoas bursitis in the contra lateral asymptomatic hip. Finally, power Doppler was not used to evaluate the presence of synovitis because most evaluations were performed using a 3.5-5 MHz convex probe, which is not particularly suitable to detect slow flows.

In conclusion, US represents a quick and readily-available imaging modality to detect iliopsoas bursitis, joint effusion, synovial hypertrophy, and communication between iliopsoas bursa and joint space in patients affected by grade II-IV hip osteoarthritis. High interobserver reproducibility was achieved when reviewing US images of those findings. Iliopsoas bursitis was detected in 2.2% of our series. Further studies are warranted to confirm our data, also comparing US to other imaging modalities (e.g. MRI).
References


Personal Information