Iliopsoas hypertrophy can cause perivisceral fat inflammation and aggravate preexisting pubalgia in soccer players

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Purpose

Aim of our study was to evaluate the importance of iliopsoas hypertrophy to aggravate preexisting pubalgia in soccer players.

Groin pain is a frequent pathological condition, affecting many athletes who practice different sports activities. Even if it is part of the daily practice in sports medicine, this pathology still represents a challenge for physicians and physiotherapists, mainly because of the complicated anatomy of this region. Many pathologies need to be considered in the differential diagnosis of groin pain because several entities may cause similar clinical signs and symptoms and overlapping findings at physical examination.

Groin pain is a frequent pathological condition, affecting many athletes who practice different sports activities; acceleration, rapid changes in direction, kicking and side-to-side motion, such as in soccer, rugby and baseball, are the type of movements most often associated with this condition. Between 2% and 8% of all athletic injuries involve the groin and 58% of soccer players have a history of groin injury [1].

Even if it is part of the daily practice in sports medicine, this pathology still represents a challenge for physicians and physiotherapists, mainly because of the complicated anatomy of this region [2].

Many pathologies need to be considered in the differential diagnosis of groin pain because several entities may cause similar clinical signs and symptoms and overlapping findings at physical examination (visceral, infectious, traumatic, neoplastic, developmental, hip-associated and pubic symphyseal causes) [1]. In soccer players, symmetric hypertrophic iliopsoas development is present because of training; however this can produce conflicts with surrounding structures and may be responsible for worsening of pubalgia [3].

Methods and Materials

10 Italian first division soccer players with a known diagnosis of pubalgia associated with a suspected sports hernia presented at our Institution between October 2011 and May 2012 with sharp pain in the right lower quadrant of the abdomen; they previously received a diagnosis of sports hernia. The pain was localized to the inguinal region, just medial to the external inguinal ring, near the insertion of the tendon and insertional region of the right adductor longus. There was no radiation of the pain into the scrotum or to the opposite groin. The pain was aggravated by sudden movements such as running, lateral cutting, kicking, shooting a slap shot and other activities that involve torso rotation and
abdominal stress during intense physical activity. Pain was usually absent or minimal at rest. The athlete had pain getting out of bed in the morning. The medical staff of their team started conservative treatment involving physiotherapy but no significant improvement resulted. Each time they interrupted their training the symptoms improved and on average after two weeks they were able to start playing soccer again; however, after a few training sessions the pain came back again and so they missed several matches running off a discontinuous matches period.

They had no history of trauma nor of muscular injury in that area but he did suffer from chronic pubalgia.

An MRI study of the lower abdomen was performed. We applied the following sequences: T2 weighted Turbo Spin Echo (TSE) with fat-suppression on non-axial planes and true fast imaging with steady-state precession (True-Fisp) on axial and coronal planes before and after performing the Valsalva maneuver.

Results

Symmetric hypertrophy of the ileo-psoas muscles (Fig. 1) due to the physical training was observed in all cases. In the right pubic bone we observed a mild intraspongious signal hyperintensity in T2 weighted fat-sat sequences, indicating edema as in the condition of pubic osteitis (Fig. 2); in the insertional portion of the right adductor muscles we also noticed a modified intensity suggesting tendinitis, consistent with a diagnosis of pubalgia. We detected also a small accumulation of fluid associated with inflammation of the perivisceral ileo-cecal fat (Fig. 3) in the anatomic space situated between the internal oblique and transverse muscles of the abdomen, the inferior rectus abdominis and the right iliopsoas, which appeared markedly hypertrophied.

Our diagnosis was pubalgia with associated perivisceral fat tissue inflammation due to iliopsoas hypertrophy.

We supposed that contraction of the iliopsoas, which happens each time the thigh is flexed in order to kick the ball, produced rubbing on the perivisceral fat causing inflammation.

To confirm our hypothesis a dynamic ultrasound examination was performed by an ultrasound (US) expert radiologist which assessed rubbing of the iliopsoas on the rectum perivisceral fat while flexing and internally turning the thigh on the abdomen (simulating the kicking motion) was performed.

Eventually a conservative approach with rest, specific physiotherapy treatment (impact waves on the insertion of the right adductor muscle associated with hyperthermia and manual therapy to reduce the contraction of the psoas) and changes to physical
training involving the abdominal muscular wall in order to reduce the iliopsoas muscular hypertrophy and prevent further rubbing on the rectum was suggested by the team medical staff.

After one month the patients rejoined their team and resumed playing soccer; the pain was significantly reduced and the control MRI showed the disappearance of osteitis pubis (Fig. 4); even though a little tenderness persisted for a further two months.

Images for this section:
**FIG 1:** MR image on coronal T2 sequence showed a symmetric ileo-psoas hypertrophy (white arrows)

Fig. 1
FIG. 2: MR image on axial STIR sequence showing intraspongyous edema as for a condition of pubic osteitis (white arrow).

Fig. 2
FIG 3: MR image on axial T2w sequence showing flogosis of the perivisceral ileo-ciecal fat with associated little fluid collection (white arrow). The bowel is compressed between the internal oblique (green circle) and transverse muscle of the abdomen (red circle), the inferior rectus of the abdomen (black circle) and the right iliopsoas (black arrow) as demonstrated after Valsalva maneuver.

Fig. 3
FIG 4: MR image on axial STIR sequence after one month showed the disappearance of osteitis pubis on the right side

Fig. 4
Conclusion

Terms including osteitis pubis, pubalgia, groin strain, abdominal muscle tear, and, more recently, sports hernia have become common diagnoses on team injury reports [4]. Many of these terms are poorly defined in the medical literature, adding confusion and leading to wide variability in diagnosis and in treatment modalities.

Athletes with pubalgia usually present with pain in the inguinal region, which may radiate to the thigh adductor muscle origins or to the scrotum and testicles. At physical examination, point tenderness is often localized to the external ring of the inguinal canal and the pubic tubercle, the lower rectus abdominis musculature, or the pubic symphysis, but there is no palpable hernia [4].

Until recently, imaging was thought to be unreliable or of little use for the diagnosis of athletic pubalgia [1]. However, improved knowledge of anatomic structures, pathophysiologic changes, and clinical findings associated with athletic pubalgia has resulted in improved imaging techniques [5]. Because many pathophysiologic processes may manifest as pubic and inguinal pain, an MR imaging survey of the pelvis is now recommended during the initial evaluation [1, 4].

Once injury to the pubic region is confirmed, dedicated imaging of the anterior pubic musculoskeletal structures is recommended [5].

Frequently, images obtained with fluid-sensitive sequences allow direct visualization of tears involving the rectus abdominis-adductor aponeurosis, which appear as irregular areas with signal intensity like that of fluid undermining the aponeurosis. Other findings commonly associated are abnormal isolated marrow signal intensity at the anterior-inferior aspect of the pubic body and deep to the rectus abdominis. Sometimes also osseous productive changes and subchondral cysts in the pubic symphysis are observed. In some patients, an initial tendinous injury precedes clinical symptoms and MR imaging findings of osteitis pubis [1].

Athletes frequently develop hypertrophic muscle volumes, depending on the type of training they practice. In soccer players there is a symmetric development of the muscles of the thigh and of the lower abdomen [3]. Sometimes this condition can lead to compression of the surrounding tissues and can be responsible for a variety of clinical signs, especially in the pelvis. In the literature several examples of this condition related to hypertrophied iliopsoas muscles have been described, as occurred in our patient; teardrop bladder is one of the most frequent conditions described [6]. In 1987 Zeiss et al. described the case of a bodybuilder with a marked hypertrophy of the psoas muscle producing a unilateral extrinsic mass effect on the median cecum with acute abdominal symptoms [7]. To our knowledge no previous cases of visceral inflammation due to muscle hypertrophy in athletes have been previously reported.
In conclusion we suggest the use of MR imaging in cases of athletes with groin pain; furthermore if no pathological evidence can be detected, a study of the pelvic structures should be performed in order to assess relations between hypertrophied muscles and visceral structure.

Images for this section:

Fig. 5

Iliopsoas hypertrophy can cause perivisceral fat inflammation and aggravate preexisting pubalgia in soccer players

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References


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