Impacto do Músculo Iliopsoas: Uma Nova Etiologia para Dor Neuropática Ilioinguinal / Iliohipogástrica?

Iliopsoas Muscle Impingement: A New Etiology for Ilioinguinal / Iliohypogastric Neuropathic Pain?

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Resumo

A pubalgia é uma queixa comum no atleta, apresentando variadas etiologias sendo a dor relacionada com os nervos ilioinguinal e iliohipogástrico uma das causas mais frequentes.

Apresentamos o caso de um atleta de *Trail* com uma pubalgia no território dos nervos ilioinguinal e iliohipogástrico que foi refractária ao tratamento convencional. Três meses após os sintomas iniciais, foi submetido a injeção de toxina incobotulínica nas fibras musculares do iliopsoas adjacentes aos nervos, na região inguinal. Os sintomas rapidamente desapareceram, apontando o músculo iliopsoas como uma possível causa de conflito com os nervos ilioinguinal e iliohipogástrico e, consequentemente, providenciando novos dados sobre esta patologia.

Palavras-chave: Bloqueio de Nervo; Neuralgia; Toxinas Botulínicas; Virilha

Abstract

Groin pain is a frequent athletic injury with a multitude of etiologies, being ilioinguinal and iliohypogastric nerve pain one of the most frequent causes.

We present a case of a trail running athlete with a groin pain in the ilioinguinal and iliohypogastric nerve territory that was refractory to conventional treatment. Three months after the initial symptoms, he was submitted to incobotulinum toxin injection in the iliopsoas muscle fibers that were adjacent to the nerves, in the inguinal area. The symptoms quickly disappeared, pointing the iliopsoas muscle as a possible cause of ilioinguinal and iliohypogastric nerve impingement and providing new insights into this pathology.

Keywords: *Botulinum Toxins; Groin; Nerve Block; Neuralgia*

Introduction

Groin pain is a broad term used to define a pain that is localized to the inner and upper anterior thigh as well as to the lower abdominal area. The multitude of etiologies makes its epidemiology difficult to be objectively described due to the heterogeneity of pathological definitions.[1] Ilioinguinal (II) and iliohypogastric (IH) nerve entrapments have been indicated for long as a possible etiology of groin pain.[2] However, the definite etiology of the entrapment is controversial as well as its precise course along the various muscular planes.

We present a clinical case that describes a refractory groin pain consequent to a ilioinguinal/iliohypogastric (II / IH) nerve entrapment that was treated with a procedure that, to the author's knowledge, has not been previously described in the literature, possibly providing new insights in the etiology and treatment of groin pain.

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Case Report

We present a case of a 34-year-old national team trail running athlete without any known disease and without any current medication. On March 2018, after a training session in a hilly terrain that was covered with snow, in which he used snowshoes for the first time, he started complaining about a bilateral diffuse groin pain.

He was submitted to medical examination in the week after the event. The pain was described as a "tightness" that affected the inguinal area, the hypogastrium and the medial part of both thighs. It spared the testicles and had no relation with urination. He also denied back pain. The main pain could not be elicited on observation, namely forced hip flexion and extension, although the palpation of the hypogastrium and adductor muscles was painful, with a reported numeric rating scale of 5. There was hyperalgesia of the inner part of both thighs. There were no alterations in muscle strength. Ultrasound examination showed no muscle lesions of the abdominal wall muscles, rectus abdominis, iliopsoas, adductor or gracilis muscles. The pubic enthesis were regular and there were no hernia signs during Valsalva manoeuvers.

On the first examination we performed a first diagnostic bilateral ilioinguinal and iliohypogastric nerve block with 5 mL of ropivacaine 10 mg/mL diluted in 5 mL of NaCl 0.9% in the fascia between the transversus abdominis and the internal oblique muscles, also known as the transversus abdominis plane (TAP) nerve block. The athlete became completely asymptomatic immediately. However, the relief only lasted 48 hours, with a total relapse after this period.

He immediately started a four-time-per-week rehabilitation program that involved superficial heat, diathermy and deep massage (petrissage) of the affected areas, as well as stretching of the adductors and hip flexor muscles. Two weeks after the initial medical appointment he started eccentric Copenhagen adductor and core strengthening exercises.

Considering the result of the first nerve block, he additionally did 2 bilateral ilioinguinal, iliohypogastric nerve blocks with the concomitant block of the superficial and deep branches of the obturator nerve, with a weekly frequency. On the third week he was asymptomatic at the palpation of the adductor muscles, having only being submitted to 2 additional bilateral II and IH nerve blocks in the following weeks.

After one month, the athlete was pain-free at rest and during training sessions in flat sections. However he maintained pain relapses that prevented him from training in the following 2-3 days after track intervals with higher intensity or longer runs in hilly terrains.

Two months after the initial presentation of the pain, he quitted the World Trail Running Championships at the 65th km, due to the relapse of the same type of pain after a longer uphill section of the course.

After 3 months, the athlete was considering the retirement of the sport. On the same month, considering a possible iliopsoas entrapment, the athlete was submitted to a bilateral ultrasound guided injection of 5U of incobotulinum toxin in the iliopsoas muscle fibers that were adjacent to the ilioinguinal and iliohypogastric nerves (Fig. 1). The procedure used a 21G needle in a fascia iliaca block-like approach.[3]

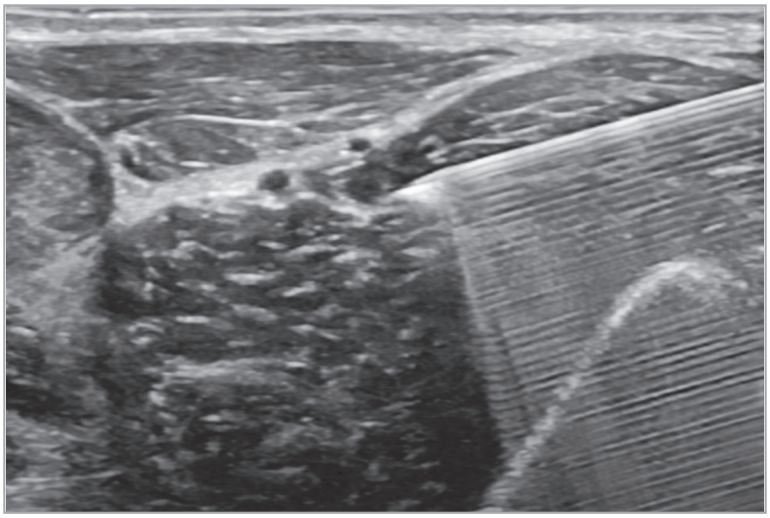


Figure 1 - Needle in-plane, in a fascia iliaca block-like approach, showing the iliopsoas muscle fibers that were injected with botulinum toxin.

Three days later, he tested himself in a 30 km hilly training course, being pain-free for the first time in this course in 3 months. Due to a referred reminiscent slight bilateral discomfort sensation we repeated the procedure 1 week after with 10U of incobotulinum toxin. Two days after the athlete was completely asymptomatic, running a total of 76 km with a positive climb of 7600 m in a 3-day event, 6 days after the procedure. The athlete denied feeling any weakness in hip flexion at any time, denying any fall during trainings and competitions after the botulinum toxin injections. Two months after the procedure, the athlete was still competing without any pain complaints.

Discussion

The II and IH nerves anatomy (Fig.s 2 and 3)

II and IH nerves are most commonly branches of the first lumbar nerve (L1) with 20% of the cases emerging from L2 or L3.[4] The nerves then pierce the psoas muscle and follow the posterior abdominal wall, anteriorly to the quadratus lumborum muscle. When the branches reach the lateral abdominal wall, their trajectory has a high level of variance. In the most frequent trajectory they run through the fascia transversalis, deeper to the transversus abdominis muscle, piercing this muscle in the anterior third of the iliac crest. The wide degree of variance of the trajectory of this nerves is the cause a variable success rate of the transversus abdominal plane nerve block: the classic block describes the injection in the fascia between the transversus abdominis and the internal oblique, missing the nerve bundle when it runs next to the fascia transversalis.[5] It is also important to note that in this region the nerves do not run in a single rounded nerve bundle but in multiple smaller bundles with ramifications between them, in a plexus-like form, that makes them sometimes difficult to be individualized with high-resolution ultrasound.[6]

After the antero-superior iliac spine (ASIS), the IH nerve runs through the abdominal wall to innervate the lower abdominal dermatome and the hypogastrium. However, the course between the ASIS and the inguinal canal is controversial for the II nerve: while some authors refer that it pierces the internal oblique muscle, running through the internal oblique/external oblique fascia,[4,7] others refer that it runs through the fascia iliaca, right next to the iliopsoas muscle.[8,9]

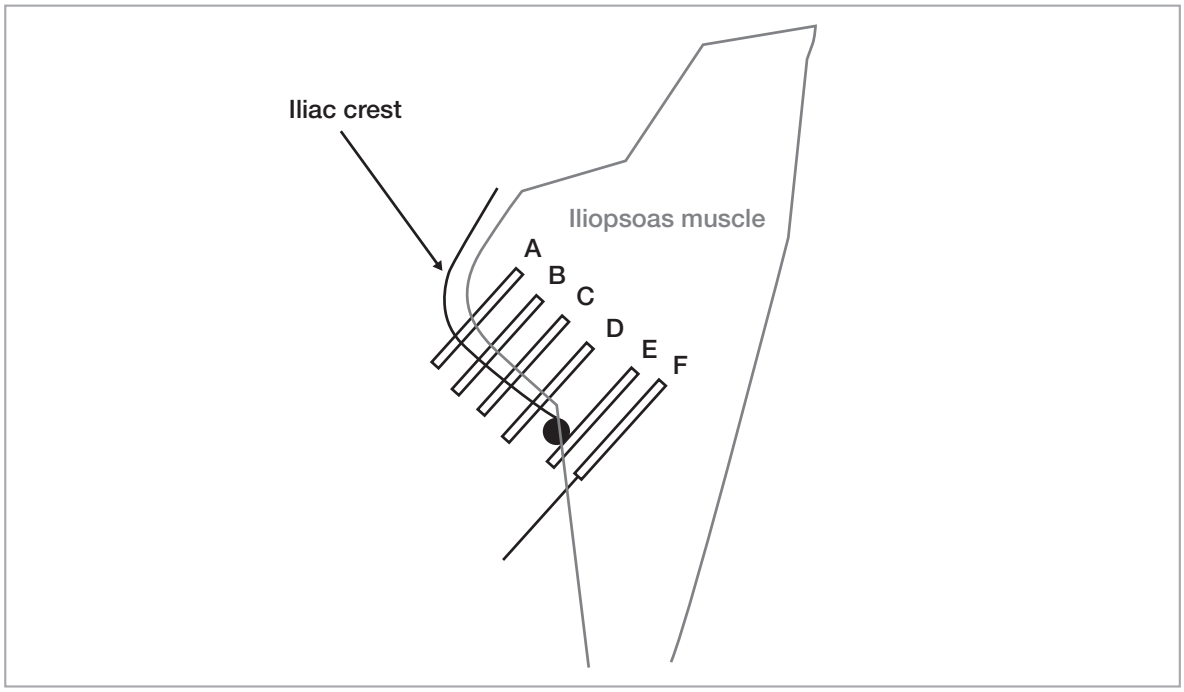
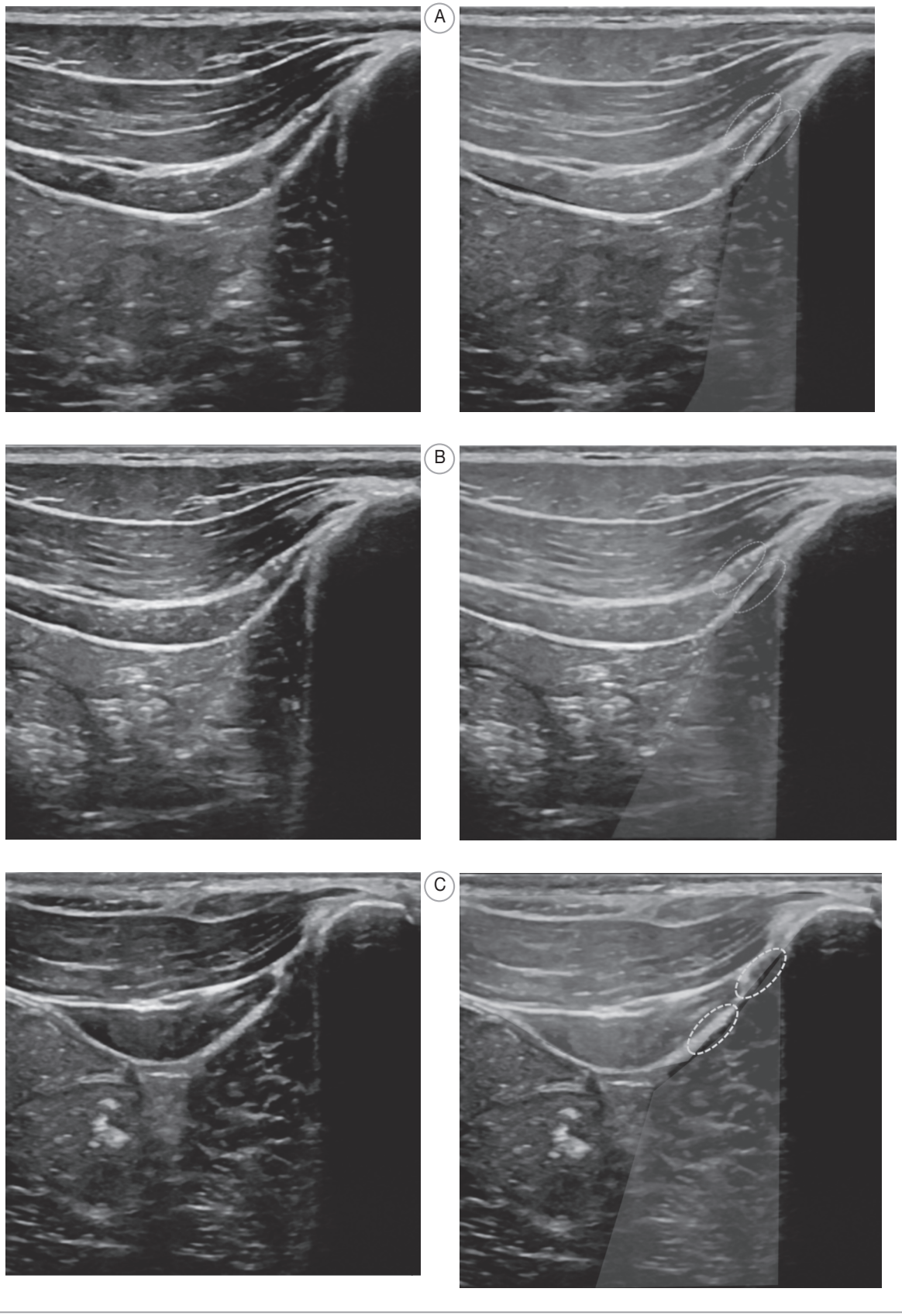


Figure 2 - Diagram of the ultrasound images of Figure 3. Image F is correspondent to the fascia iliaca block approach (original diagram).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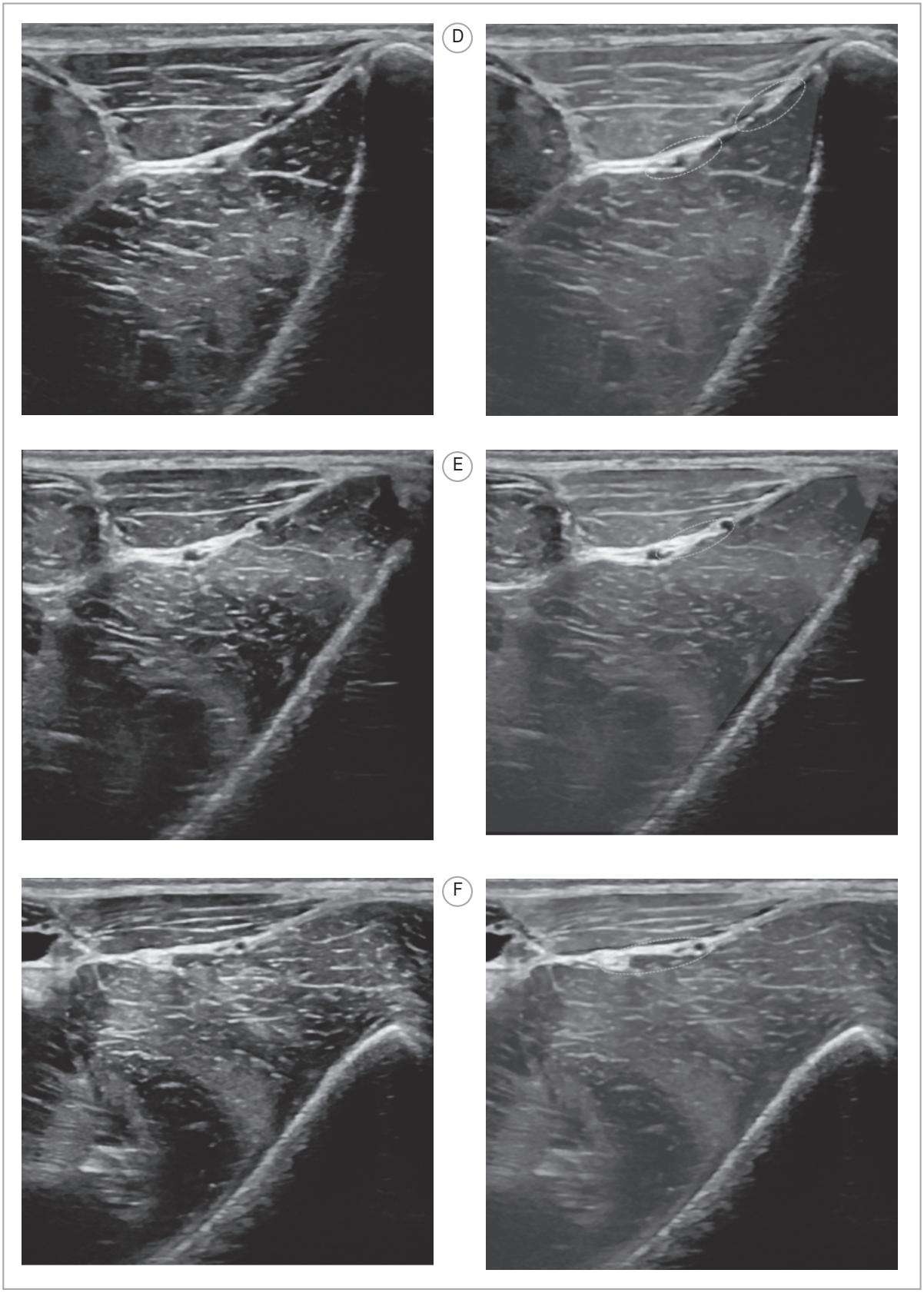

Figure 3 - Ultrasound examination of the II / IH nerve course of the presented case (red - iliopsoas muscle; orange - lateral abdominal wall muscles; dotted circles – II / IH nerves).

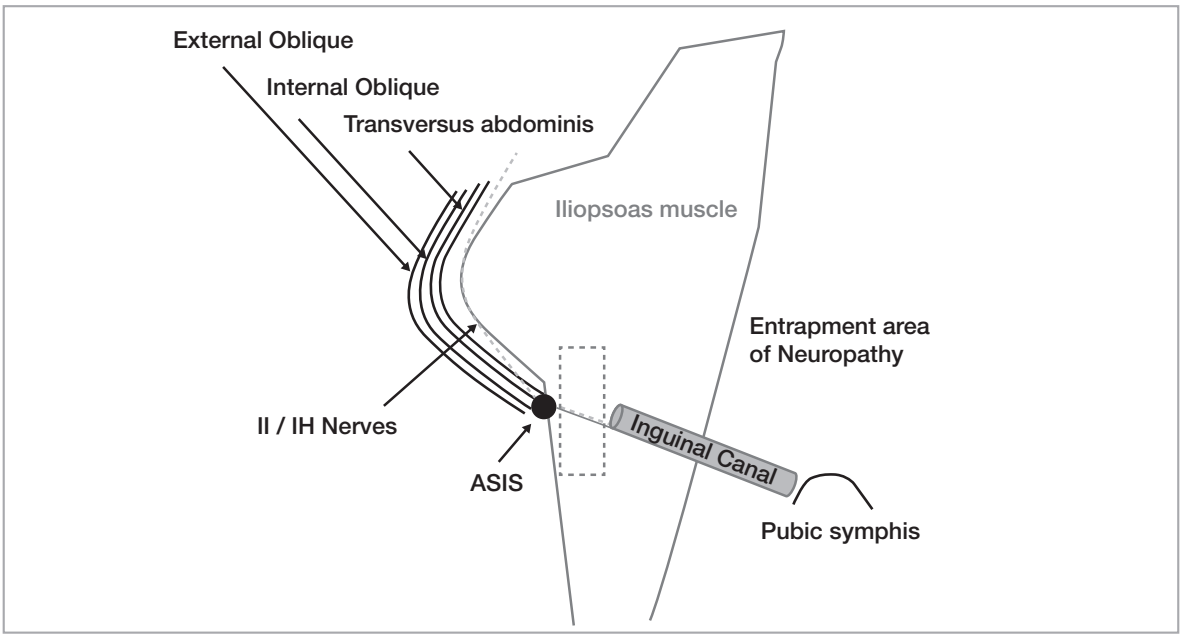

Figure 4 - Proposed entrapment area of neuropathy of the presented clinical case (original diagram).

The II and IH nerve entrapments

II and IH nerve entrapments as a cause of pain have been extensively described. Since the first descriptions of this pathology, the entrapment was thought to be made during the crossing of the transversus abdominis muscular plane.[2] However, the main compression forces in this area are made by a low abdominal pressure that is usually around 10-15 mmHg, a fact that makes this theory less plausible.[10] On the other hand, between the ASIS and the inguinal canal, these nerves run through a fascia between a mostly fibrous abdominal muscular wall and one of the most potent muscles of the human body, the Iliopsoas, hypothetically making this area prone to nerve entrapments (Fig. 4).

Clinical case considerations

In the presented case, the diagnosis of a neuropathic pain was made by the clinical definition of the affected painful area that clearly involved the iliohypogastric nerve (hypogastrium) and ilioinguinal nerve (Inguinal canal and inner part of the thigh). The absence of back pain clinically excluded a possible entrapment at the spinal or psoas muscle level. The ultrasound examination excluded other possible muscular lesions. The definitive diagnosis was made by the complete resolution of the pain after II / IH nerve block at the iliac crest level.

The brief relapse of the pain after the nerve blocks showed that there was a subjacent cause of entrapment that was still present. We hypothesized that the entrapment could be caused by the iliopsoas muscle in the trajectory of the nerve bundles between the iliac crest and the inguinal canal based on the following facts: 1. the pain was usually initially localized by the athlete to that area; 2. the pain was always elicited in uphill sections or faster track sessions that require additional hip flexion.

Regarding the botulinum toxin treatment regime, we started with a localized injection of 5U of incobotulinum toxin based on the fact that it would be enough to decrease the pressure in the nerve area but far from enough to significantly block the iliopsoas muscle. The good response to the initial treatment, made us choose the additional injection of 10U, that would still be far from a dose that would significantly block the muscle.

Definitive conclusions may only be made after the systematic replication of our findings.

Evolutionary considerations

The inguinal region is a well-known weak abdominal area that is prone to inguinal hernias, a fact that is associated with the transition from quadripedism to bipedism and the consequent 90º degree increase in hip extension.[11] This event also stretched the psoas muscle, transforming the crossing of the iliac bone in a pulley system, hypothetically increasing the tension against the abdominal muscles that insert in the inguinal ligament and consequently entrapping the II and IH nerves there.[12]

Conclusion

Ilioinguinal and iliohypogastric neuropathic pain may be a consequence of iliopsoas muscle impingement at the level of the inguinal ligament. Botulinum toxin injection of the iliopsoas muscle fibers adjacent to the nerve fibers may be a therapeutic option in refractory cases.

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