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Features of the surgical management of inguinal hernias developed in professional athletes

Particularităţile managementului chirurgical al herniilor inghinale apărute la sportivii de performanţă

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Abstract

Inguinodynia occurs in 5-18% of athletes practicing football, hockey and other sports, a fact that can finish their career prematurely. This is a controversial symptom in the clinical assessment of a patient in general and even more so in a patient practicing a performance sport. Inguinal pain can be attributed to a variety of osteoarticular, musculoaponeurotic, abdominal or uro-gynecological pathologies. Differential diagnosis involves multiple, complex investigations, not always available to the clinician. If the clinical appearance is not relevant, considering the physical profile of the patient, the physician may neglect a lesion easily identifiable in a normal patient. The therapeutic management of inguinal pain, until the identification of its etiology, may include physical rest, passive and active physical therapy, intravenously administered corticotherapy, and if the diagnosis of an inguinal parietal defect is confirmed, varied, open or laparoscopic surgery, tissue or alloplastic procedures will be performed.

Choosing the right therapeutic attitude and the right surgical procedure is sometimes difficult, and only a tailor-made, targeted therapy for each patient can lead to remarkable results. However, this paper aims to draw some general directions of the therapeutic attitude.

Keywords: inguinodynia, inguinal hernia, tissue reconstruction, alloplastic procedure.

Rezumat

Inghinodinia apare la 5-18% dintre sportivii ce practică fotbal, hochei şi nu numai, determinând chiar încheierea precoce a carierei sportive. Aceasta reprezintă un simptom controversat în evaluarea clinică a unui pacient în general şi cu atât mai mult la un pacient ce practică un sport de performanţă. Durerea inghinală poate fi atribuită unor variate patologii osteoarticulare, musculo-aponevrotice, abdominale sau uro-ginecologice. Diagnosticul diferenţial presupune investigaţii uneori multiple, complexe, nu întotdeauna la îndemâna clinicianului. Dacă aspectul clinic nu este unul relevant, având în vedere profilul fizic al pacientului, medicul poate omite un aspect lezional uşor identificabil la un pacient obişnuit. Managementul terapeutic al durerii inghinale, până la identificarea etiologiei acesteia, poate include repaus fizic, terapie fizică pasivă şi activă, corticoterapie administrată intravenous, iar în condiţiile în care se stabileşte diagnosticul de defect parietal inghinal, intervenţii chirurgicale variate, deschise sau laparoscopice, procedee tisulare sau aloplastice.

Alegerea atitudinii terapeutice corecte şi a procedeului chirurgical correct este uneori dificilă şi doar o terapie personalizată adresată ţintit fiecărui pacient poate conduce către rezultate remarcabile. Cu toate acestea, lucrarea de faţă îşi propune să traseze câteva direcţii generale de atitudine terapeutică.

Cuvinte cheie: durere inghinală, hernie inghinală, reconstrucţie tisulară, procedură aloplastică.

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Introduction

Chronic inguinal pain is a symptom that occurs both in athletes, with a frequency of 5-18% (Kachingwe & Grech), and in the general active population. It was interpreted as athletic pubalgia, pubic osteitis, Gilmore hernia, enthesopathy of Ashby's inguinal ligament, so it was considered to be a pubic inguinal pain syndrome (Campanelli, 2010). This syndrome is often found in ball sports, when shear movements or those involving a sudden change of direction are performed, and may originate in any inguinal structure: muscular, tendinous, bone, fascial, nervous, articular (Jansen et al., 2008; Campanelli, 2010).

This condition has been drawing more and more attention lately, given the risk of professional athletes of being forced to give up successful careers. With regard to the term hernia, there are many discussions; in general terms, a real hernia exists when there is a hernia sac with internal content. In the field of sports medicine, the term "hernia" is not universally accepted; in the event of such symptomatology - inguinodynia, a rather reserved attitude towards a precise diagnosis is adopted, most often by the term pubalgia or painful inguinal syndrome. The British Hernia Society recommends the term "inguinal tear" that better describes the damage to the posterior wall of the inguinal canal.

The inguinal canal is an interstitium located in the inguinal region of the antero-lateral wall of the abdomen. It has a length of 4-5 cm, 2 rings, superficial and deep, and it is crossed by the spermatic cord in men, and the round ligament of uterus in women. The anterior wall is represented by the aponeurosis of the external oblique muscle, covered by the superficial fascia. The posterior wall is formed by the transversalis fascia that coats the deep side of the transverse abdominal muscle. This fascia represents a weak point of the wall and is laterally strengthened by Hesselbach's interfoveolar ligament, and medially, from surface to depth, by the reflex ligament, the conjoint tendon and the Henle ligament. The upper wall in its lateral 2/3 is formed by the lower edges of the internal oblique muscle and the transverse abdominis, and in its medial 1/3 by the conjoint tendon, the latter being often used in tissue reconstruction of the posterior wall. The lower wall is represented by the inguinal ligament which is stretched between the antero-superior iliac spine and the pubic tubercle, it has the appearance of a concave ditch and its posterior slope is formed by the bandelette of Thompson or the iliopubic ligament, a condensation at this level of the transverse fascia. This bandelette is used in the anatomical reconstruction of the posterior wall of the inguinal canal, and the surgical risk of this maneuver is passing the thread through the femoral vein which is located under it (Ciomu & Bistran, 2008).

Inguinal hernia which develops in athletes is a pathology known for some time. In 1966, Cabot reported 202 cases in 42,000 Spanish soccer players who had been examined over a period of 30 years. The London physician, O. Jeremy A Gilmore, describes this lesion for the first time and offers a surgical solution (Preskitt, 2011).

Athletic hernia is defined as a musculoskeletal lesion of the inguinal canal floor. It is not a typical hernia because there is no protrusion of a hernia sac. Instead, its management is the same as for a usual inguinal hernia (Preskitt, 2011).

The most common cause of hernias in athletes is the weakness of the posterior wall of the inguinal canal due to the imbalance in strength between the stronger adductor muscles and the less developed lower abdominal muscles (Campanelli, 2010; Unverzagt, Schuemann and Mathisen, 2017; Van Der Donckt et al., 2003; Moeller, 2007) resulting in transversalis fascia tear.

Material and methods

The paper is a review of the specialized literature, studied using platforms such as Pubmed, Google Scholar, NCBI, SpringerLink and other international databases.

In particular, the studies of 2004-2017 were taken into account, representing both original articles and guides of sports medical associations.

Results

Most of the patients who took part in the studies that we identified in the literature were males, aged between 20 to 50 years. The defining diagnostic element was insidious unilateral pain, sometimes with referred pain at the level of the pubic tubercle and the inner thigh. Symptomatology was aggravated by effort and relieved by rest. Sometimes patients had pain in tensioning the long adductor. The classic presentation of inguinal hernia in the form of a pseudotumoral mass in the inguinal region, with impulsion and cough expansion, was often absent (Campanelli, 2010; Fon & Spence, 2000; Ekberg et al., 1988). Clinical examination identified the dilation of the external inguinal ring, but without a pseudotumoral groin mass. Of a series of 250 athletes who underwent surgery for chronic inguinal pain, only 4% had clear clinical signs of inguinal hernia (Jansen et al., 2008; Campanelli, 2010). Usually, pain had an insidious onset, but it could become bilateral, with some patients also experiencing scrotum pain.

The imaging investigations that proved to be the most relevant in identifying the hernia lesion and implicitly dictated a surgical solution were ultrasound, computed tomography and magnetic resonance imaging. Magnetic resonance, although being an expensive examination, which is extremely rarely used in the public health system in Romania for establishing the diagnosis of hernia, was proven in the studies we analyzed in this research superior to tomography because it visualizes all structures, the inguinal canal, inferior epigastric vessels, the inguinal ligament, inguinal rings, the spermatic cord, and allows differential diagnosis of pubic inguinal pain syndrome (Ekberg et al., 1988; Deysine, Deysine and Reed, 2002). The European Hernia Society recommends a standard protocol that initially consists of ultrasonography, and if this is negative, MRI associated with the Valsalva maneuver will be performed; if this investigation is also negative, herniorrhaphy will be taken into consideration.

We managed to analyze the inguinal pain etiologies and tried to divide them into several major directions (Campanelli, 2010; Brunt, 2016):

- muscular and tendinous lesions, especially of the long adductor muscle and the rectus femoris muscle (Swan

& Wolcott, 2007; Lilly & Arregui, 2002);

- osteitis pubis, more common in contact sports, involves adductor and gracilis muscles (Kesek, Ekberg and Westlin, 2002; Heise, Sproat & Starling, 2002; Ziprin, Williams and Foster, 1999);
- pelvic stress fractures, more common in athletes (van Veen et al., 2007);
- urological pathologies (prostatitis, epididymitis, urethritis, hydrocele) (Paajanen, Syvähuoko and Airo, 2004; Srinivasan & Schuricht, 2002);
- gynecological diseases (endometriosis, ovarian cyst, round ligament syndrome) (Jansen et al., 2008; Campanelli, 2010);
- connective tissue pathologies (rheumatoid arthritis, ankylosing spondylitis, Reiter's syndrome) (Swan & Wolcott, 2007; Heise, Sproat and Starling, 2002; Hackney, 1993);
- spinal and hip pathology (hip osteoarthritis, femoroacetabular impingement, acetabular labrum tear, femoral neck stress fracture, osteochondritis of vertebral bodies, L1 or L2 disc lesions).

Most authors whose papers we evaluated during the course of this work state that the initial therapeutic management of pubalgia should be physiotherapy for 6 to 8 weeks (Kachingwe & Grech, 2008; Jansen et al., 2008; McIntosh et al., 2000), but single physical therapy has not been proven to be effective.

A randomized study by Ekstand et al. comprised 66 football players, grouped into 4 categories: the first group had surgical treatment per primam, the second group had physiotherapy 3 times a week for 4 weeks, involving exercises for tightening the lower abdominal muscles plus non-steroidal anti-inflammatory therapy, the third group had daily physiotherapy including 3 types of exercises for lower abdominal muscles, and the fourth group was the control group.

Of the four groups, the third had a significant improvement in symptomatology after about 3 months, but only the first group had real long-term benefits from surgery, with the disappearance of symptoms after 6 months (Kachingwe & Grech, 2008). For patients who received conservative treatment and who did not show any improvement at the end of therapy, surgical treatment should be considered. As a conclusion of previous discussions, under the conditions of a clear diagnosis of inguinal hernia, surgery is indicated regardless of symptomatology.

Surgical treatment can be achieved by either the classic, open procedure, or laparoscopic approach, by tissue or prosthetic reconstruction; none of the surgical procedures cited in the literature was excluded from the therapeutic approach of inguinal hernia. Gilmore carried out a modified herniorrhaphy by reconstructing the aponeurosis of the external oblique muscle by strengthening the transversalis fascia and repairing the conjoint tendon. Other surgeons who approached the pathology that is the subject of this discussion and whose statements we identified in the literature used simple interrupted sutures at the ruptured edge of the external oblique fascia. The resumption of sports activity in these cases was in 5 weeks (Campanelli, 2010).

The surgical techniques currently used in athletic pubalgia are (Brunt 2016):

- primary tissue reconstruction:
    - Meyers
    - Muschaweck
- open approach with tension-free mesh;
- laparoscopic approach
    - totally extraperitoneal (TEP)
    - transabdominal preperitoneal (TAPP)
    - inguinal ligament release with TAPP (Lloyd)
- adductor tenotomy (partial or complete).

In Nam and Brody's literature review, both methods for repairing the posterior abdominal wall are included and analyzed: the open and laparoscopic approach. Over 90% of patients resumed their sports activity on average after 6 months. The open procedures used were Bassini and modified Bassini, modified Shouldice, Meyer pelvic floor repair with and without long adductor tenotomy. The open approach involves reattachment of the rectus abdominis, the conjoint tendon and transversalis fascia to the pubic tubercle and inguinal ligament. Often, the anatomical components are reinforced by a polypropylene mesh – the Lichtenstein procedure (Kachingwe & Grech, 2008). Particular attention should be paid to the ilioinguinal nerve, as it can be later embedded in the fibrosis around the mesh. If it is compromised anyway, its resection proximal to the internal inguinal ring may be considered (Brunt, 2016). Following alloplastic procedures, fewer recurrences occurred, and postoperative pain had a lower incidence. The laparoscopic approach is superior to the open one with respect to chronic pain and paresthesia. Surgeons who approach this type of pathology in sportsmen prefer the TEP technique, although the learning curve for TEP is longer than for Lichtenstein and even TAPP procedure. The convalescence period is clearly shorter in the case of laparoendoscopic interventions.

In general, in the surgical approach of parietal defects, alloplastic procedures are indicated for patients over 30 years of age, but in the case of athletes, this type of reconstruction may be considered for use in young men over the age of 18 years. However, young athletes in the period of growth will also be subjected to the tissue procedure (Brunt, 2016).

Young patients aged 18-30 years with unilateral hernia who underwent tissue surgery have a recurrence risk of at least 5% 5 years after the procedure was performed. In fact, patches less than 8x12 cm embedded laparoscopically are the cause of a higher rate of recurrence compared to those inserted using the Lichtenstein procedure (Simons et al., 2009).

The Baylor University Medical Center in Dallas tracked 100 athletes with inguinal hernia, operated over 12 years using the alloplastic procedure, the modified Lichtenstein technique. Patients were analyzed every 2 weeks and it was observed that already in the 3rd to 4th week of analysis, most patients no longer had postoperative pain.

They attended a cardiovascular exercise program to increase resistance. From the 6th week they could run. 98% of patients resumed their sports activity and were able to compete again after about three months (Preskitt, 2011).

Meyers and colleagues (Philadelphia) have the greatest surgical experience in this pathology that is the subject

of this article. 5200 athletes were operated between 1986 and 2008, of which 95.3% resumed their activity after 3 months (Bittner, 2016).

Muschaweck and Berger in Munich, Germany, present the postoperative evolution of 129 athletes operated using a minimal reconstruction technique - tissue process, between 2008-2009. Patients were able to lift up to 20 kg on the first postoperative day, and two days later they could pedal the bicycle. The mean resumption of activity for these patients was 18.5 (Brunt, 2016).

Over the course of 18 years, a team in Montreal has operated on 98 professional hockey players using the Lichtenstein procedure. Patients had a mesh of polytetrafluoroethylene (PTFE) inserted in the inguinal canal. The intervention also involved ilioinguinal neurectomy. 97 of the 98 patients returned to competition, only 3 of the patients had recurrent symptoms (Brunt, 2016).

Disscusions

The European Hernia Society describes a lower rate of recurrence for alloplastic procedures versus tissue procedures, and we agree with their perspective. In our clinic, a general emergency surgery clinic, there are no surgeries performed using tissue procedures. For this kind of treatment, the same society recommends the Shouldice technique. Although endoscopic techniques have a lower rate of postoperative complications regarding wound infections and hematoma than the Lichtenstein technique, they have a higher incidence of seroma, a longer learning curve and a longer duration of intervention than the open technique.

Concerning this discussion, for Romania, an impediment to practicing laparoendoscopic techniques is represented by the costs associated with these interventions; usually the prosthesis is not covered by the health insurance system (Simons et al., 2009).

From a cost-efficacy point of view, in patients with unilateral hernia, the alloplastic open procedure is preferred, but in patients who have physically demanding jobs, such as athletes, especially in bilateral disease, the laparoscopic approach is desirable. In terms of cost-utility, the TEP technique is preferred.

The benefits of TEP versus TAPP take into consideration several aspects. In the studies whose results we evaluated, following TAPP, the pain score at 6 hours, 24 hours, 1 week and 6 weeks, respectively, was higher than in the case of TEP, and the need for parenterally administered analgesics was higher in the case of TAPP. Scrotal edema was more common after TAPP. The duration of surgery and hospitalization was shorter for TEP than for TAPP. Bansal et al. observed a single recurrence in his study group after TAPP and no recurrence after TEP (Bittner, 2016).

The incidence of seromas was higher after TEP; an expectative attitude was adopted for them. Drainage is not indicated. The need for TEP conversion to TAPP occurred due to peritoneal adhesions and posterior wall injuries of the rectus abdominis.

There were no significant intraoperative visceral complications in any of the laparoscopic techniques (Simons et al., 2009; Bittner, 2016).

In terms of quality of life, there were no major differences between TEP and TAPP. A significant improvement approximately 3 months post-surgery was observed in both procedures. Unlike TEP, TAPP experienced an improvement in all aspects of life, with the exception of vitality and social functions (Bittner, 2016).

Ten articles in the period 1993-2011, which included 196 operated patients, concluded that laparoscopically operated patients resumed their sports activity after 4-8 weeks (Muhammad, 2012). At the same time, 90% of the patients who underwent open surgery had a good evolution and returned to sports competitions.

Even so, there is no consensus on the best surgical method. The British Hernia Society showed in 2014 that normal activity could be resumed faster following laparoscopic interventions, but there were no well-defined case-control studies to prove this. The choice of treatment depends on the patient's choice and on the surgeon's experience in the type of procedure chosen.

Conclusions

1. Athletic pubalgia requires a multidisciplinary approach, comprising a specialist in sports medicine, a physiotherapist, an orthopedist and a surgeon.
2. Conservative treatment consisting of rest, injectable, oral or topical anti-inflammatory therapy, physiotherapy, and physical exercise is recommended for all patients at the start of therapy. Physical recovery alone has not proven to be useful in the long run.
3. In the case of inguinal hernias in athletes, surgical treatment is the only one proven to be effective and offers the best chance of resuming sports activities at a level close to that before the occurrence of this pathology. In the case of unilateral or bilateral primary hernia, as well as recurrences, Lichtenstein or endoscopic alloplastic procedures are preferred.
4. Postoperative inguinodynia is rarely encountered after laparoscopic surgery and also after the use of polypropylene meshes regardless of the procedure used.
5. In the short and long term, the benefits of TEP demonstrate the superiority of this technique versus TAAP, especially with regard to inguinodynia in athletic patients.
6. The resumption of sports activities following surgical treatment has been revealed to be approximately 4 weeks in most studies.
7. Exercise of the abdominal-pelvic muscle and hip muscle has greatly improved recovery and leads to a faster resumption of sports activities, similar to that before the development of the disease.

Conflicts of interests

No conflict of interests.

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