CASE REPORT

Fatigue fracture of both branches of the left pubic bone and ischium with co-existing damage of labrum of hip joint and pars fracture L5 in a long-distance athlete – a case report

Złamanie zmęczeniowe obu gałęzi kości łonowej lewej i kulszowej ze współistniejącym uszkodzeniem obrąbka stawu biodrowego i kręgoszczeliną L5 u lekkoatletki długodystansowej – opis przypadku

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Abstract

Fatigue fractures of the pelvis are significant diagnostic problem due to their rare occurrence. The specificity of these fractures requires proper imaging diagnostics in order to make final diagnosis and to implement appropriate treatment. The work presents a case report and diagnostic-therapeutic procedure in a 28-year-old long-distance athlete with a fatigue fracture in the pelvic region, accompanied by damage to the labrum of left hip joint and with presence of the bilateral pars fracture L5. Extension of imaging diagnostics with arthro-MR, CT and densitometry confirmed the fatigue character of the fracture and enabled the implementation of proper treatment, and thus obtained fracture union and the possibility of returning to sports activities.

Key words: fatigue of pelvis fracture, lip lesion, pars fracture, diagnostic difficulties.

Streszczenie


Słowa kluczowe: złamanie zmęczeniowe miednicy, uszkodzenie obrąbka, kręgoszczelina, trudności diagnostyczne.
Introduction

Fatigue fracture (stress/marching) is damage to bone tissue not related to the trauma, and resulting from repeated microcracks in the bones, caused by their excessive and long-term overloading. General division of fatigue fractures distinguishes healthy bones and bones affected by the disease process. In the first group we deal with the often repeated application of force to a biologically healthy bone with insufficient time for regeneration and adhesion. The second group of fractures occurs in osteoporotic bones, in fibrous dysplasia, osteomalacia and other metabolic diseases, resulting in a relatively low breaking force [1]. Typical locations of fatigue fractures are: metatarsal bones, femurs, tibia, sagittal, pelvic bones and spine [2]. Fatigue fractures most often occur in athletes and professional soldiers who are also often exposed to them [1,2]. In soldiers stress fractures occur during repeated running or marching exercises [2,3]. Most of fatigue fractures also applies to long-distance runners and football players and can be recognized in both amateur and professional athletes. Based on research conducted by Japanese scientists from Keio University in Tokyo, on a group of 11,000 athletes evaluated in 1991-2001, fatigue fracture was found in 1.8% of women and 1.9% of men. The average age of patients with this type of fracture was 20 years, and was found in 1.8% of women and 1.9% of men. The average age of patients with this type of fracture was 20 years, and was found in 1.8% of women and 1.9% of men. The authors mentioned above drew attention to the influence of the type of practiced sport in relation to the location of the fracture. According to their observations, the most common among basketball players are olecranon fractures of the ulna, fractures of the medial ankle and tibial shaft, which are also common damage in volleyball and tennis players. In athletes and footballers, tibia and pelvic fractures most often occur [4]. The percentage of fatigue fractures found in the pelvic area ranges from 1% to 2% of all adult skeletal fractures of this type. They are rarely diagnosed fractures. Most often they concern the lower right branch of the pubic bone, and they are more common in women [5,6].

Aim of the work

The aim of the study is a case report and diagnostic-therapeutic algorithm in a 28-year-old long-distance athlete with a fatigue fracture in the pelvic region, accompanied by damage to the labrum of the left hip joint and with the presence of bilateral pars fracture L5.

Case report

A 28-year-old long-distance athlete began to complain about severe pain in the left groin, radiating to the buttocks, increasing during running, or during bending of the left hip joint. Symptoms reported above could also suggest damage to the labrum of the left hip joint. According to the interview, symptoms lasted for 4 weeks without any visible injury. Pain at rest was described as discomfort and significantly increased during training. In addition, the interview shows moderate lumbar spine pain for many years. In contrast, pain in the lumbar region should direct the diagnosis towards the further evaluation of the spine L / S.

The patient trained long-distance running since the age of 15 during the school at a professional level, then, regularly, running around 50 km a week on a 5-6 day cycle with 1-2 days of rest. At the time of symptoms she prepared for the marathon run, gradually increasing the intensity of running to about 80 km/week, adding the daily march of 6-10 km. Trainings at that time included long distances, one time up to 30 km and running strength exercises. Due to the winter season, the training took place on hard surfaces. The body weight of the runner was 57 kg with a height of 168 cm. There were no eating, menstrual cycles and bone tissue metabolism disorders.

Physical examination of the left hip showed positive manual tests on the basis of which suspicion of damage to the acetabulum of the hip was aroused. Diagnostics began with pelvic x-ray with hip joints in the A-P projection in the lying position and axial projection of the left hip joint, indicating a fatigue fracture of both branches of the left pubis bone (Fig. 1).

Fig. 1. X-ray of the pelvic joints in the A-P projection in a lying position and axial X-ray of the left hip with visible fatigue fracture within both branches of the left pubic bone.

After another 4 weeks, artro-MR of the left hip joint was performed to assess the acetabular hemiculm. It confirmed the damage in the anterior and upper part. The treatment in the form of running interruption for a period of 2 months was implemented. Oral medications (Osteogenon 2 x 1, Calperos 1000 1 x 1) and physiotherapeutic treatments (calcium iontophoresis + magnetic fields) on the fracture area were prescribed. Performed parallel astro-MR of the left hip joint for the assessment of the acetabular sarcoma confirmed its damage in the anterior and upper part as well as confirmed the fatigue character of fractures (Fig. 2).
The previously reported problems of the left groin have completely disappeared, which should be explained by clinically silent damage to the labrum of the left hip joint. Fracture of the upper and lower branches of the pubic bone was clearly cause of the discomfort. After a further 8 weeks, densitometry of the spine in L1-L4 section was performed, which ruled out osteopenia. It showed normal T-score values, appropriate for the patient’s age. Radiological diagnostics did not include skeletal scintigraphy due to lack of consent of the patient. Finally, the patient resumed running without complaining about previously occurred symptoms within the left groin.

**Discussion**

**Groin pain and damage to acetabular labrum of hip joint**

The most commonly reported symptom in this group of patients is uncharacteristic groin pain. In 20% of athletes who report such symptoms, the diagnosis confirms the damage of the acetabular labrum [7]. In the described runner, lesions within the hip joint also occurred, which may arise as a result of repeated torsional injuries of hips. Tearing of the labrum due to repeated micro-injuries during excessive extension movements, i.e. hyperplasia and excessive flexion or maximum abduction in the joint, often occurs in athletes [8]. The study shows that running does not cause injuries to the acetabulum of hip joint itself, but if there is discrete instability of the hip joint, it may deepen minor damage resulting in symptomatic tearing of the labrum and even damage to femoral head ligament. This damage may be caused also by subtle acetabular dysplasia [9]. During the examination of the hip joint of the patient who reported groin pain manual tests should be performed. The positive result of these tests suggests damage to the labrum in the anterior and anterolateral part. These tests include slow bending with simultaneous restoration and internal rotation of the thigh and quick bending of the hip with maximum abduction and external rotation, and after rectification, abduction with internal rotation [9,10].

MRI with contrast of the hip joint or arthroscopy is an imaging test confirming the damage of the labrum [11]. Due to the location of the pain in the groin of the runner, a decision was made to perform a pelvic magnetic resonance examination with contrast of the left hip joint. The result of the imaging examination clearly confirmed the presence of damage to the labrum in the anterior and anterolateral part. The most common location of damage to the acetabular labrum is its front part, in particular the anterior-upper quadrant, often changes can also affect the posterior part of the labrum [7,11]. Treatment of choice may be to remove...
the damaged part of the labrum of the hip joint during arthroscopic treatment or conservative treatment consisting of limited physical activity with temporary limited weight-bearing limb [9,12].

**Back pain and presence of L5 pars fracture**

During follow-up CT scan of the pelvis in the described runners, which aimed to illustrate the fracture area after a break in training, the presence of bilateral spondylolysis at L5 was diagnosed. The athlete confirmed the periodically occurring pain in lower part of spine, which has been occurring since the age of 20, mainly after overload and prolonged standing.

Damages to interspinous part of the vertebrae or pars fracture are often causes of back pain in long-distance runners. They are located within the IV or V vertebra in the lumbar region of the spine and sacrum and may be present on one or both sides. Their formation may be due to overlapping loads which can cause stress fracture at this place [13,14]. Pars fractures are usually silent in aclassic radiological examination, but they can be determined by performing the CT scan of the lumbosacral spine. In order to recognize pars fractures magnetic resonance can also be used or, for more accurate detection of fractures in the interspinous part of the vertebrae, Single Photon Emission Computed Tomography (SPECT) can be used. Bone scintigraphy, due to the lower spatial resolution, seems to be less useful [15,16,17]. Pars fractures are most often treated conservatively, surgery is considered only in selected cases [6].

**Diagnostic imaging of pelvic fatigue fractures**

The first step in the diagnostic imaging of fatigue fractures in the pelvic area, as in other fractures resulting from the acute trauma mechanism, is the performance of classical pelvic X-ray in the A-P projection in the lying position. Correct diagnosis in the case of fatigue fracture with use of classical radiology is difficult and most often it requires confirmation by magnetic resonance or skeletal scintigraphy [2,18]. In the case of fatigue fractures, the proper diagnosis is hampered by a short history of non-characteristic pain and lack of dislocation of bone fragments. For the above-mentioned reasons, it seems that a fairly large percentage of pelvic stress fractures may be unrecognized in the initial diagnostic procedure [19]. Because of the lack of a history of trauma in an interview, a significant proportion of fractures of this nature can be treated as damage to surrounding soft tissues and therefore improperly treated.

Performed in 4 week, classic X-ray of the pelvis of the left hip in a-p and axial projections in the described runner showed fracture union and led to the extension of diagnostic imaging by magnetic resonance (MR). After analyzing reported pain in the left groin and left buttock, thorough examination of the pelvis and left hip joint, a decision was made to conduct a magnetic resonance imaging with concurrent administration of contrast to the left hip joint (arthro-MR) after 8 weeks. Among the above-mentioned types of imaging examinations, the magnetic resonance is more helpful in the diagnosis of this type of bone tissue damage, which additionally illustrates the fissure fracture and periosteal swelling, indicating a previous fracture in the acute phase. Pain in the groin or buttock that is significantly worse during running without a traumatic background in the athlete, especially female, should arouse suspicion of this type of fracture and suggest a magnetic resonance or scintigraphy of the skeleton.

In the diagnostic imaging for the assessment of pain symptoms the arthro-MR turned out to be the most important examination of the hip joint, it confirmed the pelvic fatigue fracture and damage to the labrum. In every runner reporting non-specific symptoms within the groin, buttock and lower part of the lumbosacral spine, apart from physical examination and X-ray, which may not be sufficient to make a correct diagnosis, a computer tomography and magnetic resonance with a contrast of the hip joint should be perform.

**Treatment of patients after fatigue fracture**

Treatment of athletes with fatigue fracture consists of temporary running interruption and elimination of factors that could contribute to fracture. Most of this type of bone tissue damage is managed by non-surgical methods. Most often, the break in training is 6-8 weeks, and during it less demanding sports activities are recommended such as cycling, swimming, exercises on the upper muscular parts of the body and running training in the water. Among physiotherapy treatments the positive effect of the magnetic field is shown. Resumption of training should be slow, smooth and be limited again when pain occurs [20,21].

In the presented long-distance athlete, the professional running training sessions were interrupted for a period of 8 weeks. A cycle of ten series of calcium iontophoresis was applied on the fracture area, which was then repeated. The effect of the applied therapy in the runner was a total withdrawal of pain in the area of prior fracture, which in the control computed tomography of pelvic performed after 16 weeks showed complete union with the reconstruction of the fracture area, which in turn allowed to start training gradually.

In the case of fractures located in places with poorer blood supply, there is a greater likelihood of the lack of bone union and the possibility of ischemic necrosis. In such cases, it is appropriate to use immobilization and to consider surgical treatment [6,12].
Summary

Physical activity is important in the prevention of all civilization diseases and is an important element of many people’s lives, both those related to professional sport and those who choose sport as a way of spending their free time. Its beneficial effect is obvious and requires no comment. Unfortunately, sometimes sports, especially professional sports, are associated with the occurrence of injuries. Besides acute musculoskeletal injuries, injuries that arise due to overloading should also be taken into account. Running, however, is one of the oldest disciplines that is generally available and now widely promoted. It should be taken into account that more and more patients with non-specific symptoms, which will be associated with the type of practiced discipline, will be referred to orthopedic and sports medicine specialists. In the case of female patients referred to the above-mentioned specialists, the physiological differences in this group, with particular the hormonal profile, should be taken into account. Among sports physicians, and above all among trainers, it is worth emphasizing the education of young female athletes, not only in the implementation of the training plan, learning proper running technique, maintaining proper body weight but also regarding proper nutrition and regularity of menstrual cycles. Based on the example of the description of our case and the multitude of potential causes of pain in the female athlete, it should be considered whether there is a pattern of the so-called “runner’s hip”.

Conclusions

1. In the case report, the final cause of pain in the groin was the fatigue fracture of both branches of the left pubic bone, despite the occurrence of several disease found in diagnostic imaging.
2. Artro-MR diagnosis of pelvis confirmed the damage to the acetabular labrum of the left hip joint, but was clinically silent.
3. CT scan clarified the cause of the symptoms occurred in the L-S spine segment.

References