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CASE REPORTS

Avascular necrosis of the femoral head with unusual symptoms: a case report

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Abstract

Background. Avascular necrosis of the hip (AVNH) is a debilitating osteoarticular disease that has variable risk factors, but not a very specific pathogenetic pathway. Many management options were proposed and studied for AVNH treatment, but with limited or inconsistent results, as there is not a current treatment guideline. The specific symptoms of AVNH are pain and reduced range of motion of the hip, usually painful rotations of the hip and sometimes an affected walk. In some cases, patients can present with non-specific or atypical symptoms, which can make the diagnostic difficult. The golden standard imaging for AVNH diagnostic is magnetic resonance, but simple radiography can be sufficient in many cases.

Case presentation. We report a case of a 62 years old male, without significant personal pathological history or alcohol or other substances abuse, with no chronic treatment, with a confirmed arthritis of both knees. The patient presented with mechanical pain of the left shoulder and both knees, with no present or past symptoms of the hips. The patient was evaluated by a rehabilitation medicine specialist and a painful and limited range of motion of the left hip was found. Blood works and radiological investigations were done, which confirmed the diagnostic of an avascular necrosis of the left hip, arthritis of both hips and left shoulder.

Conclusions. This case, of a generally healthy male, with no toxic behavior and no symptoms at the hip region, but with clear signs of an affected left hip at clinical examination is a particular one by correlation with an atypical presentation of an avascular left hip necrosis, which emphasizes the crucial importance of a detailed and complete physical examination of a patient, even in the case of poor or none symptomatology.

Keywords: hip pain, avascular necrosis, atypical symptoms, risk factors.

Abbreviations: AVN-avascular necrosis, CD-core decompression, CT-computer tomograph, DHS-dynamic hip screw, ESR-erythrocyte sedimentation rate, ESWT-extracorporeal shockwave therapy, LIPUS-low-intensity pulsed ultrasound, LLLT-low level laser therapy, MCS-multiple cannulated screws, MRI-magnetic resonance imaging, MSCs-mesenchymal stem cells, PEMF-pulsed electromagnetic fields, PRP-platelet-rich plasma, ROM-range of motion, SPECT-single-photon emission computerized tomography, THA-total hip arthroplasty, VAS-visual analogue scale.

Introduction

Avascular necrosis (AVN) of the femoral head is a form of aseptic osteonecrosis, produced by the perturbation of the blood supply to the proximal femur. Avascular necrosis of the hip (AVNH) most commonly occurs after corticosteroids treatment, trauma (especially fractures or dislocation of the hip joint), in patients suffering from autoimmune diseases like lupus erythematosus, or patients that abuse alcohol. AVNH has the effect of osteocyte death and usually impairs physically active men, aged between 20 and 40 years; if it is not treated in due time, it can lead to secondary hip arthritis in 70–80% of patients (Liu et al., 2022).

Pathophysiologically, there is no clear mechanism of AVNH onset. The blood supply of the femoral head reaches from the medial and lateral circumflex branches of the deep femoral artery, which derives from the femoral artery. The bone necrosis happens after the blockage of the subchondral microcirculation, especially retinacular vessels, leading to microfractures in the osteonecrosis area (Liu et al., 2022).

Corticosteroid treatment is one of the most common causes of AVN, with a dose-dependent effect (Guggenbuhl

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et al., 2021). It is considered that corticosteroids interfere with the differentiation of adipocytes, by enhancing their size and number, leading to intracellular accumulation of lipids, which increases the pressure inside the bone cells. Consecutively, the vascular endothelium is injured, resulting in ischemia, vascular thrombosis and local coagulopathy (Seamon et al., 2012). However, AVN does not occur in all patients treated with corticosteroids, other factors being involved, like comorbidities and genetic polymorphisms. For example, patients with lupus erythematosus treated with corticosteroids have a higher risk of developing AVN than patients with other medical conditions (Cohen-Rosenblum & Cui, 2019).

Another common factor that is linked with an increased risk of AVN is alcohol abuse, responsible for about 20-30% of AVN, but the induction mechanism is not clear. One of the theories implies that alcohol augments the intracellular accumulation of triglycerides, stimulating the differentiation of stromal cells into adipocytes and reducing osteogenesis (Wang et al., 2003).

Anemia can increase the chances of developing AVN by approximately 60% compared to non-anemic patients. Abnormal blood cells present in sickle cell anemia limit the local blood flow, which produces ischemia (Adesina et al., 2017). On the other hand, in pediatric population, a relative rare disease that predisposes at AVN is encountered, respectively Legg–Calvé–Perthes disease (Rampal et al., 2017).

A frequent cause for AVNH is trauma that leads to a fracture or dislocation of the femoral head, which interrupts the blood supply to the femoral head. Displaced fractures of the femoral neck have a higher risk of AVNH than the non-displaced fractures (14.7% vs. 6.4%) (Slobogean et al., 2015). For the treatment of displaced hip fractures, femoral neck fixation is used with good results regarding functionality and vascular supply recovery. Dynamic hip screw (DHS) or multiple cannulated screws (MCS) are the techniques utilized in non-displaced fractures (Chen et al., 2017), but there are many cases reported in which DHS was associated with a greater risk of osteonecrosis, because it disrupts the blood supply to the femoral neck. However, in cases that used DHS with autogenous fibular strut graft, there was no AVN observed, probably due to the osteoconductive and osteoinductive potential of the fibular graft, that permits revascularization (Siavashi et al., 2015).

Other techniques used for the fixation of intracapsular femoral fractures of the femoral head are also linked to a higher incidence of AVN, like the use of cannulated screws (Ju et al., 2020). A modified cannulated screw method that involves a deep circumflex iliac artery bone grafting appears to decrease the odds of AVN (Li et al., 2018).

A time between surgery and injury longer than 24 hours seems to be associated with a greater risk of AVNH (Migliorini et al., 2022). Moreover, some factors that are present in patients with femoral head osteonecrosis were identified to be linked to failure of initial surgical management and conversion to total hip arthroplasties (THAs) (Migliorini et al., 2022). A deficiency on hip function, a bigger VAS (visual analogue scale) score and long-time symptoms were related to an increased rate of treatment failure and conversion to joint replacement. In contrast, female gender seems to have a protective role against treatment failure and conversion to THA, but there is not a clear explanation for this aspect (Migliorini et al., 2022).

Interestingly, in a study, the AVNH rate in children appears to be higher than the average rate in adults (Bali et al., 2011). A possible explanation for this might be the fact that in children, the blood supply may be disrupted more easily after a hip fracture, as they lack the intraosseous blood vessels that supply the femoral head, vessels which are present in adults (Bali et al., 2011).

Regarding the symptoms of AVNH, typical clinical presentation includes hip pain of different intensities, stiffness and sometimes crepitus. The physical examination usually reveals limited range of motion (ROM) at the hip and pain when mobilizing the hip, particularly with a forced internal rotation (Lamb et al., 2019).

The imaging techniques used for detecting bone necrosis signs involve X-ray, magnetic resonance imaging (MRI), computer tomography (CT) and radionuclide examinations. Commonly, the investigation for AVN begins with radiography, an accessible and non-expensive technique, but less sensitive that MRI, which usually shows the necrotic changes that occur in later stages of AVN. Radiography may show the "crescent sign", a subchondral radiolucency indicating subchondral collapse (Zhao et al., 2020).

Even though in some cases radiography can be enough for diagnosing AVNH, MRI is the gold standard for osteonecrosis diagnosis because it helps differenciate AVN from other diagnoses that may mimic it, like bone bruises or transitioned osteopenia (Zhao et al., 2020). Moreover, MRI enables an early diagnosis of AVN, in stages in which the modifications are not visible on radiography. Usually, MRI imaging of AVN shows limited subchondral linear-shaped low signal intensity in T1 and double-line sign in T2 (Zhao et al., 2020).

A study from 2008 revealed that single-photon emission computerized tomography (SPECT) is most useful that computer tomograph for predicting AVN prognosis in patients aged over 58 years and with displaced fractures (Dasa et al., 2008). Early stages and disease progression of AVN can also be evaluated by positron emission tomography (PET) or technetium bone scans (Zhao et al., 2020).

The differential diagnosis of AVNH is complex and includes: hip osteoarthritis, ankylosing spondylitis of hip joint, osteoarthritis secondary to acetabular dysplasia, femoroacetabular impingement syndrome, incomplete fracture in subchondral bone, transient osteoporosis or bone marrow edema, chondroblastoma of the femoral head (Liu et al., 2022).

The classification of AVN is based on the Steinberg University of Pennsylvania system, which includes six stages with the assessment of involvement within each stage. The classification also divides the AVNH stages into mild (<15% radiographic involvement of the femoral head), moderate (15-30% involvement of the femoral head), and severe (>30% involvement of the femoral head), Table I (Steinberg et al., 1995).

Table I
Steinberg's classification of avascular necrosis of the femoral head (Steinberg et al., 1995; Liu et al., 2022).

Stage	Criteria
0	Normal or nondiagnostic radiograph, bone scan, MRI
I	Normal radiographs; abnormal bone scan and/or MRI
	IA—Mild (<15% of femoral head affected)
	IB—Moderate (15% to 30% of femoral head affected)
	IC—Severe (>30% of femoral head affected)
II	Cystic and sclerotic changes in the femoral head
	IIA—Mild (<15% of femoral head affected)
	IIB—Moderate (15% to 30% of femoral head affected)
	IIC—Severe (>30% of femoral head affected)
III	Subchondral collapse (crescent sign) without flattening
	IIIA—Mild (<15% of femoral head affected)
	IIIB—Moderate (15% to 30% of femoral head affected)
	IIIC—Severe (>30% of femoral head affected)
IV	Flattening of femoral head
	IVA—Mild (<15% of femoral head affected)
	IVB—Moderate (15% to 30% of femoral head affected)
	IVC—Severe (>30% of femoral head affected)
	Joint space narrowing and/or acetabular changes
	VA—Mild
	VB—Moderate
	VC—Severe
	Advanced degenerative joint disease

AVNH treatment includes non-surgical management and different types of surgical interventions. The conservative treatment of AVNH is based on providing pain relief, enhancing hip function, preventing femoral head from collapsing and necrotic changes (Sen, 2009). The non-surgical treatment of AVN usually addresses early stages of disease, corresponding to grades 0 and I on the Steinberg scale, in patients without a history of trauma. From a physical point of view, some authors consider that restriction in weight-bearing using a cane, crutches, or a walker can be benefic for delaying disease progression, whereas others appreciate that restraining joint reactive forces has no effect on disease progression (Sen, 2009).

The pharmacological treatment of AVNH can include multiple agents, like vasodilators, bisphosphonates, anticoagulants, statins and other, which are mostly used in early stages of the disease (Sen, 2009), but w ith reduced effectiveness and no clear recommendations for their use in AVNH.

Bisphosphonates inhibit osteoclastic activity and reduce bone turnover, thus preventing woven bone formation, but the literature results are controversial, with opposite results and with no clear evidence regarding dose and duration of bisphosphonate therapy (Liu et al., 2022). In some studies, alendronate appeared to be effective in preventing femoral head collapse compared to placebo (Lai et al., 2005). Other studies did not confirm these results, finding no significant differences in radiographic outcomes, prevention of THA, and improvement of quality of life between the placebo and treatment group (Chen et al., 2012). On the other hand, osteonecrosis is one of bisphosphonates' side effects, especially at the jaws.

Statins therapy in AVNH seems to inhibit corticosteroid-induced adipogenesis and osteonecrosis of the femoral head, but without any guidelines on their use and also with controversial findings in different studies. A study from 2001 reported a significant decreased AVNH rate in patients receiving steroids and statins, whereas Ajmal et al. observed no difference of AVNH development between patients on corticosteroids receiving or not receiving statins (Pritchett, 2001; Ajmal et al., 2009).

Classen et al. indicated the benefic effect of the vasodilator iloprost in early stages of AVN, with 74.8% of patients showing an improvement regarding pain level, evaluated by the visual analog scale (Claßen et al., 2016). Moreover, enoxaparin may delay osteonecrosis progression if implemented in the early stages of the disease, but with limited data regarding its effectiveness (Glueck et al., 2005).

Some studies claimed the benefic results in AVN of extracorporeal shockwave therapy (ESWT) (Wang et al., 2015a), with the principal effect of pain reduction and even a complete regression of MRI changes in some patients. ESWT stimulates osteoblastic activity, increasing bone density in the pelvic area. ESWT seems to be more efficient in the early stages of the disease and even more effective than core decompression and grafting (Russo et al., 2015).

Hyperbaric oxygen therapy is another therapy proposed for AVN, which stimulates extracellular oxygen concentration, decreasing bone edema and intraosseous hypertension. However, the efficacy of hyperbaric oxygen therapy in AVN treatment is yet to be confirmed by randomized controlled trials (Uzun et al., 2016).

LLLT is a non-invasive light source treatment that generates a single wavelength of light, used in multiple muscle-skeletal disorders for pain and inflammation reduction and acceleration of tissue regeneration, including cartilage. Low level laser therapy (LLLT) was reported to be an effective complementary therapy in jaw osteonecrosis induced by bisphosphonates, but with very limited studies regarding hip osteonecrosis (Silva-Souza et al., 2021).

Low-intensity pulsed ultrasound (LIPUS) is a non-invasive treatment method which uses acoustic waves, that stimulates bone union in bone fractures, approved by the Food and Droug Administration. Literature data indicates that LIPUS enhances osteogenesis and neovascularization, promoting bone repair in a steroid-associated osteonecrosis model in rabbits, which used a 1-MHz pulse frequency, 20% duty cycle, and 100-Hz repetition rate at an average intensity of 200 mW/cm^2 20 minutes per day for 12 weeks (Zhu et al., 2015). Moreover, LIPUS seems to stimulate bone formation, osteoblast activity and osteogenic differentiation of mesenchymal stem cells in *in vitro* models (Uddin & Qin, 2013).

Pulsed electromagnetic fields (PEMF) were reported by Bassett et al. in 1974 as a promising treatment in patients with osteoarthritis and joint surgery, promoting fracture and articular cartilage repair and controlling inflammation (Bassett et al., 1974; Massari et al., 2019). Stage II AVN of the hip cases reported by Seber et al had

a significant disease improvement after receiving PEMF therapy for 10 hours daily, over a period of 6 months (Seber et al., 2003). Massari et al showed that 94% of patients with stages I and II of AVNH had an ameliorated condition, thus most stage III patients deteriorated and finally had to receive THA treatment (Massari et al., 2006). Therefore, more studies are needed for establishing the efficacy of PEMF in AVN of the hip treatment.

Physical therapy is a very important part of AVNH treatment either for preventing or postponing surgical treatment, or for a better and quicker recovery after the surgical intervention. Physical therapy mostly uses exercises that conserve or improves joint mobility and hip muscles' function and it objective is to maintain or restore function, ambulation, and patient's independency. Physical therapy consists in passive and active exercises, regarding patient stage of disease, as well as stretching. One of the main goals of physical therapy is muscle activation, but exercises should be adapted in time and intensity to AVNH stage, applied treatment (surgical or non-surgical), and musculoskeletal clinical examination findings (Neumayr et al., 2006). The exercises guidelines for AVNH treatment published recently by the Chinese Orthopedic Association in 2017 include exercises for all hip movements (flexion, extension, abduction, adduction), and also walking exercises, like walking with crutches or independent walking (Konstantonis, 2021). AVNH exercises should also include endurance and coordination training if the state of the patient permits it, for functionality enhancement. In a prospective multicenter study, there were no significant differences between patients that underwent core decompression followed by physical therapy program and patients that had only a physiotherapy program. Moreover, for the group that followed solely physical therapy, there was an improved hip function and surgical intervention was postponed by an average of 3 years after therapy (Konstantonis, 2021).

Platelet-rich plasma (PRP) consists in increased levels of regenerative cytokines, like basic fibroblast growth factor, endothelial growth factor, insulin-like growth factor, vascular endothelial growth factor or platelet-derived growth factor and has 8-fold higher load of platelets compared with whole blood (Eppley et al., 2004). PRP ameliorates the symptoms in early-stage hormonal AVN of the hip in a rabbit model (Karakaplan et al., 2017) and when combined with tricalcium phosphate, stimulates new bone formation and reduces inflammation in a rabbit model of AVN of the hip (Zhang et al, 2018).

Surgical treatment of AVN usually addresses young patients and early stages of the disease, whereas THA is indicated for advanced stages. Core decompression (CD) is one of the interventions often used in the early stages of AVN, with the scope of reestablishing circulation in the femoral head and diminishing the intraosseous pressure. CD Implies drilling holes into the femoral head, which develops space for new blood vessels and reduces relieves internal pressure (Salas et al., 2021).

In cases in which CD fails, a technique that fills the necrotic area in the femoral head, which involves nonvascularized bone grafts derived from different body parts (e.g., tibial autograft, fibular autograft, or allograft) is used (Lespasio et al., 2019). On the other hand, vascularized grafting is a procedure that stimulates the circulation in the femoral head and enhances subchondral architecture, using a part of the fibular bone with a nutrient artery. Vascularized grating is recommended in patients with less than 50% involvement of the femoral head and under 3 mm articular collapse <3 mm (Liu et al., 2022).

Another surgical technique for the treatment of AVN is osteotomy, which substitutes the necrotic femoral head from the load-bearing area with healthy tissue. However, a possible disadvantage of the procedure may be joint instability and arthritis, induced by the transfer of the necrotic area (Liu et al., 2022).

Stem cell therapy involves mostly mesenchymal stem cells (MSCs) derived from bone marrow, adipose tissue, or umbilical cord, which can stimulate the revascularization and regeneration of the bone tissue (Murab et al., 2021; Wang et al., 2015b). Other studies showed good results regarding pain and hip function in treating early stage AVN with bone marrow MSCs combined with pravastatin (Li et al., 2010). However, more studies are needed in order to make clear recommendations for the use of stem cell therapy.

Patients with late stages of AVN, which imply significant femoral head collapse, loss of hip function and severe pain should undergo total hip arthroplasty (THA). The procedure consists in replacing the the ball and socket of the hip with an artificial implant. THA has mostly good results regarding pain reduction and hip function, but it is considered not to be the best choice in young patients because of the possible future revision of the implant (Liu et al., 2022).

AVN of the femoral head is a complex disease and a cause of disability in patients aged between 20 and 40 years. Therefore, both patients and doctors should be aware of the risk factors that are associated with AVN development and of an early diagnostic, which will dictate the disease evolution. Imaging evaluation of AVN should begin with radiography, but MRI remains the golden standard for an early and complete diagnostic. Non-surgical treatment of AVN should be the first choice in young patients and early-stage disease, when possible, whereas surgical management is mostly used in advanced stages. Although many treatment options for AVN, both surgical and non-surgical, are proposed and studied, at present there is not enough evidence to elaborate precise guidelines regarding treatment methods for patients with AVN.

Hypothesis

The present study aims to emphasize the importance of a complete and rigorous physical examination of each patient that addresses a rehabilitation medicine specialist, regardless of the patient's subjective complaints. The reported case is based on the unusual presentation of a debilitating condition such as avascular necrosis of the hip, which can severely affect the person's quality of life.

Objectives

The objective of the physical examination of the patient was to closely evaluate all joints and muscles and to also

observe his walking or any other physical impairment. The rehabilitation medicine consult aimed to correlate the clinical findings with the patient's symptoms and to apply the proper paraclinical investigations in order to obtain a correct and complete diagnosis. On the other hand, the purpose of the case report was to disseminate the results of the explorations and the clinical evolution of the patient.

Material and methods

The study was conducted according to the ethical procedures recommended by the World Medical Association (Helsinki), after the subject provided written informed consent.

The present case report was approved for publishing by the hospital's leadership in which the author carries her professional activity.

Research protocol

a) Period and place of the research

The study was conducted over a period of 6 months (December 2022 - June 2023).

b) Case Presentation

A 62 years old male, from an urban environment, socially active, without any significant pathological or physiological history, besides of a bilateral knee arthritis, presented in December 2022 to a rehabilitation medicine consult, complaining of acute mechanical pain of both knees, mostly of the left knee and mechanical pain of the left shoulder. From the anamnesis, we discovered that the knee pain started insidiously, approximately 2-3 years ago, at first only once or twice per week, but in the last 3 weeks has become a daily, constant pain, that is exacerbated by physical activity, when climbing the stairs or when the patient maintained a prolonged orthostatism or fixed position of the knee.

The patient also accused an occasional instability of the left knee when walking for more than 1-2 kilometers. The patient had a bilateral knee X-ray performed 2 years ago, which confirmed the knee arthritis. Affirmatory, the patient used some topical nonsteroidal anti-inflammatories and Ibuprofen in dose of 400mg/day, occasionally, but without any significant relief of symptoms. The left shoulder pain debuted insidiously, approximately 3-4 weeks prior to the consult, without a history of trauma, and it was exacerbated when moving the shoulder. The patient denied any alcohol or other substances abuse or any associated diseases or treatments. From the anamnesis, we also found out that the patient did not undergo any kind of paraclinical investigation for his shoulder symptoms.

c) Applied tests

The general examination of the patient disclosed normal vital signs, with no fever, respiratory rate of 19 breaths/minute, heart rate of 82 beats/minute, blood pressure 135/80 mmHg and a body mass index of 26.04 kg/m^2. The clinical examination of the patient revealed pain and crepitus when mobilizing the left shoulder, but with conserved range of motion (ROM), pain when palpating the bicipital point of the left shoulder, cervical and lumbar paravertebral muscle contraction, hypertrophy of the C7 spinal process, reduced lumbar lordosis, a non-remarkable Lasegue test, a Schober test of 14/15cm, full lumbar spine range of motion with end range pain in left lateral flexion and left rotation, minimal edema of the left knee, crepitus and pain when mobilizing the knees, with conserved ROM of both knees. However, the clinical exam of the patient also disclosed a slight muscle hypotrophy in the left thigh musculature, a positive Patrick sign (+ on the right hip and +++ on the left hip), painful range of motion of the left hip, with most pain being felt in abduction and internal and external rotation. Muscle palpation of the left hip region revealed tenderness in the left thigh and pelvic musculature. Neurological testing of the lower limb showed normal reflexes and sensory testing bilaterally.

Laboratory blood tests of the patient displayed a slightly increased erythrocytes sedimentation rate (ESR=28 mm/hour), with no other significant modifications. Urine laboratory examination was also within normal range.

Regarding the patient's symptoms and clinical findings, radiological investigations (X-rays) were performed for the patient's left shoulder and hips. Left shoulder X-ray (Fig. 1) revealed early arthritis modifications of the scapula-humeral and acromial-clavicular joints. Hip X-rays (Fig. 2, Fig 3) showed arthritis modifications of both hips, more advanced on the left hip, based on the background of an avascular necrosis of the left hip. The left hip X-rays changes revealed subchondral collapse (crescent sign) without flattening, with less that 15% of the femoral head affected, corresponding to stage IIIA-mild of the Steinberg's classification.

Fig.1 – Left shoulder X-ray.

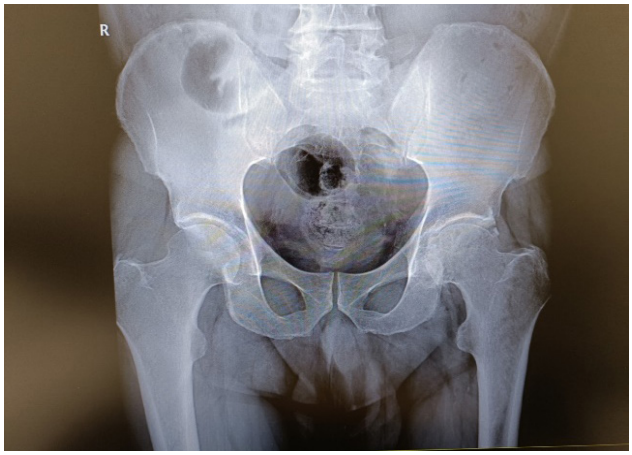

Fig. 2 – Bilateral hip joint X-ray.

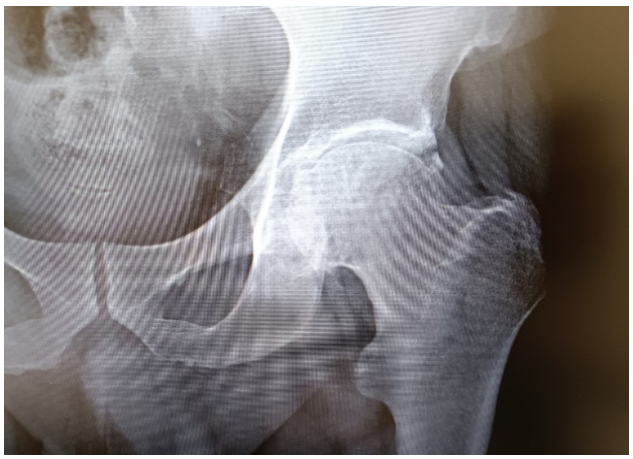

Fig. 3 – Left hip X-ray (enhanced).

Results

In this context, the patient's diagnostic was: *Primary bilateral knee arthritis, decompensated on the left, Primary right hip arthritis, Secondary left hip arthritis on the background of an avascular necrosis of the left hip, Early-stage arthritis of the left shoulder.* The patient was advised to undergo an orthopedic medical consult, pain therapy management with Diclofenac capsules in a dosage of 150 mg/day, for 10 days and chondroprotective treatment (hyaluronic acid, chondroitin and glucosamine oral treatment, in a dosage of 2 tablets/day, for 2 months).

Moreover, the patient was prescribed a personalized physiotherapy rehabilitation program (physical therapy, therapeutic ultrasound, low level laser therapy, short waves), for a duration of 10 days, with the recommendation to continue the learned exercises at home and to return for evaluation after two months if no new symptoms appear. The physiotherapy rehabilitation treatment scheme was performed in January 2023.

The patient's two months follow-up examination revealed a reduced pain level of the left knee, no pain of the left shoulder and a less painful ROM of the left hip. The patient stated that he did not want to undergo a surgical treatment for the hip avascular necrosis and wants to continue with the rehabilitation programme as long as possible. The patient returned in June 2023 for a rehabilitation medicine reevaluation, with the purpose to undergo another physiotherapy treatment, claiming that he did not experience any shoulder pain for the last 3 months, but he had an occasional mechanical pain of both knees and no left hip symptoms. The physical examination of the patient performed in June 2023 revealed no sensibility when mobilizing the left shoulder or both knees, no edema of the left knee and crepitus on both knees' mobilization. Hip examination showed a positive Patrick sign (+ on the right hip and +++ on the left hip), painful left hip abduction and internal rotation, but reduced in intensity compared to the examination performed in December 2022. The muscle evaluation of the lower limbs disclosed the persistence of hypotrophy in the left thigh musculature and tenderness in the left thigh, but improved compared to the first consult.

Discussion

The AVNH can sometimes present with atypical symptoms, as was the case of the patient described above. In this situation, the patient's left knee pain was the main symptom and could have disguised the hip pathology. Moreover, we could not find a clear cause for this patient's AVNH, but we appreciated that maybe the knee arthritis played a role in modifying the range of forces that were applied on the hip, aspect that could have led to avascular necrosis.

Other authors also reported particular cases of AVNH. For example, the case of a 27 years old female with a pyogenic arthritis that transformed in an avascular necrosis of the right hip, but with specific symptoms of right hip pain and difficulty in walking (Saklecha et al., 2022). Another reported case is that of a 41-year-old male presented to a chiropractor's office for ongoing right sided low back, hip and knee pain for the past six months following jumping off a two-meter-high roof and landing on his feet, that also had a history of a leukocytoclastic vasculitis skin eruption, treated with four months of oral corticosteroid therapy with doses up to 50 mg per day (Karim & Goel, 2004). Contrary to the case that we presented, the cases described above had a clearer probable cause for developing a AVNH, like trauma, infection and corticosteroid treatment.

Literature also reported rare cases of bilateral hip AVN, like the case of a 38-year-old man with non-secreting pituitary adenoma, which received a very small dose of oral prednisolone for secondary adrenal insufficiency after surgery for pituitary adenoma and underwent bilateral core decompressive surgery with favorable outcome (Dharmshaktu et al., 2016). However, this was also a AVNH case produced by corticosteroid treatment, even though it was received in a small dose.

An unusual case of bilateral AVNH was reported by literature in 2023. A 23-year-old male presented, similar to our patient, complaining of anteromedial knee pain, with negative radiographs for lumbar and knee pathology. Over a 4 weeks period of physical therapy, the patient experienced minimal knee pain relief and a progressive loss of hip range of motion. The patient was recommended hip radiography, which was positive for left femoral head collapse and asphericity consistent with AVN of the femoral head and also early manifestations of right hip AVN. The patient underwent a left total hip arthroplasty (THA) and a right THA 8 months later (Shadle & Cavaliere, 2023). This case is similar with our case, with a AVNH which presented with initial complaints of knee pain and with no specific cause for AVNH development.

In conclusion, our opinion is that the case that we reported should raise awareness on the possible unusual presentations of avascular necrosis of the hip, that can delay the correct diagnostic and the proper treatment. Moreover, for a correct and complete diagnostic, the physical examination of the patient should regard all joints and muscles, even though the patient's complaints are minimal.

Conclusions

1. Following the personalized rehabilitation program, the patient achieved a reduced pain level and an improved range of motion of the left hip, postponing a surgical intervention.

2. Avascular necrosis of the hip is a debilitating condition, with a higher risk of occurrence after trauma, corticosteroid therapy, if the patient chronically consumes alcohol or suffers from particular genetical conditions.

3. The symptoms of avascular necrosis of the hip usually involve pain, limited range of motion and sometimes a modified walking. However, there are reported cases of patients that did not experience any symptoms at the injured hip site or had symptoms at other joints, mostly knees.

4. A complete and rigorous physical examination of the patient is very important because it can reveal signs independent of the patient's symptoms, which is essential for a correct diagnosis.

Conflict of interests

None declared.

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