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CASE REPORT

Joint and sensory branch block of the obturator and femoral nerves in a case of femoral head osteonecrosis and arthritis☆

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Abstract The sensory innervation of the hip joint is complex. The joint and sensory branch block of the obturator and femoral nerves is effective for treating the pain caused due to different hip diseases. This could be an option to be considered in certain circumstances such as, being a surgical-anesthetic high risk, or if there is significant overweight. It could also be useful on other occasions if the traumatologist considers that it is better to delay hip replacement for a limited period.

PALABRAS CLAVE
Coxalgia;
Bloqueo nervioso;
Radiofrecuencia pulsada;
Nervio obturador y femoral

Bloqueo intraarticular y de ramas sensoriales de los nervios obturador y femoral en cuadro de osteonecrosis y artrosis de cabeza femoral

Resumen La inervación sensitiva de la articulación de la cadera es compleja. El bloqueo intraarticular y de las ramas sensitivas de los nervios obturador y femoral es eficaz para tratar el dolor producido por diversas enfermedades de cadera, y pudiera ser una opción a considerar en determinadas circunstancias. Estas circunstancias pueden ser alto riesgo quirúrgico-anestésico por el estado basal del paciente o la existencia de sobrepeso importante, en otras ocasiones el médico traumatólogo considera que es mejor retrasar la artroplastia, al menos durante algún tiempo.

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Introduction

Avascular necrosis of the femoral head (ANFH) has a multifactorial etiology. It mainly affects young populations and, if not addressed timely, can lead to femoral head collapse, which will eventually entail a hip arthroplasty. Although early presentation can be painless, pain is common at later stages and can even limit active and passive hip movement. Femoral head irrigation comes mainly from the extraosseous systems of the circumflex and retinacular arteries.[1] However, there is additional, less important vascularization, such as that originating from the round ligament artery. There are multiple treatment options[2] which vary according to the stage of ANFH (Table 1).

Sensory innervation of the hip joint is multiple and complex and comes from the sensory branches of the gluteal, obturator and sciatic nerves.[3,4] Innervation of the hip originates from the sacral and lumbar plexuses. The hip, like other joints, follows Hilton's law, according to which, the nerves which innervate the muscles acting on the joint also innervate the joint itself. The femoral and obturator nerves innervate the anterior and anterolateral sides of the joint capsule, branches of the sciatic nerve innervate the posterior side of the capsule and branches of the *quadratus femoris* innervate the posteromedial side of the joint capsule. Lastly, joint branches of the gluteal nerve innervate the posterolateral portion of this capsule. The pain caused by this joint is mainly located in the inguinal region and extends to the thigh and trochanteric region.[4]

Peripheral nerve blocks act by interrupting the nociceptive pathway at its origin and the various afferent fibers which accompany the autonomous nerves, interrupting some algesic reflex mechanisms. Multiple types of blocks can be conducted, both neural and articular. According to their purpose, nerve blocks can be classified as diagnostic, prognostic and therapeutic. Diagnostic blocks attempt to confirm a suspected diagnosis through a reversible nerve block of the structure which is thought to cause the pain by means of a local anesthetic.[5] All nerve blocks entail a risk of damaging the nerve, in a temporary or permanent manner.

Conventional radiofrequency is an ablative interventionist technique consisting in the emission through an electrode of radiofrequency waves capable of producing heat in the surrounding tissue, generating a lesion in the sensory nerves and interrupting the nervous impulse. There is a second modality, known as pulsed radiofrequency, in which no heat is produced and instead the analgesic effect is produced by the radiofrequency waves blocking electrical conduction of the sensory fibers which transmit pain. This type of block is indicated in patients suffering coxarthrosis with no possibility of surgical treatment, cases in which hip arthroplasty is deferred for any reason, in patients with hip prostheses with local pain in whom a surgical reintervention is ruled out, cases of avascular necrosis of the femoral head and cases of local bone metastasis.

Case report n.° 1

The patient was a 42-year-old male with no personal history of interest except for bilateral ANFH of unknown etiology. The laboratory data obtained enabled us to rule out an alteration of coagulation which could have explained the presence of bilateral ANFH, as well as possible episodes of fatty embolisms, atherosclerosis and adipose hypertrophy. Both hips presented the same level of involvement, grade IV according to the radiographic classification by Arlet and Ficat.[6] Osteonecrosis was confirmed by magnetic resonance imaging (MRI). Fig. 1 shows the radiographic image. The patient reported severe limitations for work and everyday activities, such as climbing stairs, walking, getting dressed and personal hygiene. Due to his age, we decided to attempt analgesic options to delay hip arthroplasty temporarily. The pain on the right hip was the most incapacitating, so we decided to carry out a nerve block on that side. Oral analgesic treatment prior to the intervention consisted in oxycodone 30 mg/12 h, nabumetone 1 g/12 h and paracetamol 1 g/8 h. In spite of the high analgesic doses employed, the hip pain was so intense that it prevented physiotherapy.

Case report n.° 2

The patient was a 79-year-old female with extensive associated comorbidity (non-insulin dependent diabetes mellitus, arterial hypertension, hyperlipidemia, obesity, repeated cerebrovascular accident, ischemic heart disease with severely depressed ejection fraction and chronic kidney failure). The usual treatment was applied, which included repaglinide 1 mg/8 h, nifedipine 30 mg/24 h, simvastatin 20 mg/24 h, furosemide 40 mg/12 h, 10 mg nitroglycerine transdermal patch for 12 h/day, acenocoumarol 4 mg/24 h and acetylsalicylic acid 100 mg/24 h. The patient also suffered ANFH with several years evolution of grade III in the Arlet and Ficat classification, which caused a significant decrease in quality of life due to pain in the inguinal region and thigh upon any physical activity, but a surgical intervention was ruled out by the patient after being informed of the

Table 1 Summary of the main treatments accepted for a vascular osteonecrosis of the femoral head.

Stage FICAT I-II	Stage FICAT II-III	Stage FICAT IV
Load restriction	Decompression of the nucleus of the femoral head	Hip arthroplasty
	(±) Morphogenetic bone proteins	
	(±) Vascularized bone graft	
	(±) Autologous bone marrow graft	
Bisphosphonates	Intertrochanteric osteotomies	
ESWT		
Hyperbaric oxygen		

ESWT, extracorporeal shock waves therapy.