Chapter 2.4.1

FEMORAL HEAD NECROSIS

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Abstract: Femoral head necrosis (FHN) is a condition in which the blood supply to the femoral head is compromised. This leads to cell death in the marrow and the bone, and interferes with the normal activity of osteoblasts and osteoclasts, and loss of the structural integrity of the femoral head. The treatment of the FHN is an unresolved orthopedic problem and multiple approaches are used for its management. HBO therapy makes oxygen available to marrow cells and facilitates the bone remodeling processes through edema reduction and angioneogenesis stimulation.

Keywords: Hyperbaric Oxygen, Hyperbaric Oxygenation, Femoral Head Necrosis, Avascular Necrosis

1. INTRODUCTION

Femoral Head Necrosis (FHN) also called Avascular Necrosis, Ischemic Necrosis, or Aseptic Necrosis is pathology generated by several causes, which reduce local blood supply so that it compromises the structural integrity of the femoral head. The natural evolution of this pathology leads to the destruction of the femoral head in most of cases (70\%)\textsuperscript{1} requiring total hip replacement (THR). It affects the younger population (25-55 years) and has an incidence between 10\% and 20\% of those requiring total hip replacement\textsuperscript{2}. The normal lifespan of a hip prosthesis is about 12 years; so considering the young age of the patients with this pathology it is certain that there are going to be several surgical treatments with surgical and anaesthesiological risks; the risk of infection and need for rehabilitation. To all this there are grave social costs as patients are unable to work for extended periods during their lifetime.
2. ETIOLOGY

Trauma is the most frequent etiological factor, but frequently FHN is related to other pathologies: Dietary or Environmental Factors (Dysbaric Conditions, Alcohol Abuse, and Cigarette Smoking); Iatrogenic (Corticosteroids, Radiation Exposure, Hemodialysis, Organ Transplantation, Cytotoxic Therapy, Laser Surgery); Hematologic (Hemoglobinopathies (Sickle-Cells Anemia, Thalassemia, DIC, Polycythemia, Hemophilia) and many others – but these are less common in the genesis of FHN. Sometimes it is not possible to determine a cause so that the term idiopathic FHN applies. At the moment the incidence and relative contributions of different pathophysiological mechanisms are not known; this contributes to the . that contribute to explain the disease are not completely recognized3-5.

3. PATHOGENESIS

The pathophysiological mechanism that causes osteonecrosis is still unknown, but it causes a progressive destruction of the vascular supply of the femoral head, that halts the oxygen and nutritional supply to the cells. The direct consequence is cellular death with necrosis and ultimately collapse of the trabecular structure with articular pain and dysfunction.

4. DIAGNOSTIC MODALITIES

MRI is at the moment the best technique to diagnose FHN even in its early stages when x-ray examination is negative for bone damage or collapse. Also diagnostic techniques include Bone Scintigraphy, CT and arthroscopy, but their use is limited to those patients where MRI cannot be used.

5. STAGING SYSTEM

In the staging of FHN there are 5 major classifications. Converging or combining the classifications allows for better comparisons between old and new literature using respective systems..

The most commonly used system is that of Ficat and Arlet system2, but with the MRI scans the Steinberg system is preferred6-8 (Tab. 2.4.1-1).