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CASE REPORT

AVASCULAR NECROSIS IN GAUCHER'S DISEASE

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Summary

Gaucher's disease is a monogenic disorder, enzymatic genetic deficiency of ß-glucocereboside, leading to acumulation of the non-degraded metabolic substrate, in the macrophages lysosomes = Gaucher cells (1). There are 3 types, bone pathology being encountered in type 1 (Nonneuronopathic form) along with: hepatosplenomegaly, hematological and pulmonary pathology. Avascular necrosis is frequently encountered with bone damage in multiple sites such as femoral head, femoral condyle or humeral head. Osteoporosis affects in a severe mode, bone strength and the ability to sustain an implant. We present a complex case of a 50 years old male with Gaucher's disease, and avascular necrosis of femoral head and lateral distal condyle.

Key words: Gaucher's disease, avascular necrosis, multiple organ involvement, implant looseness

Résumé

Nécrose avasculaire dans la maladie de Gaucher

La maladie de Gaucher est un désordre monogénique, la déficience génétique enzymatique de la ß-glucocéréboside, conduisant à l'accumulation du substrat métabolique non dégradé, dans les lysosomes macrophages = cellules de Gaucher(1). Il existe 3 types, la pathologie osseuse rencontrés dans le type 1 (forme non neuropathique) ainsi que: l'hépatosplénomégalie, l'hématologiques et la pathologie pulmonaire. La nécrose avasculaire est fréquemment rencontrée avec des lésions osseuses dans plusieurs sites tels que tête fémorale, le condyle fémoral ou la tête humérale. L'ostéoporose touche dans un mode sévère, la résistance osseuse et la capacité de maintenir un implant. Nous présentons un cas complexe d'un homme de 50 ans avec la maladie de Gaucher, et une nécrose avasculaire de la tête fémorale et du condyle distal latéral.

Mots clefs: maladie de Gaucher, nécrose avasculaire, implication d'organes multiples, relâchement de l'implant

Introduction

Gaucher's disease is a monogenic disorder, enzymatic genetic deficiency of ß-glucocereboside, leading to accumulation of the non-degraded metabolic substrate, in the macrophages lysosomes = Gaucher cells (1). There are 3 types, bone pathology being encountered in type 1 (Nonneuronopathic form) along with: hepatosplenomegaly, hematological and pulmonary pathology.

Bone involvement (2,3) is represented by (Fig. 1):

- Growth disorders (Impaired remodeling process), deformity with specific Erlenmeyer Flask Deformity (Commonly of the distal femur and proximal tibia, results of an impaired remodelling process);
- Osteoporosis (generalized or lytic lesions) leading to minimal trauma fractures;
- Osteosclerosis;
- Avascular necrosis which is one of the most severe clinical manifestations. Predominant in femur / humerus epiphysis, or as Infarct cortical area.

We present a complex case of a 50 years old male with Gaucher's disease, and avascular necrosis of femoral head and lateral distal condyle.

Case report

Male, 51 years, H: 188cm / W: 100 kg

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Personal Malignant History:

- *Gaucher's disease under treatment with ERT (enzyme replacement therapy) – Imiglucerase*
- *Splenectomy*
- *Cirrhosis of the liver (Liver transplant in 2010)*
- *Cardiac failure NYHA II*
- *Avascular necrosis of the left femoral head (total hip arthroplasty, uncemented implant)*
- *Osteochondritis of the right lateral femoral condyle*

Hip skeletal manifestations

Left femoral head avascular necrosis and in 2001 he underwent a Left hip arthroplasty with uncemented hip prosthesis (Luxembourg clinic). During surgery a shaft fracture occurs that requires wire cerclage. He was seen by us in 2009 accusing thigh pain, femoral component loosening, sinking of the femoral stem and 2 cm shorter inferior limb (Fig. 2). We could not perform surgery at that time because he was scheduled to liver transplant due to his advanced cirrhosis. At the end of 2010 the situation was worse, intense hip and thigh pain, complete degradation and displacement of femoral component, wider marrow canal, trochanteric resorption (Fig. 3). Before surgery, Gaucher patients must be carefully assessed because they are prone to anemia, thrombocytopenia, and leucopenia leading to infection and bleeding. Blood tests were normal except a minor kidney dysfunction (Urea: 60 (17-43 mg/dl), Creatinin: 1,59 (0,7-1,3 mg/dl)). Osteoporosis test, DEXA: T sore: -2.1. (osteopenia)

At that time he was under treatment with:

Enzyme replacement therapy Imiglucerase (30 IU/Kg (2000 – 2004) 1dose/2 weeks; 60 IU/kg (2004 – 2010) 1 dose / 2 weeks). Biphosphonates (Fosavance 70 mg/5600 IU) and Immunosuppressant medication (Cyclosporine 100 mg x 2/day, Mycophenolate mofetil 500 mg x 4/day, Lamivudine 100 mg/day).

In 11.2010 we performed left femoral component revision, with distally locked uncemented revision prosthesis. Reasons for uncemented revision stem were: relative young patient (51 Years old), osteointegration of the cup, good results in other revision cases with this implant (Fig. 4). Unfortunately the stem evolution was not favorable and in 2011, femoral component degradation occurred, leading to an unstable implant. (Fig. 5). A new revision was needed this time with a cemented revision stem. (Fig. 6). No complications occurred until now.

Knee skeletal manifestations

In 2012 he was diagnosed with left femoral condyle osteochondritis, secondary arthrosis of the right knee stage I Ahlback, clinically manifested by pain and partially limited range of motion. (Fig. 7, 8) The biological status was the same, with the same treatment. Our surgical solution was total knee arthroplasty, cemented, posterior stabilized implant. Why ? Because the increased risk of developing new ischemic lesions contraindicated surgical treatment by osteochondral autograft (OATS) / allograft transplantation or unicompartmental arthroplasty. After surgery evolution was good without complications (Fig. 9).

In all surgeries a special perioperative protocol was needed due to liver transplantation, a Gaucher's disease conditions.

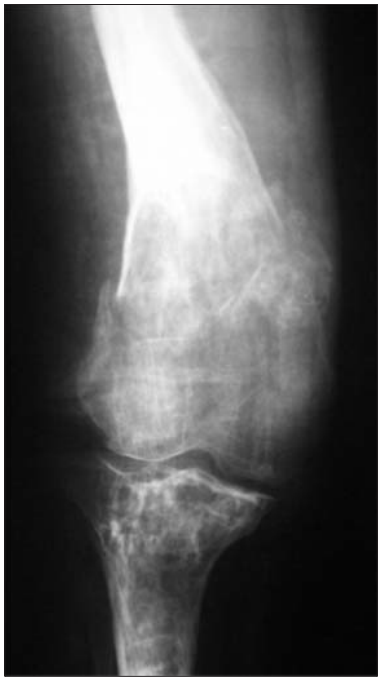


Figure 1 - Bone involvement in Gaucher disease

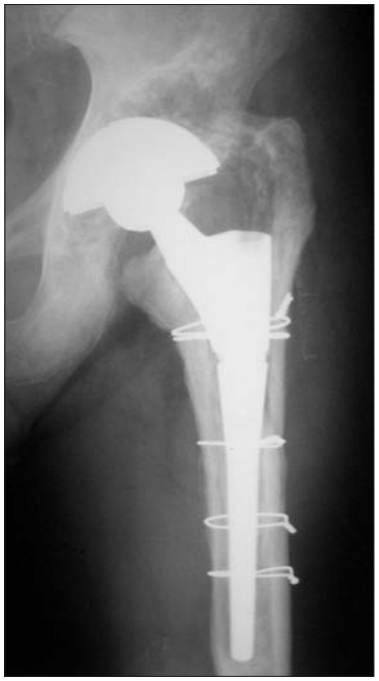


Figure 2 - 2009 X Ray after left hip arthroplasty uncemented in 2001

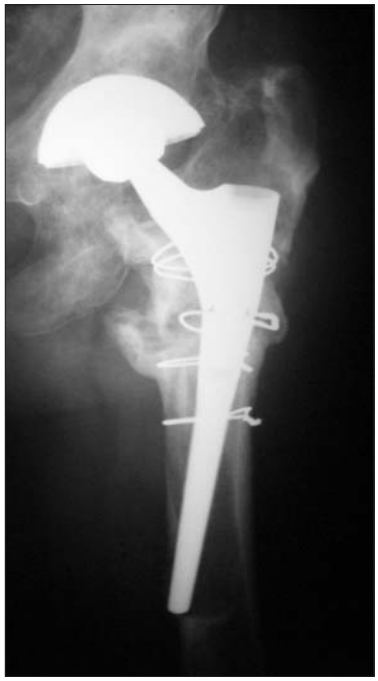


Figure 3 - 2010 X Ray-preoperative

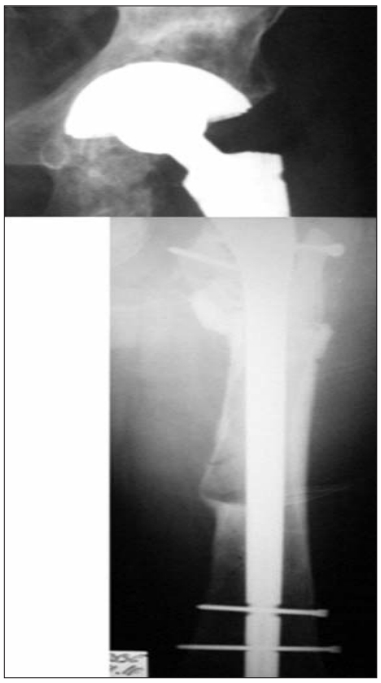


Figure 4 - 2010 X Ray -postoperative after left femoral component revision

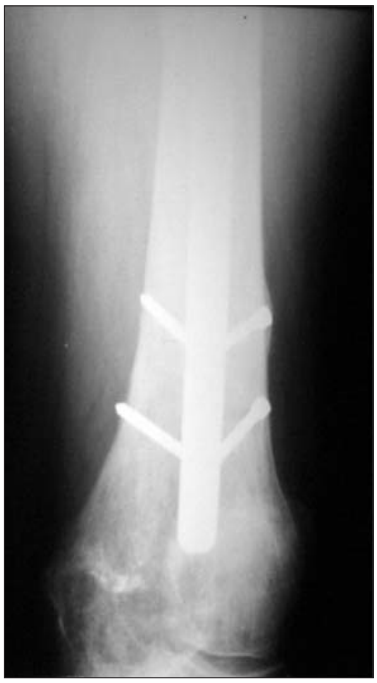


Figure 5 - 2011 X Ray - unstable implant

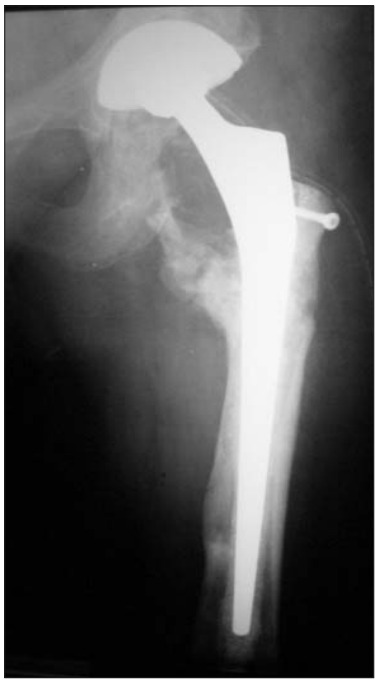


Figure 6 - 2011 X Ray - postoperative after new revision

Antibiotics and antifungal before and after surgery (2 and 10 days) using Vancomycin, Meronem and Diflucan. Usually no antibiotics are needed before surgery and only 2 days after, and we use cephalosporins. Careful hepatic and renal function monitoring was performed along with anesthesia team and we choose to go without perioperative suppression of immunosuppressive medication in order to protect the liver graft.

In all cases we used acrylic cement impregnated with antibiotics (Gentamicin), for a better infection protection

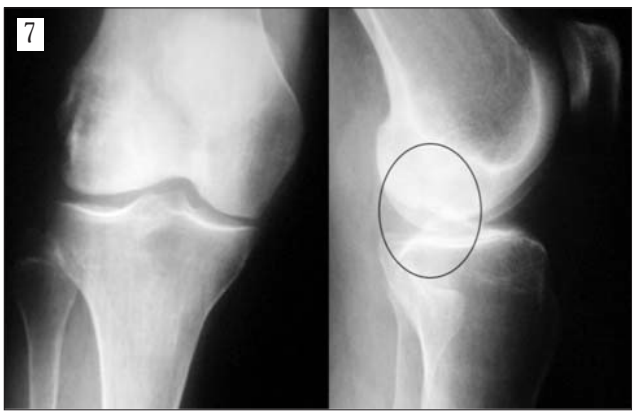
Blood transfusions were performed (4 units red blood cells / surgery) and antithrombotic prevention (Enoxaparine 0,4 ml/day, 35 days) was used after each surgery.

At follow-up in 2015 he had normal range of motion in hip and knee with no pain. DEXA values improved (T score: -1; BMD: 0,956). Blood tests were normal with a chitotriosidase value of 2350 nmol/h/ml plasma (NV 170-5700) (Gaucher marker). Imiglucerase dose was reduced to 47 IU/kg 1dose/2 weeks.

Discussions & Conclusions

Gaucher's disease is a serious condition, with more than one organ implications and with frequent associated disorders; Spleen involvement (Splenectomy), Bone marrow involvement (Infection risk), Liver and kidney disorders (transplant).

Early diagnosis and rapid initiation of treatment are crucial in the evolution of the disease. Enzyme replacement therapy (ERT) – Imiglucerase since 2000 was efficient,



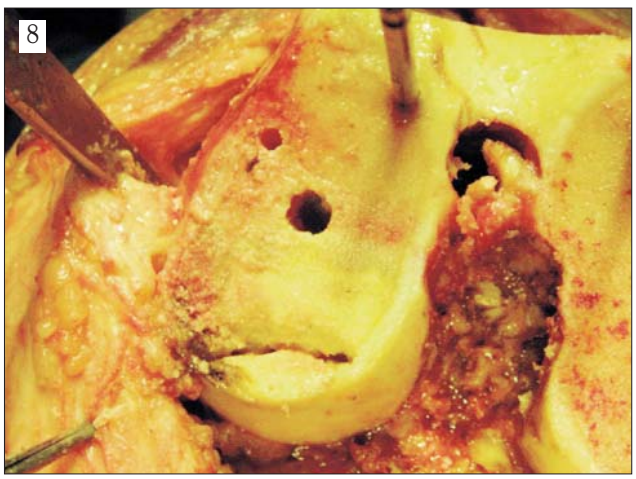


Figure 7, 8 - 2012 X Ray -left femural condyle osteochondritis, arthrosis of right knee

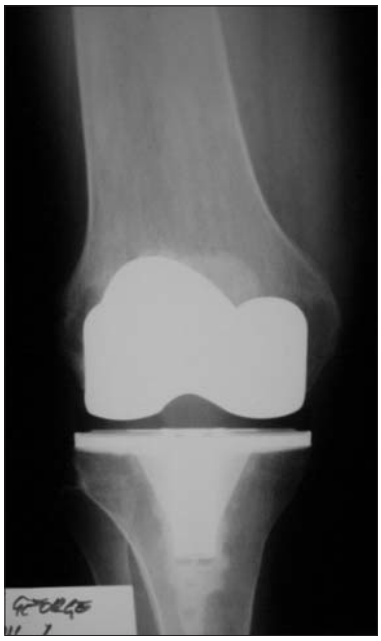


Figure 9 - X Ray after total knee arthroplasty cemented

leading to rare bone crises and with low intensity, normal physical development, no bone deformities, without Erlenmayer flask deformity, limited bone infiltration, diminishing values of chitotriosidase(from 12000 in 2000 to 2350 nmol/h/ml plasma in 2015) and without haematological dissorders

Avascular necrosis is frequently encountered with bone damage in multiple sites such as femoral head and femoral condyle.

Osteoporosis affects in a severe mode, bone strength and the ability to sustain an implant. In case of an arthroplasty, the implant must be carefully chosen by age, Dexa T Score, BMD. Uncemented implants can be hazardous. In case of a cemented implant, acrylic cement impregnated with antibiotics must be used. Osteoporosis therapy as a complementary therapy to ERT can be used. Biphosphonates, antiresorptive mechanism, are a viable option (T score -2,1 → - 1).

Conflict of Interest: Nil

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