



## Total hip arthroplasty (THA) in the aseptic osteonecrosis of the femoral head in sickle cell disease

A. Benabdeslam, A. Lahlou, A. Elbardouni, M. Mahfoud, M.S. Berrada and M. Elyaacoubi  
Service of Trauma and Orthopaedic Surgery, CHU Rabat Morocco.

### ARTICLE INFO

#### Article history:

Received: 30 January 2014;

Received in revised form:

22 February 2014;

Accepted: 4 March 2014;

#### Keywords

THA,  
Femoral head osteonecrosis,  
Sickle cell disease.

### ABSTRACT

Sickle cell haemoglobin is a very widespread in the world, constituting the most common hereditary disease. The evolution is enamelled of many complications including bone-joints, favoured by the emergence of new treatments improving the survival of these patients. The aseptic osteonecrosis of the femoral head is common in these patients. Was retrospectively analysed a monitored and treated in the service of trauma and orthopaedic of the Ibn Sina's hospital in Rabat , 04 patients with sickle cell disease, who has submitted an aseptic osteonecrosis of the femoral head. It is 02 women and 02 men. The average age was 31 years. They had all consulted for hip pain and discomfort to walking. The clinical examination had found a limitation of movements. All our patients have benefited from a standard x-ray. Stage 3 Ficat is present in 2 cases and 4 stages in 2 cases also. MRI was carried out in a single patient. The operated hips have all received a total hip joint replacement, with satisfactory results in all cases. The aseptic osteonecrosis of the femoral head in the sickle cell disease is very debilitating, of fact the young age of onset and the late diagnosis.

© 2014 Elixir All rights reserved.

### Introduction

The osteonecrosis is a condition realizing the various components of the cell death of bone. In sickle cell anemia, the red blood cell is subjected to several changes leading to a reduction in deformability, and thus an increase in vaso-occlusive events, they are responsible for the long osteonecrosis (1).

Its location at the femoral head in sickle cell disease is the most frequent and most serious because it involves the functional prognosis of the hip in young subjects (2). The clinical manifestations are nothing special, and the disease is often diagnosed late stage of joint destruction. Plain radiography classifies osteonecrosis in four developmental stages. The contribution of magnetic resonance imaging in this disease is very important, revealing pathognomonic signs, while the standard radiograph is normal (3).

The early stages of the disease, surgical treatment are conservative. Subsequently, it becomes radical by the establishment of the total hip prosthesis. We studied 04 cases monitored and treated in the service of orthopedic trauma teaching hospital Ibn Sina Rabat.

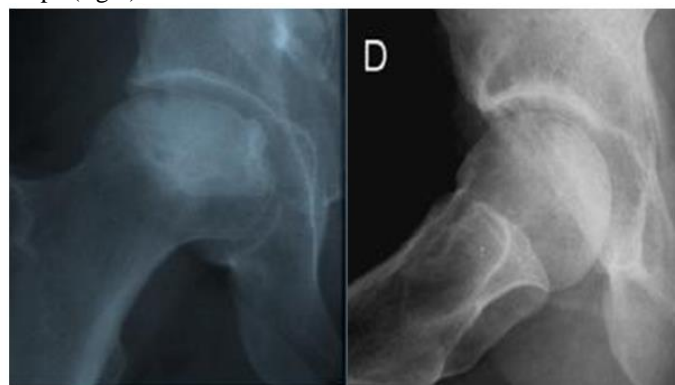
### Materials and Methods

Our study describes 4 patients with aseptic osteonecrosis of the femoral head secondary to sickle cell disease, monitored and treated in the trauma-orthopedic CHU Ibn Sina Rabat. This study was conducted over a period of 4 years.

By analysis of clinical records, the following information was collected: Age, sex, clinical study (functional signs and physical examination), radiological study (for all patients, we analyzed the standard radiograph of the pelvis using the Ficat and Arlet classification. MRI of the hip was also analyzed) and treatment (for the type of PTH and its mode of attachment) (Table 1).

### Results

The average age of our patients was 31years, with extremes ranging between 23 and 37 years. Our series includes 04 patients: 02 women and 02 men. The pain is constant; it is mechanical, and present in all patients. Abduction is limited in 02 cases. All patients received the standard radiation survey, analyzed according to the Ficat and Arlet classification. Stages 1 and 2 were absent. Stage 3 was present in 2 hips and Stage 4 in 2 hips (fig 1).



**Fig 1: stage 3; loss of sphericity of the head, the sign of the shell of egg**

MRI was requested in a single patient and revealed osteonecrosis of the femoral head with respect to the joint line. 4 operated hips in our series have all benefited a total prosthetic replacement. This indication was asked because all hips in our series were diagnosed with stage 3 or 4 of Arlet and Ficat.

We used cemented prostheses; prostheses were two piece type, and the other two of type double mobility (fig 2).

The postoperative course was uneventful, and the favorable evolution.

**Tableau 1: Observation of the various patients**

Observation	Age	sex	FUNCTIONAL SIGNS	PHYSICAL SIGNS	Radiological stage of Arlet and Ficat	treatment
1	37	F	Mechanical pain in the left hip lameness	Limitation flexion and abduction	stage 4	Dual mobility cemented THA
2	34	M	Mechanical pain of the right hip lameness	Limitation flexion and abduction walking difficult	stage 3 MRI done	one-piece cemented THA
3	23	F	Mechanical pain of the right hip lameness	Limitation of flexion and extension shortening of the right lower member	stage 3	one-piece cemented THA
4	32	M	Mechanical pain in the left hip Discomfort walking	Limitation of active and passive mobility	stage 4	Dual mobility cemented THA

## Discussion

The incidence of osteonecrosis of the femoral head in patients with sickle cell disease is difficult to establish. This is due to the low number of studies focusing on this issue, which is a contradiction, given the importance of the population suffering from this disease. Indeed, L. Went showed that 10.9% of Jamaicans are suffering from hemoglobinopathy S. And according to A. Laurens and J. Deprat, it reaches up to 40% of the people of Congo and 32% of Benin.



**Fig 2: Rx of control; the patient of the 2nd observation**

Unfortunately in Morocco, we have no epidemiological study on the incidence of sickle cell disease, and therefore its complications, including osteonecrosis of the femoral head. According to K. Homework (4), the incidence of osteonecrosis of the femoral head of non-traumatic origin is 5 times less frequent than in sickle cell disease. However, this finding cannot be affirmed as the frequency of different forms varies between countries and regions.

The average age in our series was 31 years. In K. Homawoo (40), the majority of patients are between 15 and 30 years and between 19 and 40 years for I. Mijiyawa. Patients C. Tobossi aged 16-26 years (5). Those figures are far from the average age of patients with aseptic osteonecrosis of the non-traumatic femoral head and is of the order of 42 years in a series of 16 patients followed in the service of orthopedic Traumatology Ibn Sina hospital in Rabat, 37 years in the Steinberg series and 32 years in Soucacos series (6).

The pain is nothing specific. During the illness, the patient may remain asymptomatic for a long time, and the disease diagnosed on plain radiographs. Conversely, the patient may complain of weeks and months without radiography showed no abnormality.

However, hip pain in sickle cell must always suggest the diagnosis of osteonecrosis.

The clinical examination is also nonspecific. The movements of the hip may be the limit of normal, even when the radiograph shows osteonecrosis at an advanced stage. In our series, all hips are symptomatic. Limitation of movement and lameness are present in all cases. All patients received standard radio, first-line examination before a painful hip in sickle cell. The Arlet and Ficat classification remains the most commonly used (7,8). In the series of Siquier, stage 1 is absent; stage 2 is 3.1%, stage 3: 59.37 % and stage 4: 37.6 %.

In the series of service Traumatology orthopedics Rabat from 2003 to 2006, was also absent stage 1, stage 2 accounted for 38 %, stage 3: 11%, and stage 4: 50%. In our series: Stages 1 and 2 are absent, the stage 3 is 50%, and stage 4: 50%. The absence of stages 1 and 2 is due to the late diagnosis of osteonecrosis in these sickle cell patients, and until this stage of intense and debilitating pain, reflecting the stage 3 (stage of subchondral fracture) or Stage 4 (osteoarthritis), requiring a total prosthetic hip replacement.

This delay can be explained by the fact that the hip pain is put on the account of cyclical crises, and it is only their persistence, or their association with a limp that motivates patients to consult. MRI diagnosis changed our habits, including potentially reversible stages of the disease where the femoral head still retains its sphericity. It also allows for a very precise lesion diagnosis.

The most characteristic of the tape image is hypointense on T1 and T2 which goes from one end to the other of the subchondral bone, thus defining the upper front area of the head whose signal varies seniority necrosis. However, in our series, only one patient has benefited from this review. The scanner is not systematic for diagnosis. It is reserved for the case where there is doubt about the existence of a subchondral fracture on standard radio.

Bone scintigraphy is very sensitive. It shows hyperfixations even pre-radiological stages, but is nonspecific (9,10,11). Medical treatment should be based on vasodilators, especially Vincamine, which leads to a relief of the vast majority of patients who tolerate them for a long time necrosis. Nonsteroidal anti-inflammatory drugs including acetyl salicylic acid gave very satisfactory results. In our series, and since all hips were diagnosed late, PTH was the only possible solution.

Thus, the USA, PTH represents almost unanimously authors as treatment of choice for aseptic osteonecrosis of the femoral head from the stage 3 confirmed. It was performed in all patients in our series. The immediate postoperative course was uneventful, and satisfactory long-term results. In a retrospective series of 50 PTH made service Traumatology orthopedics Ibn Rushd CHU under aseptic osteonecrosis of the femoral head, 64 % of the results were good, 24% average and 12% bad.

The results in this indication and are not as good as in osteoarthritis, due in most part to the risk of fracture prosthesis and major infectious risk in sickle cell subject, knowing that it is implemented in prostheses young subjects. But in the absence of these complications, and those with a good mastery of surgical techniques, PTH brings significant relief in these patients allowing them to resume their normal physical activity (12,13).

### Conclusion

Aseptic necrosis of the femoral head are one of the most common and most serious violations of sickle cell disease, involving the functional prognosis of the hip, especially as it occurs in young subjects, and often bilaterally. The diagnosis should be made early to potentially reversible stages of the disease. And it is the MRI is the most specific imaging and more sensitive. Changes outside of treatment is to progressively worsening stages of stages of subchondral fracture and osteoarthritis.

The current progress in hip has completely changed the functional prognosis of the disease, since it can make the patient stable, painless and mobile hips after installation of osteoarthritis.

### References

- [1] : Hunger Ford DS, Zizic TM. Avascular necrosis of bone. Intextbook of rheumatology edited by W N kelley, ED harris, S Ruddy and C Sledge 1989-1710.philadelphia, WB, saumerders, 1985.
- [2] : Mazières B. Ostéonécrose de la tête fémorale, revue marocaine de traumatologie, 2002-45-56.
- [3] : Mazabraud A. Nécrose idiopathique de la tête fémorale. Etude anatomopathologique et orientation étiologique. Sem hôpital Paris 1963, 39 ; 2773-2775.
- [4] : K. HOMA WOO, K. BISSANG, B. SONGNE, A. AYITE DREPANOCYTOSE ET OSTEO-NECROSE DE LA TETE FEMORALE Considérations thérapeutiques - A propos de 38 cas. Médecine d'Afrique Noire : 1991, 38 (7)
- [5] : TOBOSSI C. (1979) A propos de 16 cas d'ostéo-nécrose de la tête fémorale chez les drépanocytaires observés au Centre National Hospitalier et Universitaire de Cotonou (BENIN).
- [6] : Soucacos PN., Malizos KN., Beris AE. DEpartment of orthopaedic surgery, School of medicine, University of Ioannina, Greece. Ostéonécrose de la tête fémorale : le hip sauvetage à l'implantation d'un greffon fibulaire vascularisé : Les progrès de la microchirurgie. Revue Orthopédie clinique et la recherche connexe. CORTBR 1995, n° 314, pp. 67-75.
- [7] : Arlet J, Ficat RP. Diagnostic et traitement d'une coxopathie chronique, Editions techniques, Encycl. Med Chir. (Paris France) Appareil locomoteur 1431 2A 105, 1990, 25p.
- [8] : Ficat P. : Idiopathic bone necrosis of the femoral head : Early diagnosis and treatment J bone joint surgery, 1985, 67B, 3-9. ---[69] : Boettcher VG., Bonfiglio M., Koert S. : Non traumatic necrosis of the femoral head. Experience in treatment. JBJS, 1970, 52 A, 322-329
- [9] : Kubo T, Yamazoe S, Sugano N, et al. Initial MRI findings of non-traumatic osteonecrosis of the femoral head in renal allograft recipients. Magn Reson Imaging 1997;15:1017- 23.
- [10] : Ph. HERNIGOU, M.C. VOISIN, E. DESPRES, D. GOUTALLIER : Confrontation de l'imagerie par résonance magnétique nucléaire et de l'histologie dans les nécroses des têtes fémorales. Revue du Rhumatisme 1989, 56, (11), 741 -744
- [11] : Ph. HERNIGOU : Ostéonécrose des épiphyses de l'adulte. Edition technique, Encyclopédie Médico-chirurgicale Appareil Locomoteur 1995, 14-028-A-10.
- [12] : Steinberg ME., Larcom PG., Strafford B., Steinberg DR., Hosik BW., Hartam KE. : A qualitative system for staging avascular necrosis, JBJS Volume 77-B, N°1, January 1995, pp 34-41.
- [13] : Ph. Hernigou, D. Cohen, M. Rahmi : le traitement des nécroses aseptiques de la tête fémorale ; Revue marocaine de chirurgie orthopédique et traumatologique, 2001, 04, 9-11.