

## Femur Fracture Complications: Supported in Intensive Care of Surgical Emergencies of Surgical Emergencies

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### Introduction

The fracture of the femoral shaft represents a great classic of traumatology. It affects in particular the young subject, male, readily after a violent road trauma and in a frequent multiple trauma context.

In this case, the bone, visceral, thoracic and neurocerebral lesions frequently associated determine the prognosis, and the management of the fracture takes place in a multidisciplinary context.

### Materials and methods

**TYPE OF STUDY:** This is a descriptive retrospective study of 44 cases who presented with a fracture of the femoral shaft, regardless of their sex or age.

**LOCATION AND PERIOD OF THE STUDY:** All the files studied were collected at the intensive care unit and anesthesia of the surgical emergencies CHU IBN ROCHD in CASABLANCA, during a period of 2 years from January 2015 until December 2016

**DATA COLLECTION:** The data were collected using a pre-established operating sheet comprising: epidemiological, clinical, radiological, therapeutic and evolutionary data.

**STATISTICAL STUDY:** The statistical analysis was carried out by entering data in Excel and analysis using SPSS software, in consultation with the epidemiology service of the Faculty of Medicine and Pharmacy of Casablanca.

### Results

In our series the age of the patients varied between 16 and 85 years, the most affected age groups are the 20 to 30 years old groups with 19 cases (43%), this shows the great

exposure of the young subject to this type. fractures, with a clear male predominance of 73% and a sex ratio  $\approx 2.6$ . The fracture mainly involved the left side in 30 cases and road accidents were the most frequent etiology (66); the general examination aimed to eliminate a major lesion involving the patient's vital prognosis, we found a Glasgow score of  $13.69 \pm 1.31$  [6 - 15] with a Glasgow Coma Scale (GSC) less than 8 in 4.54% of our patients, respiratory distress dominating the clinical picture on admission, the mean respiratory rate was 23 c / min and the systolic blood pressure (SBP) was on average 97.95 mmHg , the mean diastolic blood pressure (DBP) is 61.13 mmHg, and the mean heart rate was 104 Bpm, 22 patients were tachycardic (50%) and 20 patients were admitted in shock.

All the patients presented with a painful thigh and absolute functional impotence, 96.6% of the patients had a limb in external rotation, 46.6% had a shortened thigh, 57.8% had an enlarged thigh with deformity in antero-external arch in 51.2% of the patients. In our series, 24 cases (55%) were polytrauma victims of which 18 had presented the association of two lesions, and 11 cases (25%) presented a polyfracture, we diagnosed a case presenting a section of the superficial femoral pedicle; also, a nerve damage to the external popliteal sciatic nerve was found.

The radiological assessment allowed confirmation of the of the diagnosis of the fractures by specifying the characteristics specific to each fracture (the site, the type, and the displacement); the average 1/3 represented the most frequent seat, found in 71.1% of cases; for the type of fracture line, we used the classification of Muller and Nazarian and we noted the high frequency of simple type A fractures in 25 cases (57%), of which 16 cases (36.36%) were simple fractures with transverse line (type A III). 8 patients benefited from cerebral CT, 18 patients received thoracic CT and 12 patients received abdomino-pelvic CT,

these explorations were made as part of the initial lesion assessment of polytrauma victims, in front of clinical signs suggesting a probable lesion at the level of the various cranio-thoraco-abdomino-pelvic levels and whose results have demonstrated a high frequency of thoracic lesions found in 22.27% of cases. Oxygen therapy through the tube or oxygen glasses was used in all patients; however, 13 of them (30%) had to be artificially ventilated. In our series, there were no cases of difficult intubation. The indication for mechanical ventilation was neurological failure in 23% of cases and respiratory distress in 27%, and hemodynamic failure in 50% of cases. All patients underwent a filling which consisted of filling with 9 ‰ saline crystalloids and the efficiency of the filling was judged on the return to normal of blood pressure and the resumption of urine output. Blood transfusion was required in 25 patients (56.81%). The use of vasoactive drugs was necessary in 51% of cases, usually after failure of filling in order to improve the hemodynamic status. Sedation was required in 18 patients (41%), with the predominant use of Hypnovel and Fentanyl. Regarding analgesia, it was our major concern at the admission of our patients insofar as it allows patient comfort with reduction in general metabolism and therefore reduction in oxygen consumption, it was provided by opioids in 77 % of cases in a fractional or continuous way with a self-pushing syringe, paracetamol by injection was used in all patients in combination with morphine or sometimes with anti-inflammatory drugs.

Antibiotic therapy was administered to all patients with an open fracture, the combination Amoxicillin + Clavulanic acid was the most used. The prevention of tetanus was systematically ensured by the antitetanus serum (TAS) and the follow-up of a tetanus vaccine (TT). It should also be noted that all of our patients have benefited from prevention of thromboembolic complications by low molecular weight heparin.

Placement of a chest tube was necessary in 4 patients (9%). 28 patients (68%) were operated on under locoregional spinal anesthesia and 13 patients under general anesthesia (32%), the means of osteosynthesis used were intramedullary nailing and screwed plates, and external fixators.

For complications, 20 patients (45.45%) presented with hemorrhagic shock, 14 of them were multiple trauma patients, 5 had multiple fractures and only one patient had an isolated open femoral fracture.

Among our 44 patients, 6 patients (13%) presented with fat embolism syndrome (FES); in 3 cases, FES occurred preoperatively, before surgical fixation, on D4 of the trauma in two patients and on D5 of the trauma in one patient; in 2 cases, FES occurred postoperatively, on D3 postoperative in one patient and D5 postoperatively in the other; while it occurred in a single case intraoperatively.

The clinical manifestations were dominated by the respiratory signs evolving in 2 cases by a respiratory distress syndrome, cutaneous petechiae were observed in 4 patients, 3 of them had conjunctival petechiae. Neurological signs were present in most of our patients dominated by disturbances of consciousness namely agitation and confusion. As for hemodynamic signs; 4 patients presented with tachycardia with HR > 120 bpm and one patient presented with cardiac arrest. Anemia and thrombocytopenia marked the blood counts of all our patients, 4 of our patients (66%) had a disturbed lipid profile and 2 patients had hypo albuminemia.

On the chest x-ray, there was a discrepancy between respiratory symptoms and chest imaging in 3 patients. Subsequently, all patients presented with alveolar or interstitial syndrome. The thoracic CT angiography was performed in a single patient, and he had objectified bilateral frosted glass opacities. On the other hand, cerebral CT was normal in 3 cases and revealed cerebral edema in a single patient.

For thromboembolic complications, one patient presented with DVT which was complicated by pulmonary embolism. Infectious complications were observed in two patients (4.54%) who presented with a local infection at the level of the skin opening and two other complications related to the site.

Noted a diabetic patient who presented with diabetic ketoacidosis. In our study, 7 patients died (15.9%), 3 cases preoperatively and 4 postoperatively; the cause of preoperative death was mainly fat embolism, multiple organ failure and septic shock

## Discussion

The femoral shaft fracture can occur at any age but mainly interests young adults between 20 and 39 years old depending on the series. Thus, we deduce that the young active population is the most exposed to this type of fracture given the frequency of accidents on public roads [1]. However, the average age of our series remains a little higher compared to the other series. KASTANIS [2] had a very young streak with an average age of 23.

The male predominance is reported by several studies. This can be explained by the great exposure of men to road accidents. In our series, humans were most frequently affected and this agrees with the results of all series, particularly those of SCHEDTS [3] and WOJCIK [4].

The discussion of the frequency of involvement on the right or left side is controversial, but most authors report the predominance of the left side [5]. SCHIEDTS [3] in 75%, Borel [6] in 63.24% and explained this by the fact that the traffic is on the right. In our series we found a slight predominance of the right side. The normal femur is a very strong bone, its involvement requires a violent high-energy

trauma. Thus, we find that road accidents are the most frequent etiology in several studies.

The skin opening was present in 10-20% of femoral fractures; in our series 15.9%. The association of a femoral shaft fracture and a pelvic ring fracture is not an exceptional entity, especially in high energy trauma. Brainard et al. found this association in the overturned pedestrian in 13% of cases, in our series it was found in 11.36% of cases. The upper shaft-metaphysis association actually constitutes a particular form of bifocal fracture of the femur. It occurs in 2 to 6% of cases, mainly in the context of high energy trauma, bilateral fracture of the femur is a classic association that can occur in 2 to 10% of cases depending on the series. It is characterized by increased morbidity and mortality linked to frequent associated lesions (thorax, abdomen, skull) but also by the risk of significant FES due to the two femoral fracture foci; the association of an ipsilateral tibial and femoral fracture constitutes the classic floating knee. It is encountered in 10 to 20% of fractures of the femur.

For complications, hemorrhagic shock was noted, blood loss during a fracture of the femoral shaft is estimated at about 1.3 L on average and is the cause of a constant drop in blood pressure, compensation by macromolecular solutes was therefore systematic. However, it is clearly accepted that an isolated and uncomplicated fracture of the femur cannot alone lead to the onset of a true state of hypovolemic shock, the existence of which should lead to the search for another hemorrhagic lesion (vascular wound, visceral lesion or brain, associated fracture in particular of the pelvic ring). There was also Fat embolism syndrome, Gurd proposed in 1970 diagnostic criteria that are still used, they include major criteria and minor criteria the diagnosis of FES is brought before the association of a major criterion and 4 minor criteria with in addition the presence of fatty macroglobulinemia. Most of the authors have abandoned this last criterion. Based on our series, there is a higher frequency of clinical and laboratory manifestations compared to other series. Thromboembolic disease is a classic complication in trauma to the lower limb. It is therefore not a specific complication of femoral fracture; however it is accepted that the frequency of DVT after fracture of the femoral shaft is of the order of 40%. But in the study by Geert et al [7] its frequency reached 80% in the absence of prophylaxis, the fracture of the femur thus constituting a statistically significant risk factor. In our series, we noted 1 case of deep vein thrombosis with a percentage of 4.54%, and this can be explained by the effectiveness of the prophylaxis with low molecular weight heparin, initiated in all our patients. Regarding infectious complications, the infection can manifest itself in various forms, it can be early and acute, in the form of an inflammatory collection on the surgical approach or on a possible skin opening or delayed by a few weeks, while the patient left the inpatient department. Clinical signs may be more severe, sometimes amounting to local pain without local or general inflammatory signs. Finally, it can be much later by taking different aspects: osteitis, infected pseudarthrosis, chronic fistulization. According to Simon [8] the average rate of infection on ECM is 1.1% for closed

fractures, and between 3.2 and 6.6% for open fractures according to studies conducted by Malik [9] Noumi [10] and Jenny [11]. The therapeutic method of choice for infection remains prevention. Among the measures directly dependent on the fracture of the femur it is necessary to retain the need for an antibiotic prophylaxis adapted to the local conditions, for open fractures a careful cleaning and trimming with biological samples and finally trimming, and an early fixation even in the case of open fractures, impossibility of usual internal fixation using an external fixator, possibly provisional pending secondary internal fixation.

## Conclusion

Complications can be serious and can be life-threatening, so understanding these complications and how to prevent them can improve patient outcomes. Resuscitation means play an essential role in the face of the various serious situations linked to this fracture. Without forgetting that, efforts must be made in terms of road safety to reduce the rate of road accidents which are the main cause.

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