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## Clinical Outcome of Non Simultaneous Bilateral Trochanteric Fractures

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**Abstract-** The intertrochanteric fractures cause, over variable degrees, many problems of management problems of taking depending on the physiological condition of the patient as well as diseases that are associated. The literature is rich in studies on per trochanteric fractures. The results of treatment of intertrochanteric fractures were changed by the emergence of resistant osteosynthesis implants, avoiding certain mechanical failures, also by raising awareness of pre and post operative care and reducing very significantly the level of postoperative mortality at the origin of the bad reputation of these fractures in the elderly. The occurrence of contralateral trochanteric fracture is a rare and unusual event reported in the literature. A retrospective study is reported in 24 patients with a mean age of 68 years with bilateral trochanteric fracture. An analysis of the epidemiological distribution of morbidity and mortality has been made with a description of the postoperative evolution and functional outcome in these patients.

**Keywords:** *bilateral fracture, trochanteric fracture, elderly, functional outcome.*

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# Clinical Outcome of Non Simultaneous Bilateral Trochanteric Fractures

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**Abstract-** The intertrochanteric fractures cause, over variable degrees, many problems of management problems of taking depending on the physiological condition of the patient as well as diseases that are associated. The literature is rich in studies on per trochanteric fractures. The results of treatment of intertrochanteric fractures were changed by the emergence of resistant osteosynthesis implants, avoiding certain mechanical failures, also by raising awareness of pre and post operative care and reducing very significantly the level of postoperative mortality at the origin of the bad reputation of these fractures in the elderly. The occurrence of contralateral trochanteric fracture is a rare and unusual event reported in the literature. A retrospective study is reported in 24 patients with a mean age of 68 years with bilateral trochanteric fracture. An analysis of the epidemiological distribution of morbidity and mortality has been made with a description of the postoperative evolution and functional outcome in these patients.

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## I. INTRODUCTION

The trochanteric fractures are responsible for high morbidity and mortality especially in the elderly population over 65 years. With the increase in the average age in the world's population, the Orthopedic Surgeon is encountered more and more with bilateral trochanteric fractures. The objective of this paper is to study the epidemiological distribution of this type of fracture, time of the second fracture and to report the clinical and functional results of different therapeutic methods.

## II. MATERIAL AND METHOD

This is a retrospective study mono centric spread over three years, between January 2010 and December 2013, on 24 patients hospitalized in trauma and orthopedics surgery department B4. We have studied in such patients, with non-simultaneous bilateral trochanteric fracture, the age, the demographic distribution, the seat of the second fracture,, type of osteosynthesis, the time of occurrence, the use of an eventual anti osteoporotic treatment and the clinical and functional outcome. The average age of our patients was 68 years, the series contained 18 Women for 6 Men, and 10 patients of the series were operated in the

same department of surgery for the first fracture (figure 1 – 2 ). 90% of our patients were autonomous after the first surgery. One patient was hospitalized for severe decompensation of his diabetes (figure 3). Two men are operated in the same year for an adenocarcinoma non-metastatic prostate cancer (figure 4). The reception of all the patients was systematically at the service of surgical emergencies with complete radiographic assessment including a radiograph of the pelvis and knees. The pre-anesthetic assessment of these patients was an essential and important step for possible surgical management.

*Table 1 :* shows the distribution of associated diseases in our patients.

All patients underwent a transthoracic heart-echo-, chest radiography with an expert opinion of Cardiology. Therefore the average hospitalization days shall be extended with an average of 15 days. The average time of the surgical procedure was 6 days. The deadline for the second fracture was highly variable in the study population with a mean of 16 months. . One patient with an ischemic cerebrovascular accident during the first episode fell into the rehabilitation session in the second episode of fractures within a period 9 months (figure 5). According to Ender classification of intertrochanteric fractures, 90% of the series have an unstable fracture, with rupture of the internal walls and comminution of the greater trochanter. (Table 3)

## III. TECHNIQUES AND OSTEOSYNTHESIS EQUIPMENT

The number of ways of fixation of trochanteric fractures is particularly important. They followed the developments of the osteosynthesis, when there are only a few decades, the surgical treatment of these fractures is recognized as superior than the orthopedic treatment.

Advances in the quality of materials as well as the design of the implants have benefited, more than any other sector, of the osteosynthesis failure analysis.

In this series of patients, two determinants factors in the choice of type of internal implant, bone quality and the importance of fracture comminution. 85% of the patients have an osteoporosis which occurs in 90% of cases an unstable fracture, with a detachment of the lesser trochanter and varus displacement. To this situation the intramedullary fixation devices (third

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generation standard gamma nail) was preferred over the extramedullary devices (DHS Dynamic Hip Screw) figure.

The surgical act took place in all patients under spinal anesthesia, on an orthopedic table for a fracture reduction. Standard gamma nail were implemented in 20 cases by an extra trochanteric exposure and in 4 cases a DHS plate by subtrochanteric minimally surgical exposure was introduced.

#### IV. RESULTS

Analysis of the results of the series shows a rate of consolidation, any type of fracture confused, 95% of cases of patient operated. A single case of infection occurring on DHS plate in a diabetic patient managed by medical treatment with surgical debridement. A case of immediate post-operative deaths by cardiogenic shock in a patient with triple non-surgical coronary stenosis. A case of myocardial infarction with an ejection fraction of 50% at one year postoperatively. All patients were followed in consultation with rehabilitation sessions with hip walking without support from the first day after surgery. That is how the urinary and pulmonary infection rate is practically null. No cases of pressure ulcers or skin suffering support have been reported. One case of migration of cervical screw plate DHS 130 was operated by a Lame plate 95.

#### V. DISCUSSION

In the period between January 2010 and December 2013, per trochanteric fractures accounted for the majority of cases of fractures of the upper end of the femur with 220 files. Non-simultaneous bilateral fractures of these cases represent 9.1% which is comparable to the series published in the literature. [1]. According to recent studies the incidence increases with aging of the population relative to the increase of osteoporosis. With increasing age, the risk of repeated falls increases and consequently the risk of non-simultaneous fracture also increases.

##### a) Sex ratio

Our study confirms the predominance of hip fractures in women than in men, with less than one quarter of male patients in the whole series. This proportion is also explained by the predominance of women in this age relative to life expectancy [2] and [3].

##### b) Anatomical form of the contralateral fracture

According to Ender classification [5] The contralateral fracture was generally the same shape as the first anatomical fracture. Two-thirds of the series had the same fracture types.

Symmetry has been demonstrated in 64-83% of cases depending on the series [4], [8], [13] and [14]. Schroder et al. [13], in a series of fractures of the proximal femur, found 6.2% of contralateral fractures, with 68% of the same anatomical type. Boston [14] was

83% identical fractures with 25% of bilateral subtrochanteric fractures. One explanation is the generalized decrease in bone mass was more pronounced in patients with a fracture of the Trochanter [14].

In the study of Shabbat et al. [4] exist 92% of symmetry. This symmetry is explained by the fact that each patient has his own approach and its own architecture of the bone, which could result in the same type of fall and therefore the same anatomical type of fracture. Fukushima et al. [8] Schroder et al. [13], and Ferris et al. [19] propose endogenous and morphological criteria.

The main morphological criterion could be the size of the femoral neck: a short neck-less than 5 cm may increase the risk of a fracture of the greater trochanter, while the neck of more than 5 cm may preferentially lead to a fracture of the femoral neck.

##### c) Mortality and morbidity of bilateral Trochanter fractures

Trochanteric fractures have a bad reputation of increasing the mortality from 20% to 25% after the age of 70 years and accelerated loss of autonomy [1], [2], [3], [5] and [6]. The study of Tinetti et al. [] Shows a mortality rate of 2.5 years was 41%, with 48% of deaths in the first year. As well, 92% of patients had a satisfactory range before fracture compared with 61.5% being independent and autonomous 52.6% for walking to 2.5 years. The fall resulting in fracture was symptomatic of a pathological condition in 41% of cases. Zuckerman [9] evaluate the post operative autonomy after surgery for hip fracture, 20% stopped working, 30% of autonomy altered, and only 50% return to the previous level of autonomy.

The mortality rate in our series was 4.1% in patients with bilateral subtrochanteric fracture against a rate of 9.1% among patients registered in the same period with a unilateral subtrochanteric fracture. Boston [14] found a higher mortality in the second fracture (30% at 3 months 13% after a first fracture). For Berry et al. [7] the mortality increased by 16% at 1 year after a first fracture 24% for contralateral fracture. Haentjens et al. [22] found a higher mortality rate for trochanteric fractures (28% at 1 year), which occur in the elderly whose return to autonomy may be more difficult. Predictors of mortality in the short and medium term are advanced age more than 85 years, the minimum autonomy before the fracture and the time of surgical treatment [18]. Limited autonomy is a risk factor for recurrence and a negative factor for survival [7] and [21]. Patient management should be complete and consist of treating the episode of acute fracture and prevent the occurrence of complications related to factors and comorbidities, while preserving the autonomy of the patient. This management must be multidisciplinary and both medical and surgical with

surgeons, geriatricians, physiotherapists, dieticians and general physicians. [5]

d) *Can we prevent the second fracture?*

The risk factors for trochanteric fractures are multiple. A number of these factors can be prevented such as osteoporosis, iatrogenic factors, reduced physical activity and nutrition and neurosensory disorders. Others have no effective preventive measures (maternal history of hip fracture, the length of the femoral neck, hormonal history). [6] We must insist on the importance of preventing falls and especially repeated falls [5] and [21]. Merle [5] and Chiu et al. [30] found that 80% of patients who had a fracture of the hip fell in the following year. Neurological deficits are the main risk factors for falls in older people. Patients lateralization have higher rates of dementia, neurological disease, and Parkinson's disease [4], [8] and [30]. Malnutrition is also a risk factor [6] and [21]. Osteoporosis, the main risk factor for hip fracture, is under-diagnosed and under-treated [4], [6], [12] and [16]. However, a 5% increase in bone mineral density (BMD) appears to reduce the risk of fracture of the proximal femur by 25% [6] and [23].

It has been demonstrated that medical treatment with bisphosphonates, estrogens, vitamin D and calcium, and recently strontium ranelate [24], to reduce the rate of hip fracture in elderly women [26] and [27]. Bisphosphonates increase BMD, especially during the first 3 years of treatment, and reduce the risk of non-vertebral fractures [16] and [23]. The indication is suggested after a vertebral fracture, wrist or hip fracture because these are signs of osteoporosis [5]. The study of files the series shows that only 2 patients received treatment with vitamin D with calcium. Haentjens et al. [22] described the Trochanter fracture often associated with vitamin D deficiency. Taking vitamin D in combination with calcium reduces the incidence of hip

fracture in particular during the first 18 months [5], [16] and [28]. This treatment preserves bone quality and reduces the risk of falls by improving muscle function [12] and [15]. Shabbat et al. [4] confirmed that the preventive medical treatment is generally well accepted, while only 24% of patients receive after a first fracture. Kamel et al. [29] have shown that only 5% of women are effectively treated after a first hip fracture.

Chapurlat and Meunier [16] confirmed the obligation of orthopedic surgeons to refer the patient to a medical treatment of osteoporosis when they show a typical fracture (fracture of the lower end of the wrist, vertebral fracture or hip fracture). This management includes the specific treatment of osteoporosis as well as calcium and vitamin D.

After an initial Trochanter fracture, effective rehabilitation should be established with a capital for as short as possible and exercises to increase walking and promote rapid recovery of autonomy period. It is essential to adapt the patient's environment or even equip the patient to prevent future falls, as well as to provide appropriate medical care to its comorbidities.

VI. CONCLUSION

Trochanteric fractures are a public health problem for the elderly. The incidence of bilateral Trochanter fractures increases with the aging of the population. The incidence is continuing growth in the order of 10%, with 85% identical to the first fracture. They occur on average within two years after the first fracture. Prevention is necessary and essential, requiring a triple action: on the patient's environment, rehabilitation to establish autonomy after a first fracture, and preventive treatment of osteoporosis.

*Conflict of interest*

The authors declare no conflict of interest.

Table 1 : Distribution of associated defects in the study population

	Type II diabetes	Adenocarcinoma of the prostate	Vascular ischemic stroke	ischemic heart disease	Parkinson's disease	depression	dementia	kidney failure	Cirrhosis of viral hepatitis C
Number of cases	4	2	1	1	1	3	1	2	1



Figure 1 : Bilateral fracture of the trochanter (DHS plate)



Figure 2 : Bilateral fracture of the trochanter (decline of neck screw)



Figure 3 : DHS plate for treatment of trochanteric fracture right not Displaced



Figure 4 : Undisplaced contralateral fracture

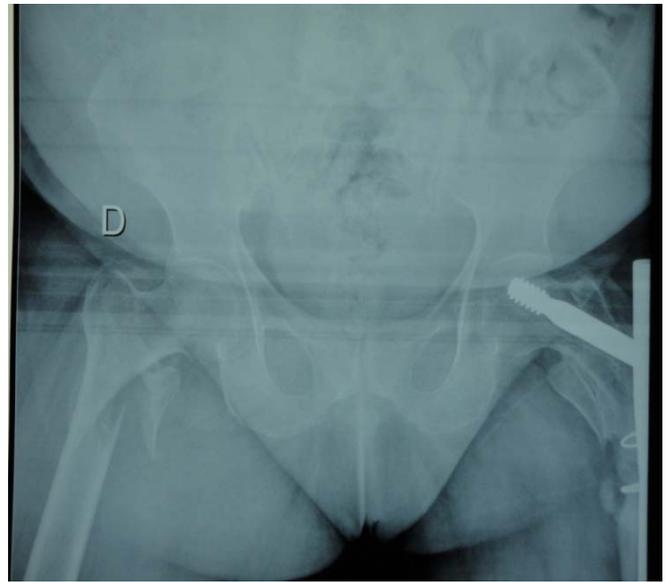


Figure 5 : The right trochanter contralateral communitive fracture



Figure 6 : Consolidation of both fracture sites

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