

Study of Contralateral Hip Fractures After Surgical Management of First Hip Fracture - A Retrospective Study

¹Dr. Sujay Gupta, Post Graduate Resident, Department of Orthopaedics, Government Medical College, Kota (Raj.) India

²Dr. Lokesh Jangid, Senior Resident Department of Orthopaedics Government Medical College, Kota (Raj.) India.

³Dr. Mahendra Meena, Senior Resident, Department of Orthopaedics, Government Medical College, Kota (Raj.) India

⁴Dr. Rajesh Goe, Ex-Senior Professor, Department of Orthopaedics, Government Medical College, Kota (Raj.) India

⁵Dr. Ram Prasad Meena, Senior Professor and Head of the Department, Department of Orthopaedics, Government Medical College, Kota (Raj.) India.

Corresponding Author: Dr. Sujay Gupta, Post Graduate Resident, Department of Orthopaedics, Government Medical College, Kota (Raj.) India

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Abstract

Introduction: Previous studies have shown that 2–12% of patients with a hip fracture of any type sustain a subsequent contralateral hip fractures over a variable period of time.

Aims and Objective: To analyze the epidemiology and risk factors of contralateral hip fractures in a large cohort treated at a Tertiary Health Care centre between Jan 2016 and Jan 2021.

Materials and Methods

- Type of study: Retrospective, Single-centre, observational , cross sectional.
- Duration of Study: 5 years (Jan 2016-Jan 2021). Number of patients: 647 (M - 285 ; F - 362) .
- subjects: Operated Patients with previous episode of hip fracture treated with any surgery. The operative records and medical history were analysed retrospectively and recorded.

Results

Total number of contralateral hip fractures occurred in 12.5% of all patients. The mean age of patients was 72.4 years . The mean time of occurrence of contralateral hip fracture was 18 months. Mortality of the whole study population was 15.1% at 5 years .Most common type noted were intertrochanteric fractures. Majority of subsequent hip fractures occurred in 1st year.

Conclusion: 12.5% of previously operated patients developed subsequent hip fractures. Most common type of subsequent C/L hip fractures noted in our study was intertrochanteric fractures. Majority of fractures occurred within 1st year of surgery. Older age, female sex and associated comorbidities (Diabetes, chronic heart disease) were noted to be associated with contralateral hip fractures. Nutrition played an important role because osteoporosis had increased since 1st episode of fracture on one side. Early and active rehabilitation after surgery

is important to prevent the occurrence of contra-lateral hip fracture in the elderly.

Keywords : contralateral , hip , intertrochanteric fracture , osteoporosis , subsequent , risk factors

Introduction

The incidence of a subsequent femoral fracture is significant among patients who have suffered an initial hip fracture [1–3]. Previous studies have stated that 2–12 % of patients with a hip fracture of any type sustain a contralateral subsequent femoral fracture. The high impact of these fractures on patients' quality of life, social independence and mortality is well known, as well as the relevant social and economic burden. The incidence of PFFs increases every year due to overall aging of the population and prevalence of osteoporosis. These fractures are still the main indication for hospitalization and surgical treatment in the elderly. Besides high morbidity and mortality rates, patients who suffer from a subsequent femoral fracture have an increased risk of undergoing a second fragility fracture, including a contralateral subsequent femoral fracture (4). Aim of the study is to analyze the epidemiology and risk factors of contralateral proximal femur fractures on a large cohort of PFF patients treated in a single center. Secondary aim of the study is to study the impact of previous hip surgery on the prevalence of subsequent contralateral hip fractures.

Materials and methods

In our trauma center, all the in-hospital medical records and ambulant patient's files were prospectively recorded with an electronic database, so that information on specific procedures could be determined also by a manual search at any time. In our retrospective cohort study, we included all the patients with previous episode of hip fracture (inter-trochanteric or subtrochanteric femoral fracture) treated with osteosynthesis (a short or

long Intramedullary Nail or DHS or cannulated screw) or replacement surgery at GMC, Kota who received surgical treatment for contralateral proximal femoral fractures between January 2016 and January 2021 (5 years) 647 (M - 285; F - 362). After registering the study patients from the database, the descriptive data such as gender, age, fracture side, fracture type, duration between emergency admission and surgical treatment, surgical procedure (osteosynthesis versus arthroplasty), hospitalization in days as well as cognitive impairment were collected. To study the true impact of previous surgery on the distribution of Subsequent hip fractures after intramedullary nailing or DHS or cannulated screw or replacement surgery of neck, inter-trochanteric and subtrochanteric fractures, the pre-operative status in both femur was investigated. The occurrence of and time to a new admission due to a subsequent hip fracture was registered, yielding total exposure time. Patients in the control group with nearly the same age, the same gender, type of hip fracture (femoral neck, intertrochanteric or subtrochanteric fracture), duration of osteoporotic medication and time of occurrence of the first hip fracture were included in the study.

The inclusion criteria for this study were

1. All patients who received surgical treatment for contralateral proximal femoral fractures between January 2016 and January 2021
2. Patients aged 60 years or older previously treated for hip fracture (intertrochanteric, subtrochanteric and femoral neck fractures).

The Exclusion criteria were

1. patients aged < 60 years
2. old, periprosthetic fractures
3. pathological fractures caused by a tumor disease,
4. simultaneous bilateral or segment fractures,
5. isolated fractures of the trochanteric region,

6. femoral head fractures
7. previous long term or high dosage systemic corticosteroid therapy.
8. revision hip arthroplasties.

Comorbidities taken into consideration were

1. hypertension and cardiac diseases (cardiac insufficiency, myocardial infarction, angina pectoris, arrhythmia)
2. respiratory diseases (chronic obstructive pulmonary disease, chronic respiratory insufficiency)
3. diabetes mellitus.
4. renal and liver insufficiency
5. visual impairment
6. Alcohol consumption, smoking

Regarding pharmacotherapy, previous long term or high dosage systemic corticosteroid therapy was recorded, as well as pharmacological therapies for osteoporosis (Vitamin D and/or antiresorptive drugs) in use at the time of admission.

Finally, a follow-up was performed with evaluation of any revision (including revisions external performed) as well as determination of mortality—with an endpoint at least 5 years postoperatively for every patient

Results

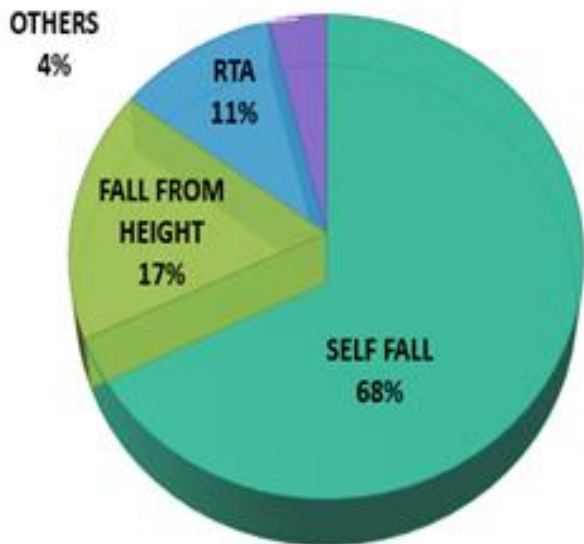
1. A total of 647 (Males - 285; Females - 362) patients with proximal femoral fractures were surgically treated between January 2016 and January 2021. Out of 647, 81

patients were treated for a contralateral fracture, resulting in an incidence rate of 12.5%. The mean age at the time of the initial fracture was 76.4 years (median 79.0 years; SD ± 8.2), and female were especially affected (53/81; (65%). The mean age of the female and male was almost identical (76.4 versus 78.3). Most common mode of subsequent injury was self-fall (55/81) followed by fall from height and road traffic accidents. The mean time of occurrence of contralateral hip fracture was 18 months within the occurrence of initial hip fracture (Range 2 months to 54 months). Mortality of the whole study population was 4.1% (26 patients) at 1 year and 15.1% (98 patients) at 5 years. Out of 98 patients who died, 29 had contralateral hip fracture. This data was collected using telephonic conversation. Majority of subsequent hip fractures occurred in 1st year (31/81; 38.2%) and 61% (50/81) occurred within 2 years after the initial fracture. There were gender-specific differences regarding the time interval: females suffered a contralateral fracture significantly sooner than males (mean 53.2 versus 69.9 months; p = 0.002). Out of 647 patients to have an initial hip fracture, 477 (73.7%) had intertrochanteric fracture. Interestingly, intertrochanteric fractures were also the most common type in subsequent contralateral hip fractures with an incidence of 83.9% (68/81) . At last, significantly more patients were affected by dementia at the time of the contralateral fracture.

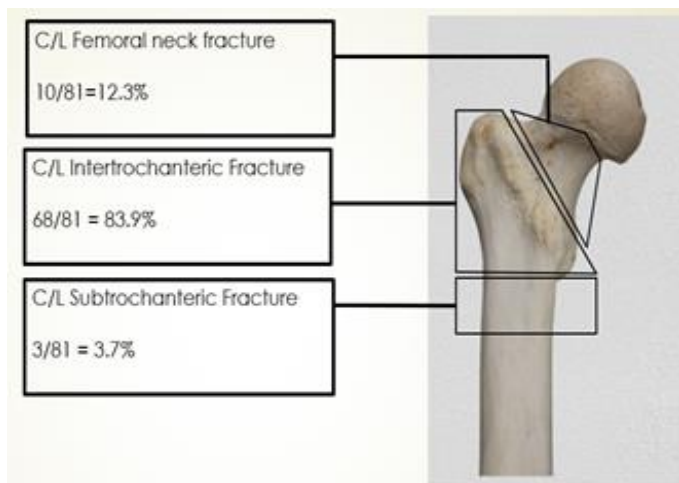
Table 1: Variables of the total 81 study patients into initial versus contralateral fractures.

Variables	Initial fracture	Contralateral fracture	p value
Age (mean)	76.4 (SD± 8.2)	84.3 (SD± 7.5)	0.000
Female/male	53/81	28/81	–
Fracture side: right/left	38/43	43/38	–
Time to surgery (h)	32.0 (SD± 33.2)	26.6 (SD± 21.6)	0.201
Osteosynthesis/arthroplasty	41/40	34/47	0.358
Duration of hospitalization (days)	15.7 (SD± 6.0)	15.1 (SD± 8.2)	0.074

Graph 1: mode of injury.



Graph 2: type of subsequent hip fracture.



Graph 3: occurrence of subsequent contralateral hip fracture.

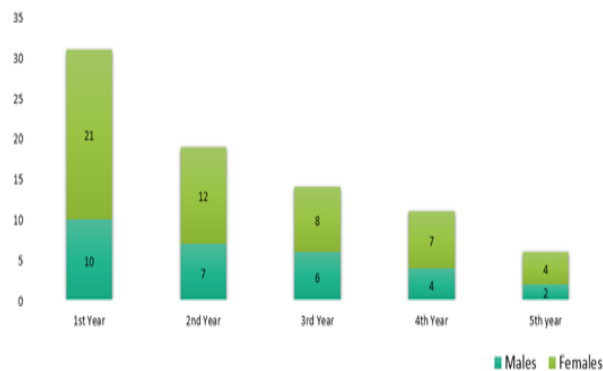


Table 1

Sn.	Risk factor	Second hip fracture (n= 81)	No second hip fracture (n= 564)	P value
1	Dementia	14	38	0.007
2	Smoking	39	141	0.015
3	Respiratory diseases	29	83	0.019
4	Diabetes mellitus	37	168	0.043
5	Renal insufficiency	21	86	0.024
6	Alcohol	34	148	0.032
7	Hypertension	43	267	0.617
8	Cardiac diseases	21	109	0.461
9	Liver insufficiency	08	63	0.532

Discussion

To the best of our knowledge, this retrospective cohort study is the first analysis that provides a high number of contralateral femoral fractures with a minimum follow-up of 5 years for the entire collective. It must be emphasized that all patients or their relatives were reached despite a follow-up period of many years. Therefore, we have no “lost to follow up” for patients. The cumulative prevalence of subsequent contralateral hip fracture at final follow-up in our study was 12.5%. which is in concordance with the rate of a meta-analysis by Zhu e al. who had observed a prevalence of 8.5 % [8]. Second, the

study documented a mean interval of 5.2 years for a contralateral after an initial fracture, which coincides with the result by the authors Gaumetou et al. [16], who analyzed 241 patients and evaluated a mean interval of 5.6 years. However, in many studies the mean interval was only 2 up to 3.4 years and thus significantly shorter [7, 9, 14, 15, 17–19], which is certainly due to shorter periods of follow-up and “lost to follow-up”. Third, our data demonstrated, that the highest risk for a contralateral fracture was within the first year (38.2%) after the initial fracture. This was also reported by other authors [7, 9, 14, 19]. Our analysis was also in agreement with other authors, that contralateral fractures primarily had the same fracture pattern as the initial fracture [7, 14]. In this study, the first author reviewed all pre- and postoperative X-rays of the study patients again and made an objective differentiation of cervical neck versus trochanteric fracture. We also recorded the renal, and liver function status database of the patients. Also we interrogated them about their personal drinking, smoking and eating habits, history of any drug intake and medical history of hypertension and cardiac diseases (cardiac insufficiency, myocardial infarction, angina pectoris, arrhythmia), respiratory diseases (chronic obstructive pulmonary disease, chronic respiratory insufficiency) and diabetes mellitus and concluded our results. We also observed that diabetics and chronic alcoholics were at an increased risk of subsequent contralateral hip fracture, as reported in studies done previously [7, 8, 15]. Similarly, we observed that dementia was the most significant risk factor in our cohort in predicting a second hip fracture, which is in agreement with previous studies [4]. Significant association for both renal insufficiency (disturbances in bone and mineral metabolism, secondary hyperparathyroidism) [5,6] and respiratory diseases [2,6] (impaired mobility and long-term corticosteroids systemically

predispose to reduced bone mineral density) was observed, which was also seen in studies conducted by Mitani et al [5]. Significant association was found between osteoporosis and subsequent contralateral hip fractures from serological tests (S. Calcium, alkaline phosphatase), thorough radiological and clinical examination. Patients who had history of osteoporosis had more tendency to subsequent fractures due to decreased bone quality. A higher female (65%) preponderance was seen in our study as observed in another study conducted by Song Liu et al [1]. This could be possibly be due to a decline of estrogen levels in postmenopausal period [7, 9, 14, 16]. At the time of our follow-up, only ten patients were still able to walk without impairment. However, this does not reflect the status of the affected hip joint or the leg, but more the general condition of the frequently multimorbid patient. The authors investigated the preoperative as well as postoperative mobility after contralateral fractures [7]. Regardless of the initial health condition, the situation 1 year postoperatively had worsened in about 50% of the cases. It should be pointed out that the health status of the elderly patients can worsen due to the course of time alone—and not exclusively by the incident of the fracture only. On detailed interrogation, we observed that patients developed fear after 1st fracture and overall mobility of patient after 1st operation was reduced significantly as compared to pre-trauma ambulatory level. This probably had further weakened the long bones and resulted into 2nd fracture.

Conclusion

The contralateral femoral fracture was accompanied by a higher mortality rate. Around 12.5% of previously operated patients developed subsequent contralateral hip fractures. Majority of these fractures occurred within 1st year of surgery. Most common type of subsequent Con

contralateral hip fractures noted in our study was intertrochanteric fractures. Older age, female sex and associated comorbidities (Dementia, Diabetes, Respiratory diseases, Renal insufficiency and Smoking) were noted to be associated with contralateral hip fractures. Decreased mobility played an important role in predisposing the patients to subsequent contralateral hip fracture. We recommend that early and active rehabilitation after surgery is important to prevent the occurrence of contralateral hip fracture in the elderly. We also recommend a thorough medical optimization, counselling and fall prevention assessment of operated patients prior to their discharge to reduce the risk of a second fracture.

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