

A DEMOGRAPHIC AND OPERATIVE AUDIT OF SUBTROCHANTERIC FEMUR FRACTURE IN A TERTIARY CARE TEACHING INSTITUTE



Orthopaedic

KEYWORDS: : subtrochanteric fracture; plating; nailing; demography; femur.

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ABSTRACT

This study was carried out to audit the demographic trends of subtrochanteric femur fractures in the young and middle-aged population. It also analyzed the role of demography and fracture classification on surgeon's choice of operative intervention. Among the study population of 25 to 50 year age group, there appeared to be no significant relation between the demography or fracture type and the operative method selected by the surgeon (extra-medullary plating or intra-medullary nailing).

INTRODUCTION

The George Institute for Global Health, University of Oxford has estimated that by the advent of 2020, almost one-fifth of the Indian population shall be over 60 years of age, raising the annual incidence of hip fractures to around 6,00,000. Estimating with the current available age-specific mortality rates, 40 % of these cases shall prove mortal in a timeline of one year. [1]

Considering the large number of studies carried out, pertaining to the evaluation of all aspects of hip fractures, there still remains a lot to be answered. A significant chunk of the questions related to this group of fractures, are queries linked to the choice of intervention in these fractures. They arise out of the dramatic improvements or deteriorations in function due to the particular modalities of treatment selected in that particular type of hip fracture. Hence over the years, a large number of criteria, both subjective as well as objective, have been developed, to measure the end-results of the treatment modalities used for hip fractures. However, it is vital that these assessments are, both, valid and reproducible.

Subtrochanteric fractures are diaphyseal fractures of the femur occurring in the proximal femur between the inferior aspect of the lesser trochanter and a distance of about 5cm distally. [2]

Astley Cooper, the renowned English surgeon and anatomist, gave the very first description of subtrochanteric fracture in 1851, along with the intra and extra-capsular description of the fracture anatomy in hip fracture. [3], [4] These fractures generally occur in bimodal age distributions: the young, high energy, often polytraumatized population; and the elderly osteopenic population, typically resulting from a low-energy fall from a standing height. The subtrochanteric region experiences the highest tensile and compressive stresses of any bone in the human skeleton. Compressive forces in the medial cortex can exceed 1200 lbs per square inch resulting in severe comminution of the medial cortex. [2] This hampers the medial cortical blood supply.

This study was carried out to audit the demographic trends of subtrochanteric fractures in the young and middle-aged population and study the role of demography on surgeon's choice of operative intervention.

MATERIAL AND METHODS

All patients of subtrochanteric femur fracture within an age group of 25 to 50 years, who underwent operative intervention by either intra-medullary nailing or extra-medullary plating at the King Edward VII Memorial Hospital, from July 2012 to November 2013 were included in the study.

The cases were classified on the basis of:

1. The operative method (intra-medullary nailing or extra-medullary plating)
2. Seinsheimer classification into types: I, II A, II B, II C, III A, III B, IV, V
3. Jensen-Michaelsen classification into stable and unstable types
4. Different age groups
5. Male and female groups
6. Different groups based on the time interval from trauma to surgery

Aims And Objectives: This study measures the demographic trends and their influence on the surgeon's choice of operative method.

Study Design: Retrospective, analytical, observational study.

Inclusion criteria:

1. Unilateral Subtrochanteric femur fracture
2. Age >25 years and <50 years
3. Operated by intra-medullary nailing or extra-medullary plating

Statistical Analysis: The statistical test used was two-tailed Chi-Square test.

RESULTS

A total of 53 cases operated for subtrochanteric fractures were included in the study. They were classified according to Seinsheimer's classification. Type IIIA constituted the maximum number of cases (n=11) with 7 by the plating method and 4 by the nailing method; followed by Type V (n=10) with 6 by the plating method and 4 by the nailing method. Rest of 32 patients belonged to Type I (n=4), IIA (n=4), Type IIB (n=5), Type IIC (n=7), Type IIIB (n=7) and Type IV (n=5).

By Jensen-Michaelsen classification of subtrochanteric fractures into stable and unstable varieties, the study population could be divided into 20 stable (11 plating and 9 nailing) and 33 unstable (19 plating and 14 nailing) fractures.

Table 1: 'p' value (two-tailed) by chi square test: 0.997. Signifies that there was **no statistically significant relation between the Seinsheimer grade and the choice of method selected by the surgeon.**

Table 2: p value (two-tailed) by chi square test: 0.855. Signifies that there was **no statistically significant relation between the fracture type (in terms of stable and unstable), and the choice of method (plating or nailing) selected by the surgeon.**

Table 1: Grouping of the subtrochanteric fractures according to the Seinsheimer type and subgrouping into operative methods

Seinsheimer type	Extra-medullary plating	Intra-medullary nailing	Total
I	2	2	4
II	9	7	16
A	2	2	4
B	2	3	5
C	5	2	7
III	10	8	18
A	7	4	11
B	3	4	7
IV	3	2	5
V	6	4	10
Total (n)	30	23	53

Table 2: Stable and unstable fractures according to Jensen-Michaelsen classification

Jensen-Michaelsen classification	Extra-medullary plating	Intra-medullary nailing	Total
Stable	11	9	20
Unstable	19	14	33

The mean age of the patients in our study was 38.87 years with the minimum age being 28 years and the maximum age being 49 years. Maximum patients belonged to the 35-44 year age group (n=28)

Table 3: Age distribution in Seinsheimer types

Sein- sheimer type	n	Average age		
		Over- all	Plating	Nailing
I	4	35.5	37	34
IIA	4	35.75	33.5	38
IIB	5	39.4	42.5	37.33
IIC	7	34.43	36	30.5
IIIA	11	41.09	39.43	44
IIIB	7	41.71	41.33	42
IV	5	37.6	38.33	36.5
V	10	40.5	41.5	39
Overall	53	38.87	39	38.70

Table 4: Age-group distribution irrespective of the Seinsheimer type'

Age-group	Overall	Extra-medullary plating	Intra-medullary nailing
25-34	13	7	6
35-44	28	16	12
≥45	12	7	5

p' value (two-tailed) by chi square test: 0.971. Signifies that there was no statistically significant relation between the age group and the choice of method selected by the surgeon.

The study population had 28 males and 25 females.

Table 5: Gender distribution in the Seinsheimer types

Sein- sheimer grade	n	Males	Females				
		O	P	N	O	P	N
I	4	2	1	1	2	1	1
IIA	4	3	1	2	1	1	0
IIB	5	3	2	1	2	0	2
IIC	7	3	2	1	4	3	1
IIIA	11	7	5	2	4	2	2
IIIB	7	3	1	2	4	2	2
IV	5	1	1	0	4	2	2
V	10	6	4	2	4	2	2
Total	53	28	17	11	25	13	12

Table 6: Gender distribution depending on the method employed irrespective of the Seinsheimer

Sex	Plating	Nailing
Males	17	11
Females	13	12

O: Overall, P: Plating, N: Nailing

p value (two-tailed) by chi square test: 0.523. Signifies that there was no statistically significant relation between the gender of the patient and the choice of method selected by the surgeon.

The average duration from the time of trauma to surgery was 3.11 days with a range of 1-13 days. Maximum cases were operated in the period of 2-4 days (n=39).

Table 7: Time from trauma to surgery in the Seinsheimer types

Seinsheimer grade	n	Time from trauma to surgery (average in days)
I	4	4.5
IIA	4	1.75
IIB	5	2.8
IIC	7	3.57
IIIA	11	3.91
IIIB	7	3.43
IV	5	2.2
V	10	2.3
Overall	53	3.11

Table 8: Selection of method according to time from trauma to surgery

Time from trauma to surgery	Overall	Plating	Nailing
< 2 days	6	3	3
2-4 days	39	19	20
5-7 days	4	4	0
> 7 days	4	4	0

p value by chi square test: 0.065. Signifies that there was no statistically significant relation between time from trauma to surgery and the choice of operative method selected by the surgeon.

DISCUSSION & CONCLUSION

This study throws light onto the demographic classification of subtrochanteric femur fractures occurring in the young and middle-aged population. It further sub-classifies the subtrochanteric femur fractures into Seinsheimer and Jensen-Michaelsen subtypes. Statistical analyses reveal no correlation between the demography or

fracture subtype and the surgeon's choice of operative method, viz. extra-medullary plating or intra-medullary nailing. Thus there is no preconceived choice of operative method depending on the age group, gender or the fracture sub-type in the 25 to 50 year population of subtrochanteric femur fractures.

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