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EVALUATION OF FUNCTIONAL OUTCOME OF EARLY VERSUS DELAYED SURGERY FOR FRACTURES OF HIP IN ELDERLY

Orthopaedics

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ABSTRACT

Background and Objectives: The present study consists of 37 consecutive elderly patients treated surgically for fracture of the hip at Tertiary care Hospital, Surat from August 2016 to December 2018. Of these 31 patients were available for follow up and were evaluated to study the functional outcome of early versus delayed surgery for fracture of hip.

Methods: 18 patients with intertrochanteric fracture treated by internal fixation with dynamic hip screw and the remaining 13 patients who had fracture neck of femur were treated with arthroplasty. 6 in the intertrochanteric fracture group and 4 in the fracture neck group were operated with 72 hours after injury and the remaining were operated after 72 hours. The pre-existing medical conditions, intra-operative and post-operative complications were documented. The functional results at the end of one year were judged according to the hip rating scale of Merle d'Aubigine.

Results: 26% of patients in the intertrochanteric fracture group and 28% of patients in fracture neck group who were operated later than 72 hours had died at 12 month follow-up compared to 17% and 12.5% respectively in those patients who were operated early. The operative delay had a direct bearing on 1 year mortality so also on the development of pressure sores and increased length of hospital stay.

Interpretation and Conclusion: Operative delay of more than 72 hours in elderly patients with fracture of hip results in increased incidence of pressure sore formation, increased length of hospital stay and significantly increases mortality at 1 year follow – up.

KEYWORDS

Fracture hip, intertrochanteric fracture, fracture neck of femur, arthroplasty.

INTRODUCTION

Fractures of Hip are one of the commonest injuries sustained by the aged. These occur predominantly in patients over 60 years of age. They are 3 to 4 times more common in women than in men. These fractures usually occur in bones being affected by osteoporosis, osteomalacia or Paget's disease (Kaufer H. 1980, Dover J. 1980) with trivial fall being the most common mechanisms of injury.

For many, this fracture is often a terminal event resulting in death due to cardiac, pulmonary or renal complications. Approximately 10 to 30% of patients die within 1 year of fracture. (Kyle et al 1980)[1]. Earlier, little attention was paid to these fractures, as these occur through cancellous bone with excellent blood supply, healed regardless of treatment. However conservative treatment usually resulted in malunion with varus and external rotation resulting in a short leg gait and limp, and a high rate of mortality due to complication of recumbency and immobilization.

The goal of treatment in fractures of hip must be restoration of the patient to his or her pre-injury status at the earliest possible time. This led to recommendations for internal fixation of these fractures to increase patient comfort, facilitate nursing care, decrease hospitalization and reduce complications of prolonged recumbency.

The present study is an attempt to compare the outcome of early versus delayed surgery for fractures of hip in elderly.

AIM OF THE STUDY

To evaluate the functional outcome of early versus delayed surgery for fractures of hip in patients over 60 years of age

MATERIALS AND METHODS

The present study consists of 37 consecutive elderly patients who were treated surgically for fracture of the hip at the department of orthopaedic surgery, Tertiary care Hospital, Surat from August 2016 to December 2018. Of these 31 patients who were available for follow up for a minimum period of one year after the fracture are included in the study. These patients were evaluated to study functional outcome of early versus delayed surgery for fracture of hip.

The patients who were older than 60 years ,who had either displaced intracapsular fractures or extracapsular fractures of hip and who had been independently mobile before sustaining the fracture of the hip were included in the study. Patients who were unable to walk before the fracture, who were younger than 60 years and those with associated other fractures or those with pathological fractures were not included in this study.

Of these 61 patients, 13 patients had fracture neck of the femur and were treated by hemiarthroplasty; the remaining 18 patients had intertrochanteric fracture and were treated by internal fixation using dynamic hip screw.

Once the patient was admitted to the hospital, all the essential information was recorded in the proforma prepared for this study. The patients were regularly observed during their hospital stay. Those patients who got discharged from the hospital were advised for regular follow up in the out-patient department. Those who did not come for follow-up were reminded by post. 6 patients who could not come for follow up answered the required questions. 13 patients were lost to follow-up. Only those patients whose data were available at the end of one year or more after the fracture were taken up for the study.

After basic and other relevant investigations based on the medical history, all the patients were referred to physician for medical evaluation. Many of the associated medical problems were diagnosed after their admission to the hospital. Patients were operated only when they were found medically fit for anaesthesia.

13 patients with fracture neck of the femur were operated for hemiarthroplasty and bipolar prosthesis was used. Moore's posterior approach was used 9 patients and in remaining patients lateral approach was used. Use of different approach was the choice of the surgeon. Whenever lateral approach was used, whole blood was transfused in most of the cases either during surgery or in the immediate post operative period. Blood transfusion was rare when posterior approach was used.

In patients with intertrochanteric fractures dynamic hip screw with plate or PFN was used to fix the fractures. All these patients were operated on the fracture table with standard approach and using an image intensifier. 3 patients required opening of the fracture site for reduction of the fracture. Whole blood was reserved for the surgery and was used in selective cases either intra-operatively or post-operatively. We used pre-operative (prophylactic) antibiotics in all the cases. In most of the patients, one dose of third generation cephalosporin injection or ciprofloxacin injection was given one hour before the surgery. We continued the use of same group of antibiotic for a minimum of three doses of injections, later on they were put on respective oral preparations till the fifth post operative day. This choice of mode of administration of the antibiotic was based on the duration of the surgery and overall condition of the patient. We did not use thromboembolic prophylaxis; there were no thromboembolic complications in our patients. Unless contraindicated anti-

inflammatory medication was administered post operatively for a minimum of five days. Some of our patients required anti-inflammatory medication for a longer duration, but were advised to restrict the use of these medications.

In majority of the patients operated for fracture hip, splintage was not given following surgery. Post operative traction for few days to weeks was given on occasions when there were intra- operative complications. All the other patients were allowed to sit up on the bed within 24 hours. They were taught quadriceps strengthening exercises and were encouraged to sit on the side of the bed within three days.

Those with hemiarthroplasty for fracture neck were made to stand with a walker on the 4th day or as soon as possible and were encouraged to walk with full weight bearing using a walker within a week. The patients who were operated for intertrochanteric fracture were encouraged to walk with a pair of axillary crutches without bearing weight on the operated side.

Remaining patients in both groups who had problems either during or in the immediate post-operative period were ambulated once they were fit for ambulation. Majority of our patients were discharged from the hospital at the end of second or beginning of the third post operative week. Arthroplasty patients were advised to use a walker or cane (stick) on the sound side regularly and others were advised to walk with axillary crutches till further advice.

At the time of discharge the patients were asked to come for follow up on or around the 30th post operative day. Further follow up was done at 3 months, 6 months and at one year. Some of the patients who did not turn up for follow up were reminded by post. Patients were functionally assessed using **Hip Rating Scale of Merle D'aubugne** [23]

RESULTS

The following observations were made from the data collected during the study of evaluation of functional outcome of early versus delayed surgery for fracture of hip.

Table: Age Distribution:

Range	IT Fracture Group		Fracture Neck Group	
	Number	Percentage	Number	Percentage
60 – 65	5	26	4	27
66 – 70	6	31	4	27
71 – 75	1	06	2	15
76 – 80	5	31	2	23
>80	1	06	1	08

The mean age the patients of the IT fracture group were 72.4 years. In the fracture neck group the mean age was 71.2.years.

Table: Sex Distribution:

Sex of patients	Fracture of Hip
Males	10
Females	21
Total	31

Majority of the patients in both the groups were females. There were 21 females of the total 31.

Table: Number of cases

		TYPE	
		IT Fractures	Fracture Neck
Duration from Injury to Surgery (in hrs)	< 72 Count %	6 34.3%	4 30.8%
	> 72 Count %	12 65.7%	9 69.2%
Total	Count %	18 100.0%	13 100.0%

Out of the 18 patients in the intertrochanteric fracture group, 6 underwent internal fixation within 72 hrs of injury and the remaining patients underwent internal fixation after 72 hours.

In the fracture neck group of the total 26 patients treated by hemiarthroplasty, 8 patients underwent surgery within 72 hours and the remaining 18 after 72 hours following injury.

Table: Associated Medical Conditions

		Type	
Associated Medical Conditions		IT Fractures	Fracture Neck
Anaemia	Number %	6 (34.3%)	2(30. 8 %)
Anaemia + HTN	Number %	1(2.9 %)	0
Anaemia + IHD	Number %	0(2.9 %)	1(3.8 %)
Anaemia + RS	Number %	1(2.9 %)	0(3.8 %)
Anaemia + UTI	Number %	0	1(3.8 %)
Br. Asthma	Number %	0(2.9 %)	0(3.8 %)
DM	Number %	2(8.6 %)	1(7.7 %)
DM + Anaemia	Number %	1(2.9 %)	0
DM + HTN	Number %	3(14. 3 %)	2(15. 4 %)
DM + UTI	Number %	0(2.9 %)	0
HT + IHD	Number %	0	1(3.8 %)
HTN	Number %	1(5.7 %)	3(19. 2 %)
HTN + RS	Number %	0(2.9 %)	0
IHD	Number %	2(8.6 %)	1(3.8 %)
IHD + DM	Number %	0(2.9 %)	0
IHD + HTN	Number %	1(2.9 %)	0
UTI	Number %	0(2.9 %)	1(3.8 %)

Most of our patients in this series had more than one medical problem. The commonest medical problem was iron deficiency anemia. Hypertension, ishaemic heart disease and diabetes mellitus were other common problems.

Table: Post operative Complications

TYPE	Post op Complications	Duration from injury to Surgery (in hrs)	
		< 72	> 72
		No.	No.
IT Fractures	Bed sore	1	4
	Deep infection	0	2
	Mech. Failure	0	1
Fracture Neck	Bed sore	0	1
	Dislocation	0	3
	Deep infection	0	1
	Mech. Failure	0	0

The most common post operative complication in our study was development of pressure sores. It was significantly higher in those patients who were operated later than 72 hours of injury.

Table: Hospital Stay

The mean hospital stay in both the groups (intertrochanteric and fracture neck group) was higher in those patients who were operated after 72 hours from injury.

Type	Duration from injury (hours)	Mean (days)
IT fractures	< 72	19.5
	> 72	21.2
Fracture neck	< 72	17.7
	> 72	18.6

Table: Mortality in Relationship to the Interval between Injury and Surgery

26% of the patients in the intertrochanteric fracture group and 28% of the patients in the fracture neck group who were operated after 72 hours from injury died compared to 17% and 13% respectively in those operated earlier than 72 hours from injury at the end of 1 year.

Type	Duration from injury to Surgery (in hrs)	Mortality	
		Number	Percentage
IT fractures	< 72	1	16. 7 %
	> 72	3	26. 1 %
Fracture Neck	< 72	1	12.5%
	> 72	2	27. 8 %

Table 10 : Post operative Complications and Mortality

Type	Duration from Injury to Surgery (in hrs)	Post operative complications	Mortality	
			Number	Percentage
IT Fractures	< 72	Bed sore	0	0%
	> 72	Bed sore	0	0%
		Deep infection	1	33.3%
		Mech. Failure	1	100%

Fracture Neck	< 72	Mech. Failure	0	0%
	> 72	Bed sore	1	20%
		Dislocation	0	100%
		Deep infection	1	100%

Mortality following surgery of the hip is also dependent on the complications following surgical procedure. In those patients with complications following surgery the mortality was high. While assessing the morbidity, the various post surgical complications were studied. The complications were found in both the groups (intertrochanteric fracture and fracture neck group). Of these deep infection and mechanical failure were significant.

Table: Pain score (as per rating scale of Merle d'Aubigne) in patients in both the group

Pain	Intertrochanteric fracture group %		Fracture Neck Group %	
	< 72	> 72	< 72	>72
None	4	0	37. 5	16. 7
Rare	33	27	37. 5	44. 5
After walking 10 to 20 minutes	4	4	0	5.5
Before 10 minutes walking	0	1	0	0
Immediately after walking	0	1	12. 5	5.5
Always, even when sitting or lying	4	1	0	0

About 60% of the patients from the intertrochanteric fracture group and 70% of the patients in the fracture neck group were either comfortable or were able to tolerate pain.

Table: Mobility with or without walking aid

Walking ability / stability	Intertrochanteric fracture group		Fracture Neck Group	
	< 72	> 72	< 72	>72
Normal and unlimited	13	5	32	23
Cane and slight limp only after long distances No instability	25	22	6	8
Cane only outdoors, Major limp, slight instability	4	5	6	2
Cane, limp, instability always two canes / crutches	4	5	0	3
Unable to walk	0	2	0	0

Mobility is the other parameter used to assess the functional results. In our series most of the patients were satisfactorily mobile at the end of twelve months. 20% of the patients in the intertrochanteric fracture group and 15% of the patients in the fracture neck group were non ambulant.

TABLE: RESULTS

Type	Result		Duration from injury to Surgery (in hrs)	
			< 72	> 72
IT Fractures	Excellent	Number Percentage	1 8.3	0 0.0
	V. Good	Number Percentage	1 16.7	1 8.7
	Good	Number Percentage	3 50.0	5 43.5
	Poor	Number Percentage	1 16.7	3 21.7
Fracture Neck	Excellent	Number Percentage	1 37.5	2 16.7
	V. Good	Number Percentage	1 25.0	2 27.8
	Good	Number Percentage	0 12.5	1 16.7
	Poor	Number Percentage	1 12.5	1 11.1

At the end of twelve months after surgery of those who survived were functionally better in both the groups. About 70% of the intertrochanteric fracture group and 75% of the patients in the fracture neck group were functionally satisfied.

DISCUSSION

This study was aimed to assess the effect of delay from the time of injury to the time of operation on post-operative complications and on the one year mortality rate for elderly patients with fracture of the hip.

Our study includes 31 patients aged over 60 years with fracture of hip. Most of them sustained fracture following trivial injury. Of these 18 patients had intertrochanteric fracture and 13 patients had fracture neck of femur.

In literatures the cut off period between early and delayed surgery for fracture of hip varies from 6 hours (Dorotka R et al[18]) to 3 days (Zuckerman et al[24]). We considered surgery after 3 days following fracture of hip as operative delay in our study.

Of the 18 patients with IT fracture (group I) 6 were treated with internal fixation with dynamic hip screw within 72 hrs after injury and the remaining underwent internal fixation after 72 hours.

In 13 patients with fracture neck of femur (Group II) 4 underwent hemiarthroplasty within 72 hrs of injury and the remaining 18 patients after 72 hrs.

The average age in group I was 72.4 years and in group II it was 71.2 years. This study has a 67% female preponderance and 33% males.

The most common post surgical complication in both the groups were development of pressure sores and this was significantly higher in those patients who underwent surgery later than 72 hours.

4% of patients in group I and 39% of patients in group II who were operated later than 72 hours developed pressure sores. 1 patient in group I and none in group II had pressure sores who were operated within 72 hrs after injury.

Similar results are reported in literature, Grimes J.P[10] and Slegmeth AW[19] have concluded that operative delay resulted in increased incidence of pressure sores.

The mean hospital stay was higher in both the groups who underwent surgery later than 72 hours. In group I it was 19 days and in group II it was 17 days for those who had early surgery and 21 and 18 days in group I and group II who had late surgery.

Slegmeth A. W, Gruruswamy K, Parker M.J[19] reported that early surgery reduces the mean length of hospital stay from 36.5 to 21.6 days and also reduces the incidence of pressure sores.

2 patients in group I and 1 in group II who underwent late surgery developed deep infection.

Rogers FB et al[11] in 1995 after a 5 years retrospective study of 82 elderly (>65 year) patients with isolated low impact hip fractures concluded that there was a significantly higher infectious morbidity in those patients who were operated late (>72 hours).

We had 1 mechanical failures in group I operated late and 1 in group II operated early. Although early weight bearing was not allowed in the patients of group I, it was almost impossible for these patients to avoid occasional weight bearing on the limb that had been operated on. Of the 1 mechanical failure in group I, the implants and screws loosened in one, and blade plate broke in the other. The incident resulted in overall rate of mechanical failure of 8.7% in group I. One of these patients was re- operated. In group II we had 1 mechanical failure in which the prosthesis penetrated the medial cortex. It was detected in the immediate post- operative period before the patient was made ambulant. She was taken to the theatre again and the procedure was redone.

One patient in group II who was operated early developed posterior dislocation of the prosthesis in the immediate post-operative period who was treated by closed reduction and immobilization for three weeks. The immobilization however resulted in the development of pressure sore.

The complications developed in the post-operative period had a direct bearing on the mortality and morbidity. The patients who had a poor hip score were the ones who survived the complications. In

group I, 1 (16.7%) of the 6 patients operated early died and 3 (26.5%) of 12 patients operated late died. At the end of 1 year, in group II 1(12.5%) out of 4 patients operated early and 3 (27.8%) of the 9 patients operated late died. It can be noted that the mortality at one year follow up is higher in both the groups operated later than 72 hours following injury.

Zuckerman et al[6], in their series of 367 patients, who sustained fracture of hip found that delay of three calendar days or more from the time of admission to the time of operation almost doubled the risk of mortality within the first year of fracture.

Hamlet WP et al[9] in their series found significant mortality between patients having surgery within 24 hours of admission (20%) and those having surgery beyond 24 hours of admission (50%).

Beringer TR et al[15] (1996) concluded that medically fit elderly patients presenting with proximal femoral fracture have improved survival rates with early surgery within 24 hours of admission.

Pain is the major criteria for assessing the functional results in majority of the series. Hinchey and Day[25] (1964), D'Acry and Devas[26] cautioned that pain with or without loosening or migration may be associated with sepsis.

We observed that 8% of patients in group I who were operated early and 38% of patients who were operated early in group II had no pain at follow up and 17% of patients in the group II who were operated late had no pain at follow up. Most of the patients in both the group whether they were operated early or late had occasional pain which could be taken as acceptable degree of pain.

25% of patients who were operated early and 9% of patients who were operated late in group I were not using any walking device. In group II 63% of patients operated early and 45% of patients operated late were not using any walking device. Most of the other patients who were using walking aids are relatively bound to their homes.

Various criteria were used to assess the functional outcome following fractures of the hip. How best the patient could be returned to the pre-fracture state has been the major criteria. In India our customs demand squatting and sitting cross legged without difficulty. To achieve this patient should have good range of flexion, abduction and external rotation at the hip and full flexion of the knee. This is however difficult to achieve even though the best modalities of treatment available. The distance the patient could walk with or without support and the range of movements at the hip are the major criteria in determining these results in the western literature. We used the hip score rating scale of Merle d'Aubigne[23].

In group I 17% of patients who were operated early and 26% of patients who were operated late had died at the end of one year. In group II mortality was 13% and 28% respectively.

The results of hip score rating were satisfactory in majority of the patients who survived at 12 months follow up in both groups. The results did not very much in relation to the timing of surgery in both the groups however our study there was increased incidence of development of pressure sore, increased length of hospital stay and increased mortality at the end of 1 year in those patients who were operated later than 3 days.

CONCLUSION

In our study, elderly patients with fracture of hip had increased incidence of pressure sores, increased length of hospital stay and significantly high mortality rate at the end of 1 years in those patients who were operated upon 3 days or later after sustaining the fracture. In those patients who survived we did not find significant difference in functional results in both the intertrochanteric fracture group as well as fracture neck of femur group who were operated earlier or later than 72 hours following injury.

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