ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACEUTICAL SCIENCES

Published by JK Welfare & Pharmascope Foundation Journal Home Page: www.ijrps.com

Prediction score to assess morbidity/mortality of patient after fracture proximal 1/3rd femur

Ravindra B. Gunaki, Rahul Sharma*, Chitresh Mehta, Swapnil Chitnavis, Vibhu Pratap Singh

Department of Orthopaedics, Krishna Institute of Medical Sciences, Karad, Maharashtra, India

Article History:

Received on: 06 Feb 2021
Revised on: 09 Mar 2021
Accepted on: 12 Mar 2021

Keywords:

Fracture,
Hip joint,
Comorbidities,
pre-fracture mobility

ABSTRACT

Fractures around the hip joint in the elderly is a major health concern with respect to perioperative and post operative morbidity, especially in the 1-year postoperative period. The prospective and retrospective study was carried out at Krishna Institute of Medical Sciences, Karad, over a period of 1 year. Various comorbidities play a detrimental role in the postoperative outcome of these fractures. 100 patients of the gediatric age group with fracture around the hip joint were studied and followed for about a year to assess 1-year morbidity. An attempt is made to categorize all the comorbidities and create a Comorbidity Index. The Predictors included in the Comorbidity Index are age, pre-fracture mobility, anaemia, gender, diabetes mellitus, hypertension, ischemic heart disease, renal disease, dementia, alcohol dependence, tobacco chewing, serum protein levels, previous surgeries, stroke, antiplatelet drug intake, duration between operation and death and cause of death. The outcome of the Comorbidity Index determines the deceased patients had an average of 13.73 Comorbidity Index Score, whereas the non-deceased patients had an average of 4.95 Comorbidity Index Score. This score can also be helpful in providing counselling to the patient and the patient's relative about the patient's outcome for surgery. This score will also prove useful in reducing medico-legal complications and will be documented and explained to the patient's relatives.

*Corresponding Author

Name: Rahul Sharma
Phone: +919466756987
Email: rahulsharma9466756987@gmail.com

ISSN: 0975-7538

DOI: https://doi.org/10.26452/ijrps.v12i2.4643

Production and Hosted by

IJRPS | www.ijrps.com

INTRODUCTION

The fractures around the hip in elderly patients is a major public health concern. The age group the fracture affects mainly also increases perioperative and postoperative morbidity, mortality, loss of independence, and financial burden.

The most crucial phase being the first year after the operation. Studies have shown that 1-year mortality in the wake of supporting a hip break has been assessed to be 15%. The overall danger of mortality in the old patient population increments 4% each year.

The regular post-operative follow up of operative Hip Fracture Patients required a holistic approach for patient care. The patient's general condition and other comorbidities play a vital role in the recovery of the patient.

A detailed survey in these patients helped us to understand the postoperative mortality related factors. An attempt is made to compile all the data we have achieved. The aim of the study is to study the effect of various comorbidities in patients with hip fracture.

METHODS

The prospective and retrospective study was carried out at Krishna Institute of Medical Sciences, Karad, from July 1 2018, and March 1, 2020. This program was standardized, redesigned, and expanded to include 100 geriatric patients with various comorbidities who sustained a hip fracture. Patients with hip fractures were admitted through the casualty department, OPD or directly from other institutions. All patients admitted under the orthopedic department were screened under the routine protocol. When the patient was medically fit, the patient was posted for surgery. Throughout the hospital stay, orthopaedic surgeons shared "responsibility" of the patients' orthopaedic complaints as well as other comorbidities.

Inclusion Criteria

1. Patients 50 years of age or older
2. Proximal femur fracture
3. Patient willing to take part in a study

Exclusion Criteria

1. Pathological fracture
2. Periprosthetic fracture
3. Previous hip fracture treated or treated nonoperatively.

The Predictors included in the Comorbidity Index are age, pre-fracture mobility, anaemia, gender, diabetes mellitus, hypertension, ischemic heart disease, renal disease, dementia, alcohol dependence, tobacco chewing, serum protein levels, previous surgeries, stroke, antiplatelet drug intake, duration between operation and death and cause of death.

RESULTS AND DISCUSSION

In our study, conducted at our hospital, among the study population of 100, 15 mortalities were noted in the prospective postoperative period, which was termed Group A. The remaining 85 patients were assigned to Group B.

In our study, people belonging to the 50-70 years age group were 5 (33.33%) among Group A and 41 (48.23%) among Group B. People belonging to age group > 70 years were 10 (66.67%) among Group A and 44(51.76%) among Group B, Table 1

In our study, 100% of the study population in both Group A, as well as Group B, had Pre Fracture Mobility, Table 2.

In our study, 86.67% of patients were anaemic in Group A, while only 6.25% of patients were anaemic in Group B, Table 3

In our study, among Group A6.67% of patients suffering from Diabetes Mellitus for less than 5 years, 33.33% patients suffered from Diabetes Mellitus for 5-10 years, and 20% patients suffered from Diabetes Mellitus for greater than 10 years. While in Group B, 90.58% of patients were not diagnosed with Diabetes Mellitus and 9.42% of patients suffering from Diabetes Mellitus for less than 5 years, Table 4.

In our study, among Group A, 26.67 % of patients suffered from Hypertension for less than five years, 20% of patients suffered from Hypertension for 5-10 years. While in Group B, 85.88% of patients were not diagnosed with Hypertension and 14.11% of patients suffered from Hypertension for less than 5 years, Table 5.

In our study, among Group A, 13.33% of patients had a history of Ischemic Heart Disease and 6.67% of patients had a history of CABG, Table 6.

In our study, in Group A, 6.67% of patients had a history of stroke and 6.67% of patients had a history of stroke with paralysis. While in Group B, 5.89 % of patients had a history of stroke, in Table 7.

In our study, 40% of patients were on Antiplatelet Drugs in Group A, while 5.89% of patients were on Antiplatelet Drugs in Group B, in Table 8.

In our study, slight elevation of urea and creatinine levels were seen in 66.67% of patients in Group A and in 14.11% of patients in Group B. Moderate elevation of urea and creatinine levels were seen in 26.67% in Group A and in 5.89% in Group B, Table 9.

In our study, 6.67% of patients among Group A had a history of Dementia, Table 10.

In our study, 26.67% of patients in Group A and 5.89% of patients in Group B had a history of Alcohol Dependence, in Table 11.

In our study, 20% of patients in Group A and 14.11% of patients in Group B had a history of Tobacco Chewing, Table 12.

In our study, among Group A, 20% of patients had normal serum protein levels, 66.67% patients had serum protein levels in the range of 5-6 g/dl, and 13.33% patients had the level < 5 g/dl. While in Group B, 94.11% of patients had normal serum protein level, and 5.89% of patients had serum protein levels in the range of 5-6 g/dl, Table 13.

In our study, 40% of patients from Group A and 5.89% of patients from Group B had a history of Previous Surgeries, Table 14.

Table 1: Distribution of study population according to age group

Age group	Group A	Percentage	Group B	Percentage
< 50	0	0	0	0
50-70	5	33.33	41	48.23
>70	10	66.67	44	51.76

Table 2: Distribution of study population according to Pre Fracture Mobility

Pre Fracture Mobility	Group A	Percentage	Group B	Percentage
Yes	15	100	85	100
No	0	0	0	0

Table 3: Distribution of study population according to Presence of Anaemia

Anaemia	Group A	Percentage	Group B	Percentage
Yes	13	86.67	5	6.25
No	2	13.33	80	93.75

Table 4: Distribution of study population according to Presence of Diabetes Mellitus

Diabetes Mellitus	Group A	Percentage	Group B	Percentage
Absent	6	40	77	90.58
<5	1	6.67	8	9.42
5-10	5	33.33	0	0
>10	3	20	0	0

Table 5: Distribution of study population according to Presence of Hypertension

HTN	Group A	Percentage	Group B	Percentage
Absent	8	53.33	73	85.88
<5	4	26.67	12	14.11
5-10	3	20	0	0
>10	0	0	0	0

Table 6: Distribution of study population according to Presence of Ischemic Heart Disease

IHD	Group A	Percentage	Group B	Percentage
No	12	80	85	100
Yes	2	13.33	0	0
CABG	1	6.67	0	0

Table 7: Distribution of study population according to Presence of Stroke

Stroke	Group A	Percentage	Group B	Percentage
No	13	86.67	80	94.11
Yes	1	6.67	5	5.89
Stroke with paralysis	1	6.67	0	0

Table 8: Distribution of study population according to History of Antiplatelet Drug intake

Antiplatelet Drug	Group A	Percentage	Group B	Percentage
Yes	6	40	5	5.89
No	9	60	80	84.11

Table 9: Distribution of study population according to Presence of Renal Disease

Renal Disease	Group A	Percentage	Group B	Percentage
No	1	6.67	68	80
Slightly elevated Urea Creatinine Level	10	66.67	12	14.11
Moderately Elevated Urea Creatinine Level	4	26.67	5	5.89
Dialysis	0	0	0	0

Table 10: Distribution of study population according to Presence of Dementia

Dementia	Group A	Percentage	Group B	Percentage
Yes	1	6.67	0	0
No	14	93.33	85	100

Table 11: Distribution of study population according to the Presence of Alcohol Dependence

Alcohol Dependence	Group A	Percentage	Group B	Percentage
Yes	4	26.67	5	5.89
No	11	73.33	80	94.11
Psychiatric treatment for /withdrawal	0	0	0	0

Table 12: Distribution of study population according to Presence of Tobacco Chewing with Peptic Ulcer Disease

Tobacco Chewing	Group A	Percentage	Group B	Percentage
Yes	3	20	12	14.11
No	12	80	73	85.89

Table 13: Distribution of study population according to Presence Serum protein Level

Serum Protein Level	Group A	Percentage	Group B	Percentage
6-8.3 g/dl	3	20	80	94.11
5-6 g/dl	10	66.67	5	5.89
<5 g/dl	2	13.33	0	0

Table 14: Distribution of study population according to History of Previous Surgeries

H/O Previous Surgeries	Group A	Percentage	Group B	Percentage
Yes	6	40	5	5.89
No	9	60	80	94.11

Table 15: Distribution of study population according to Duration between operation and death

Duration	Group A	Percentage
>6 months	13	86.67
3-6 months	2	13.33
0-3 months	0	0

Table 16: Distribution of study population according to the Liver Function Test (Total Bilirubin)

LFT (Total Bilirubin)	Group A	Percentage	Group B	Percentage
0.3-1 mg/dL	3	20	63	74.11
1-1.5 mg/dL	8	53.33	17	20
>1.5 mg/dL	4	26.67	5	5.89

Table 17: Distribution of study population according to History of Peripheral Vascular Disease

H/O PVD	Group A	Percentage	Group B	Percentage
Yes	6	40	12	14.11
No	9	60	73	85.89

Table 18: Distribution of study population according to Ejection Fraction %

EF%	Group A	Percentage	Group B	Percentage
>60	5	33.33	68	80
55-60	3	20	17	20
<55	7	46.67	0	0

Table 19: Comorbidity Predictor Table

	0	1	2	3
Age	-	<50	50-70	>70
Prefracture Mobility	Yes	No	-	-
Anemia	No	Yes	-	-
Diabetes Mellitus	Absent	<5 Years	5-10 Years	>10 Years
Hypertension	Absent	<5	5-10 Years	>10 Years
Ischemic Heart Disease	No	Yes	H/O CABG	-
Stroke	No	Yes	Stroke with Paralysis	-
H/O Antiplatelet Drugs	No	Yes	-	-
Renal Disease	Normal	Slightly Elevated	Moderately Elevated	Dialysis
Dementia	No	Yes	-	-
Alcohol Dependence	No	Yes	Psychiatric Treatment for Withdrawal	-
Tobacco Chewing with Peptic Ulcer	No	Yes	-	-
Serum Protein Level	6-8.3 g%	5-6 g%	<5 g%	-
H/O Previous Surgery	No	Yes	-	-
LFT Total Bilirubin (mg/dL)	0.3-1	1-1.5	>1.5	-
PVD	No	Yes	-	-
EF%	>60	50-60	<50	-
ASA	1,2 (Normal Cardiac finding)	2 (Abnormal Cardiac Finding)	3	4

In our study, 86.67% of patients had >6 months duration between operation and death, and 13.33% of patients had 3-6 months duration between operation and death, Table 15.

In our study, 53.33% of patients had Total Bilirubin levels of 1 to 1.5 mg/dL in Group A and 74.11% of patients in Group B had Total Bilirubin levels of 0.3 to 1 mg/dL, Table 16.

In our study, 40% of patients in Group A and 14.11% of patients in Group B had a History of Peripheral Vascular Disease, Table 17.

In our study, among Group A, 33.33% patients had EF% >60%, 20% patients had EF% in the range of 55-60%, and 46.67% patients had EF% <55%. In Group B, 80% patients had EF%

>60%, 20% patients had EF% in range of 55-60%, and 0% patients had EF% <55%, Table 18.

In our study, among Group A, 26.67% of patients had an ASA score of 2, 53.33% of patients had an ASA score of 3 and 20% of patients had an ASA score of 4. While in Group B, 34.11% of patients had ASA score 2, 47.05% of patients had ASA score 3 and 18.84 % of patients had ASA score 4, Table 19.

Numerous medical care centers use proof-based therapy conventions for the consideration of old patients with proximal femur cracks. This is likely in light of the enormous number of old patients with hip cracks, the helpless results that these patients experience, and the significant expense of hip break care (Pedersen *et al.*, 2008). The exploration supporting the utilization of this model of care has been blended. Different randomized controlled preliminaries have neglected to show huge enhancements in long haul mortality after hip crack a medical procedure with this model of care. (Naglie *et al.*, 2002; Gilchrist *et al.*, 1988) In an accomplice correlation by Pedersen et al. 1 of 535 patients with hip breaks treated inside a multidisciplinary hip crack program, the general 1-year mortality was 23% contrasted and 29% for the individuals who were treated with normalized care. Notwithstanding, this improved mortality was just a pattern in the Kaplan-Meier investigation and not huge (P $\frac{1}{4}$ .2) (Barone *et al.*, 2006) contrasted co oversaw patients and controls and uncovered 1-year mortalities of 25% and 35.3%, individually. Notwithstanding, patient consideration and rejection rules were not clear. In our investigation of 100 patients, the death rate was 15%.

Introductory examinations depicted an in-clinic death pace of 1.5% for a lot more modest accomplice of patients. The considerably lower mortality at 1 year in this program was not anticipated. The 1-year unadjusted death pace of 21.2% is lower than other distributed investigations of patients treated in normal consideration when including systematized patients. Different investigations, including co-administration of patients, have cited lower death rates at 1 year; however, they avoided patients with dementia, nursing home occupants, or non-ambulatory patients who commonly have various clinical comorbidities (Koval *et al.*, 2004).

The Parker portability score is a device to survey preinjury versatility capacity and help separate 1-year mortality after proximal femur fractures (Parker and Palmer, 1993). We found that this list was prescient of 1-year mortality in our investigation population. The ORs of 1-year mortality were 2.79 (P $\frac{1}{4}$ .01) and (P $\frac{1}{4}$ .05) for low (0-4) and medium (5-8) portability scores, individually. A planned 10-year study found that patients requiring an assistive gadget for ambulation before their hip crack had a 28% expanded danger of mortality. Likewise, patients who were restricted to ambulation inside their home had 2.2 occasions more serious danger of mortality. In our examination, among Group A most extreme Parker Mobility Score was 5, least was 1, the normal being 3. In Group B, the most extreme Parker Mobility Score was 9, least was 4, the normal being (Fisher *et al.*, 2006).

Furthermore, the nursing home population has a high commonness of osteoporosis and falls (Rapp *et al.*, 2008; Parker and Palmer, 1993; Berry *et al.*, 2009) have shown 1-year death rates in hip break patients from nursing homes to be 36% for ladies and 54% for men. A new 3-year study surveying Medicare patient cases for intertrochanteric hip cracks found the 90-day death rate was twofold for nursing home residents (Forte *et al.*, 2010). However, subsequent to adapting to different qualities, like preoperative comorbidity and capacity, there could have been not, at this point, a critical distinction among local area and noncommunity inhabitants.

47% of our examination population was determined to have dementia before their hip break. The 1-year death pace of deranged patients was 29.3% versus 13.9% for those without dementia (P < .0001). Patients with dementia are known to have higher death rates after hip cracks.

A 5-concentrate by Khan et al. of hip cracks uncovered a 1-year death pace of 28% of patients with serious dementia versus 12% without. An investigation by 376 patients with hip breaks uncovered a 2-year death pace of 26.4% in patients with dementia versus 6.5% with those without dementia (Hershkovitz *et al.*, 2010). In our investigation, 6.67% of

patients among Group A had a history of Dementia.

This investigation, just as others, shows expanded mortality after the medical procedure with expanding age 20-23. Mortality was 2% for patients more youthful than 70 years and over 27% for those matured 90 years or more established. In an investigation of 612 patients, Aharonoff et al. found that an age >85 years was prescient of 1-year mortality. Nonetheless, different investigations have not shown a huge relationship between age and mortality after hip fracture. Richmond et al. found an essentially expanded mortality danger in patients in the 64-to 85-year-old gathering as contrasted and those more seasoned than 85 years (Berry *et al.*, 2009) showed that in an investigation of 195 nursing home inhabitants matured 65 years and more seasoned with hip breaks, there was a 30% increment in mortality with like clockwork of propelling age. These discoveries are to be expected, as one would anticipate expanded mortality with expanding age.

Patients with a Charlson score of 4 or more prominent were found to have double the danger of death before 1 year. Studies have utilized the CCI to survey hazard and foresee 1-year mortality. 28-32 The CCI utilizes a total score of comorbidities to give prognostic data. 33 Roche et al. 34, in their investigation of 2448 hip breaks, found that having at least 3 clinical comorbidities was identified with higher entanglement rates and mortality (Bentler *et al.*, 2009) contemplated 495 hip cracks and found that patients with at least 3 comorbid conditions were 65% bound to kick the bucket than those with less conditions. In our investigation, among Group A most extreme Charles Comorbidity Index was 8 (assessed long term endurance rate 0%), least was 3 (assessed long term endurance rate 77%), the normal score being 5.73. In Group B most extreme Charles Comorbidity Score was 5 (assessed long term endurance rate 21%), least was 1 (assessed long term endurance rate 96%), the normal score being 3.18.

As per score rules, the most extreme score conceivable is 31, while the base score is 1.

In our investigation, among Group A, the greatest score was 18 and the least score was 9; the normal score was 13.73. While in Group B, the most extreme score was 8, and the least score was 2; the normal score was 4.95.

This investigation has a few qualities. It incorporates a huge accomplice of patients. The investigation characterizes factors that foresee 1-year mortality after hip breaks. What's more, it offers to back to the usage of a co-administration model for the treatment of patients with hip cracks. The impediments incorporate the review plan and the absence of controls. Also, the number of men and minorities were restricted, and the information may not be appropriate to all geriatric populations.

CONCLUSION

In reference to a standard index, like the Charlson Comorbidity Index, we can conclude that this score gives us information about possible mortality/morbidity of the patient of proximal $1/3^{rd}$femur fracture. The outcome of the Comorbidity Index determines the deceased patients had an average of 13.73 Comorbidity Index Score; whereas the non-deceased patients had an average of 4.95 Comorbidity Index Score This score can also be helpful in providing counselling to the patient and patient's relative about the patient's outcome for surgery. This score will also prove useful in reducing medicolegal complications and will be documented and explained to the patient's relatives. This score is comparable to the Charlson Comorbidity Index for predicting a patient's outcome following surgery.

Funding Support

The authors declare that they have no funding support for this study.

Conflict of Interest

The authors declare that they haver no conflict of interest for this study.

REFERENCES

Barone, A., Giusti, A., Pizzonia, M., Razzano, M., Palummeri, E., Pioli, G. 2006. A comprehensive geriatric intervention reduces short-and long-term mortality in older people with hip fracture. *Journal of the American Geriatrics Society*, 54(7):1145–1147.

Bentler, S. E., Liu, L., Obrizan, M., Cook, E. A., Wright, K. B., Geweke, J. F., Chrischilles, E. A., Pavlik, C. E., Wallace, R. B., Ohsfeldt, R. L., Jones, M. P., Rosenthal, G. E., Wolinsky, F. D. 2009. The Aftermath of Hip Fracture: Discharge Placement, Functional Status Change, and Mortality. *American Journal of Epidemiology*, 170(10):1290–1299.

Berry, S. D., Samelson, E. J., Bordes, M., Broe, K., Kiel, D. P. 2009. Survival of Aged Nursing Home Residents With Hip Fracture. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 64(7):771–777.

Fisher, A. A., Davis, M. W., Rubenach, S. E., Sivakumaran, S., Smith, P. N., Budge, M. M. 2006. Outcomes for Older Patients With Hip Frac-

tures: The Impact of Orthopedic and Geriatric Medicine Cocare. *Journal of Orthopaedic Trauma*, 20(3):172–180.

Forte, M. L., Virnig, B. A., Swiontkowski, M. F., Bhandari, M., Feldman, R., Eberly, L. E., Kane, R. L. 2010. Ninety-Day Mortality After Intertrochanteric Hip Fracture: Does Provider Volume Matter? *The Journal of Bone and Joint Surgery-American Volume*, 92(4):799–806.

Gilchrist, W. J., Newman, R. J., Hamblen, D. L., Williams, B. O. 1988. Prospective randomised study of an orthopaedic geriatric inpatient service. *BMJ*, 297(6656):1116–1118.

Hershkovitz, A., Polatov, I., Beloosesky, Y., Brill, S. 2010. Factors affecting mortality of frail hip-fractured elderly patients. *Archives of Gerontology and Geriatrics*, 51(2):113–116.

Koval, K. J., Chen, A. L., Aharonoff, G. B., Egol, K. A., Zuckerman, J. D. 2004. Clinical Pathway for Hip Fractures in the Elderly: The Hospital for Joint Diseases Experience. *Clinical Orthopaedics and Related Research*, (425):72–81.

Naglie, G., Tansey, C., Kirkland, J. L., Ogilvie-Harris, D. J., Detsky, A. S., Etchells, E., Tomlinson, G., O'rourke, K., Goldlist, B. 2002. Interdisciplinary inpatient care for elderly people with hip fracture: a randomized controlled trial. *Cmaj*, 167(1):25–32.

Parker, M. J., Palmer, C. R. 1993. A new mobility score for predicting mortality after hip fracture. *The Journal of Bone and Joint Surgery. British volume*, 75(5):797–798.

Pedersen, S. J., Borgbjerg, F. M., Schousboe, B., Pedersen, B. D., JÃ¸rgensen, H. L., Duus, B. R., Lauritzen, J. B. 2008. A Comprehensive Hip Fracture Program Reduces Complication Rates and Mortality. *Journal of the American Geriatrics Society*, 56(10):1831–1838.

Rapp, K., Becker, C., Lamb, S. E., Icks, A., Klenk, J. 2008. Hip Fractures in Institutionalized Elderly People: Incidence Rates and Excess Mortality. *Journal of Bone and Mineral Research*, 23(11):1825–1831.