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Original Research Article

Functional Outcomes and Mortality Predictors in Geriatric Hip Fracture Patients with Multiple Comorbidities: A One-Year Study at a Tertiary Care Centre in Western Gujarat

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Abstract

Background: Hip fractures in the elderly carry high morbidity and mortality, especially when several comorbidities are present, the risks rise sharply. In India, late presentations, delayed surgeries and a heavy burden of chronic diseases often lead to poorer results compared to Western countries. This study evaluated functional recovery and identified factors predicting mortality in such high-risk geriatric patients treated at a tertiary hospital in western Gujarat.

Material and Methods: A prospective observational study was conducted for a year, at the Department of Orthopaedics and Medicine, at a tertiary care centre Gujarat. Patients aged ≥65 years presenting with low-energy hip fractures and having at least two major comorbidities were included. Polytrauma, pathological fractures and patients refusing surgery were excluded. Data on demographics, comorbidities, Charlson Comorbidity Index (CCI), time to surgery, laboratory parameters and type of surgery were recorded. Follow-up was done at 3, 6 and 12 months for mortality and functional assessment using Modified Harris Hip Score (MHHS) and Parker Mobility Score (PMS) in survivors.

Results: Of 138 patients enrolled (mean age 78.6 ± 8.2 years, 56% female), 61% had intertrochanteric fractures. Mean CCI was 5.4 ± 1.8 and mean delay to surgery 4.9 ± 3.1 days. In-hospital mortality was 9.4%, 30-day mortality 13.8%, and one-year mortality 27.5%. On multivariate analysis, independent predictors of one-year mortality were age >80 years (p=0.002), male gender (p=0.009), CCI ≥6 (p<0.001), delay to surgery >72 hours (p=0.004), serum albumin <3.0 g/dL (OR 3.88, p=0.007) and preoperative haemoglobin <10 g/dL (p=0.012). Among survivors at 12 months (n=100), mean MHHS improved from 42.6 ± 12.4 at 3 months to 68.3 ± 16.8 at 12 months; only 38% regained pre-fracture mobility (PMS ≥7).

Conclusion: One-year mortality in geriatric hip fracture patients with multiple comorbidities remains high (27.5%) in western India and is largely driven by advanced age, higher comorbidity burden, male sex, delayed surgery and malnutrition. Functional recovery is modest, with less than two-fifths returning to pre-injury mobility levels. Aggressive perioperative optimisation and reduction in surgical delay may improve survival and function.

Keywords: Geriatric hip fracture, multiple comorbidities, mortality predictors, functional outcome, Modified Harris Hip Score, Charlson Comorbidity Index, Western India.

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Introduction

Hip fractures represent one of the most serious injuries in older adults, leading to substantial loss of independence, high healthcare costs and increased mortality. Worldwide, approximately 1.6 million hip fractures occur annually, and this figure is projected to rise sharply in developing countries because of ageing populations. In India, with its rapidly growing elderly cohort, the incidence is increasing, yet outcomes often lag behind those in developed nations owing to delayed presentation, limited operating room availability and a greater load of chronic illnesses. [1,2] The presence of multiple comorbidities significantly worsens prognosis after hip fracture. Conditions such as diabetes, cardiovascular disease, chronic respiratory illness and renal impairment not only

delay wound healing and increase infection risk but also contribute directly to postoperative cardiac, pulmonary and renal complications. [3] Studies from various Indian centres have consistently shown that patients with three or more comorbidities face mortality rates exceeding 25% at one year, much higher than in patients with fewer chronic conditions. [4] Despite several reports on hip fracture outcomes from northern and southern India, data from western Gujarat remain scarce. Most published series either include all age groups or do not specifically analyse the subgroup with multiple comorbidities. [5] The present study was therefore undertaken at a busy tertiary care centre in western Gujarat to assess functional recovery and identify predictors of mortality in geriatric patients with hip fractures who had at least two major comorbidities, providing region-specific evidence that may help in risk stratification and resource allocation.

Materials and Methods

This prospective observational study was carried out in the Department of Orthopaedics along with department of medicine at a tertiary care centre, Gujarat, for a yeae. Approval was obtained from the Institutional Ethics Committee and written informed consent was taken from patients. All procedures followed the Declaration of Helsinki.

Patients aged 65 years or older presenting with radiologically confirmed low-energy hip fractures (femoral neck or intertrochanteric) and having at least two major comorbidities (hypertension, diabetes mellitus, ischaemic heart disease, chronic kidney disease stage ≥3, COPD, previous stroke or dementia) were included. Exclusion criteria were high-energy trauma, periprosthetic or pathological fractures, previous surgery on the affected hip, refusal of surgical treatment or loss to follow-up before 30 days.

Data collected included age, gender, fracture type, comorbidities, Charlson Comorbidity Index, time from injury to surgery, preoperative haemoglobin and albumin, type of surgery (hemiarthroplasty, total hip arthroplasty, dynamic hip screw or proximal femoral nail) and postoperative complications. Patients were followed at 3, 6 and 12 months in outpatient clinic or by telephone. Functional outcome in survivors was assessed using Modified Harris Hip Score and Parker Mobility Score; mortality was recorded at 30 days, 6 months and 1 year. Statistical analysis was performed with SPSS version 26. Categorical variables were compared using χ^2 test, continuous variables with Student's t-test or Mann–Whitney U test. Multivariate logistic regression were used to identify predictors of one-year mortality. P-value <0.05 was considered significant.

Results

A total of 138 patients fulfilled the criteria (mean age 78.6 ± 8.2 years; 77 females, 61 males). Intertrochanteric fractures accounted for 84 cases (60.9%) and femoral neck fractures for 54 (39.1%). Mean Charlson Comorbidity Index was 5.4 ± 1.8. The commonest comorbidities were hypertension (74%), diabetes mellitus (62%), ischaemic heart disease (38%) and chronic kidney disease (24%). Mean time to surgery was 4.9 ± 3.1 days; 112 patients (81%) underwent surgery within 7 days. In-hospital mortality was 13/138 (9.4%), 30-day mortality 19/138 (13.8%) and one-year mortality 38/138 (27.5%). Among survivors at one year (n=100), mean Modified Harris Hip Score at 3 months was 42.6 ± 12.4, at 6 months 58.9 ± 15.2 and at 12 months 68.3 ± 16.8. Pre-fracture Parker Mobility Score was 7.8 ± 1.6; only 38 patients (38%) regained PMS ≥7 at one year. One-year mortality was significantly higher in males (36.1% vs 20.8% in females, p=0.03), patients with CCI ≥6 (42.6% vs 12.5%, p<0.001) and those operated after 72 hours (41.2% vs 18.7%, p=0.001).

Table 1: Baseline characteristics and comorbidities (n=138)

Parameter	Value
Age (years, mean ± SD)	78.6 ± 8.2
Female:Male	77:61
Intertrochanteric fracture	84 (60.9%)
Charlson Comorbidity Index	5.4 ± 1.8
≥3 comorbidities	118 (85.5%)
Time to surgery (days)	4.9 ± 3.1
Preoperative Hb <10 g/dL	46 (33.3%)
Serum albumin <3.0 g/dL	52 (37.7%)

Table 2: Frequency of major comorbidities

Comorbidity	Frequency	Percentage
Hypertension	102	73.90%
Diabetes mellitus	86	62.30%
Ischaemic heart disease	52	37.70%
COPD	36	26.10%
Chronic kidney disease	33	23.90%
Previous stroke/dementia	28	20.30%

Table 3: Predictors of one-year mortality (multivariate logistic regression)

Variable	Odds Ratio (95% CI)	p-value
Age >80 years	4.82 (2.14–10.86)	0.002
Male gender	3.67 (1.68–8.03)	0.009
CCI ≥6	5.91 (2.76–12.65)	<0.001
Delay to surgery >72 h	4.15 (1.89–9.11)	0.004
Serum albumin <3.0 g/dL	3.88 (1.76–8.57)	0.007
Preoperative Hb <10 g/dL	3.42 (1.56–7.49)	0.012

Table 4: Functional recovery in one-year survivors (n=100)

Time point	Modified Harris Hip Score (mean ± SD)	Parker Mobility Score (mean ± SD)	Patients regaining pre-fracture mobility (PMS ≥7), n (%)
Pre-fracture	82.4 ± 10.2	7.8 ± 1.6	92 (92%)
3 months	42.6 ± 12.4*	3.2 ± 1.8*	4 (4%)
6 months	58.9 ± 15.2*	4.8 ± 2.1*	18 (18%)
12 months	68.3 ± 16.8*	5.9 ± 2.3*	38 (38%)

Discussion

The burden of hip fractures in elderly patients with multiple comorbidities continues to challenge orthopaedic surgeons in resource-constrained settings. Our one-year mortality of 27.5% aligns closely with other Indian reports on similar high-risk cohorts and underscores that, despite advances in implants and perioperative care, survival remains poorer than in many Western series where multidisciplinary protocols have brought mortality down to 18–22%.

Advanced age emerged as a strong independent predictor, with patients over 80 years showing almost five-fold higher odds of death within one year. This finding mirrors observations from northern India by Tandon et al. (2021) [6] who reported an odds ratio of 5.08 for age >75 years in patients aged 50 and above, and also corroborates large international cohort studies where each additional decade of age adds substantial risk. The biological plausibility lies in reduced physiological reserve and higher prevalence of frailty in the very old. In our series, mean age of deceased patients was 83.4 years compared to 76.2 years in survivors, emphasising the need for even more aggressive preoperative optimisation in octogenarians and nonagenarians. [7]

Male gender independently tripled the mortality risk, a pattern repeatedly documented across continents. A multicentre Indian study from Rajasthan reported 1.6 times higher mortality in males, while Scandinavian registries show hazard ratios around 2.5–3.0 after adjusting for comorbidities. Possible reasons include higher smoking rates, delayed presentation and lower bone density in Indian males contribute to this difference, though sarcopenia and testosterone deficiency may also play roles. Higher Charlson Comorbidity Index (≥6) was the strongest predictor in our cohort (OR 5.91), consistent with reports from both developing and developed countries. Tandon et al. (2021) found >2 comorbidities conferred OR 0.150 (protective when absent), whereas a Turkish series by Jurrison et al. (2022) [8] documented CCI as the most powerful predictor with hazard ratios exceeding 6 when score ≥5. The cumulative effect of cardiac, pulmonary and renal impairment clearly overwhelms postoperative recovery in Indian patients who often present late with decompensated illnesses.

Delay to surgery beyond 72 hours increased mortality odds four-fold, reinforcing the international consensus that early surgery within 48–72 hours improves survival. [9] In our government tertiary setup, mean delay was 4.9 days, similar to several other Indian public hospitals where operating room availability and preoperative cardiac clearance cause bottlenecks. A meta-analysis by Klestil et al. (2018) [10] and Indian data from Maharashtra showed identical risk elevation when surgery is delayed beyond 72 hours, underlining the urgent need for dedicated hip fracture pathways even in resource-limited environments. [11]

Malnutrition indicators—preoperative hypoalbuminaemia and anaemia—remained

significant after multivariate adjustment, echoing findings from across Asia and Europe. Jain et al. (2021) reported OR 5.43 for haemoglobin ≤10 g/dL, while large UK and Spanish cohorts have shown albumin <3.0 g/dL to be among the strongest modifiable predictors. In our population with high prevalence of vegetarianism and chronic disease, preoperative nutritional correction appears crucial yet frequently overlooked. [12]

Functional recovery was modest, with only 38% of survivors regaining pre-fracture mobility at one year. This figure is lower than the 76% reported by an early Indian geriatric hip fracture programme that implemented fast-track surgery and better rehabilitation, and also lower than Scandinavian registries where 50–60% regain independence. [13] The heavy comorbidity burden and delayed rehabilitation services in our setting explain much of this gap, highlighting the need for structured postoperative physiotherapy and nutritional support. [14]

The study was conducted at a single centre with relatively small sample size, and loss to follow-up for functional scoring occurred in some patients who could only be contacted telephonically. We did not use more comprehensive frailty scores or detailed sarcopenia assessment, which might have added further insight.

Conclusion

In geriatric hip fracture patients with multiple comorbidities treated at a tertiary centre in western Gujarat, one-year mortality reached 27.5% and was independently predicted by advanced age, male gender, high Charlson score, delayed surgery, hypoalbuminaemia and anaemia. Functional recovery remained limited, with fewer than 40% returning to pre-injury mobility levels. These outcomes, comparable to other Indian reports but worse than best international standards, highlight the urgent requirement for dedicated hip fracture units, early surgical intervention within 48 hours, aggressive nutritional optimization and comprehensive geriatric care to reduce mortality and improve quality of life in this vulnerable population. Region-specific protocols tailored to patients with heavy comorbidity burden are essential to narrow the gap with global benchmarks.

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