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IN RIPAS HOSPITAL**

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Short Running Title: Fall audit of hip fractures RIPAS Hospital

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## FALL ASSESSMENT AUDIT IN OLDER PATIENTS WITH NECK OF FEMUR FRACTURES IN RIPAS HOSPITAL

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### ABSTRACT:

Hip fractures are a significant contributor to increased dependence, reduced quality of life and mortality in older adults. All patients with fragility fractures should be assessed for fall risk factors and managed to reduce future risk of falls and fractures. The aim of this study was to evaluate the quality of secondary fall prevention assessment in older patients admitted with neck of femur fractures in Raja Isteri Pengiran Anak Saleha (RIPAS) Hospital. Patients aged 65 years old and older admitted with a neck of femur fracture from 1st January 2021 to 31st March 2021 in RIPAS Hospital were included. Electronic health records for these patients were reviewed for assessment of fall risk factors. Data was entered into Excel and analysed using descriptive statistics. There were 28 patients, with the majority (20; 71.4%) being female. Mean age was 89.4 years. Among the hip fractures, 24 (85.7%) received inpatient orthogeriatric medical input. Previous history of falls was documented in 15 (53.6%) patients, while 27 (96.4%) had the nature of falls documented. Orthostatic blood pressure was not assessed in 23 (82.1%) patients. There were 27 (96.4%) patients who received physiotherapy input, 25 (89.3%) patients received Occupational therapy input, and 20 (71.4%) patients had a home assessment done during the admission. Among the 25 (89.3%) patients not known to have a diagnosis of cognitive impairment prior to admission; 17 (68.0%) were screened via focused history taking regarding cognitive issues. All patients had their medications reviewed during admission for drugs associated with risk of falls. In conclusion, the main aspects to improve on were history taking of previous falls, evaluation for orthostatic hypotension and assessment for cognitive impairment. Other aspects related to standards of care for hip fracture patients such as fracture prevention should also be evaluated to improve outcomes.

**Keywords:** Elderly; Hip fracture; Orthogeriatrics; Osteoporosis; Rehabilitation

**INTRODUCTION:**

Hip fractures are a significant contributor to increased dependence and reduced quality of life in older adults [1,2]. In fact, hip fractures contribute the highest burden in terms of cost, morbidity and mortality compared to other types of fractures [3]. A recent projection done in 2018 showed that the number of hip fractures will increase from 1.1 million to more than 2.5 million in 2050 [4]. The cost of hip fracture will also correspondingly increase from 9.5 billion USD in 2018 to 15 billion USD in 2050 [4].

Primary and secondary prevention of hip fractures are important. According to British Orthopedic Association guidelines, all patients with a fragility fracture should be managed on an orthopaedic ward with routine input from an ortho-geriatric medical team and should be offered multidisciplinary assessment and intervention to prevent future falls [5]. It has been shown that the collaborated care provided by orthopedic surgeons and geriatricians in hip fracture patients are associated with better patient outcomes and the risk of future fractures reduced with interventions provided [6,7]. In order to improve patient outcomes after hip fractures, continuous audit should be performed based on standards provided in evidence-based guidelines.

Raja Isteri Pengiran Anak Saleha (RIPAS) Hospital is a tertiary hospital in Brunei. Hip

fractures are generally admitted to an Orthopaedic ward, with geriatrics consultations provided routinely twice a week to review fall and fracture risks. All hip fractures are automatically reviewed by the orthogeriatrics service and do not require referrals from the orthopaedics team. These patients are identified by screening orthopaedics wards through the electronic medical records, Brunei Healthcare Information and Management System (Bru-HIMS). After discharge from hospital, hip fracture patients are provided orthogeriatrics clinic follow-up appointments. In addition to falls, bone health and rehabilitation outcomes, hip fracture patients also receive cognitive assessment in this clinic if a history of cognitive impairment was identified during the admission.

This paper describes an audit performed on older patients who presented with neck of femur fractures in RIPAS Hospital to evaluate the standards of care provided in terms of fall assessments.

**METHODOLOGY:**

All older patients age 65 years and older admitted with neck of femur fractures from 1st January 2021 to 31st March 2021 were included. Data collection was done using a self-designed structured proforma (Appendix A), which included age, gender, pre-fall mobility baseline, history of falls, history of cognitive

impairment, orthostatic blood pressure, home assessment, occupational therapist and physiotherapist review, medication review and pre-discharge mobility. Data collected was analysed using Excel for descriptive statistics.

This audit assesses the following standards of hip fracture care:

- All hip fracture patients should be reviewed by the Orthopaedic-Geriatrics Liaison Service.
- All hip fracture patients should have documented history of previous falls in the past six months.
- All hip fracture patients should have documented the nature of falls.
- All hip fracture patients should have documented orthostatic blood pressure
- All hip fracture patients should have a review by occupational therapist (OT).
- All hip fracture patients should have a review of their home environment for fall risks.
- All hip fracture patients should have a review by physiotherapist (PT).
- All hip fracture patients should have an evaluation for cognitive impairment in hospital
- All hip fracture patients should have a medication review for drugs contributing to falls or osteoporosis.

## RESULTS:

### Demographics:

A total of 28 patients were included. The majority were female (20; 71.4%) with mean age of 89 years, ranging from 69 to 93 years. Figure 1 shows the distribution of the patients according to age categories.

The median duration of hospitalization was 22 days, ranging from 3 to 56 days. Twenty- four patients were able to mobilise with or without walking aids independently prior to the fall or hip fracture. Table 1 summarises the pre-fall mobility of the patients. None of the patients regained their baseline mobility on discharge. Three (10.7%) patients passed away during the admission.

### Orthogeriatric input:

Twenty- four (85.7%) patients received orthogeriatric medical input during the admissions.

Two patients were admitted under renal ward due to the need for renal replacement therapy. A patient refused surgery and was discharged before being seen by the orthogeriatric medical team. One patient was reviewed by an on-call senior medical officer for acute medical issues in the orthopedics ward, but was missed by the geriatrics team.

Figure 1: Age category of patients (n = 28)

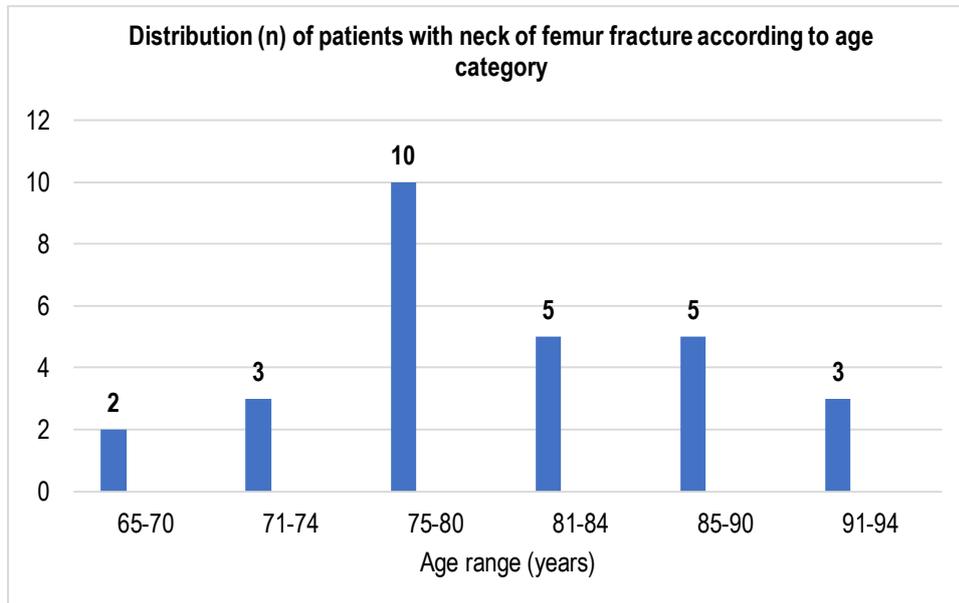


Table 1: Pre-fall mobility (n = 28)

Without walking aid	10 (35.7%)
With walking aid	14 (20.0%)
Wheelchair	3 (10.7%)
Bedbound	0
Not documented	1 (3.6%)

Documented history of falls over the past 6 months:

Fifteen (53.6%) patients had their previous history of falls being recorded in their medical notes. Of these, only four (26.7%) patients admitted to having another previous fall in the past 6 months. A patient with previous falls did not have the number of falls documented.

Documented nature of fall:

Twenty- seven patients (96.4%) had their nature of falls resulting in their hip fracture documented.

Documented orthostatic blood pressure:

Twenty-three (82.1%) patients did not have an orthostatic blood pressure documented in their

medical notes. Of these, eight (34.8%) patients were already hypotensive, which may explain why orthostatic blood pressure was not assessed.

Occupational therapist (OT) involvement:

Twenty-five (89.3%) patients were reviewed by an occupational therapist (OT) during the admission. One patient was seen as outpatient. Two patients did not receive OT input as they deteriorated in intensive care unit and passed away.

Home assessment:

Twenty (71.4%) patients had home assessments done by the occupational therapist during their admission. Two home visits were done as outpatient and another two home visits could not be carried out due to the distance of the patients' residence. Three patients passed away, thus home visits were not carried out. One patient was referred to an occupational therapist on the day of discharge. Environmental fall risk factors were only evaluated via feedback from the patient and family.

Physiotherapist (PT) involvement:

Twenty-seven (96.4%) patients received physiotherapy input during the admission. One patient did not receive physiotherapy input, as they were medically unstable (and subsequently passed away).

Cognitive assessment:

Twenty-five (89.3%) patients were not known to have cognitive disorders prior to the admission. Out of these, seventeen (68.0%) patients were being screened via a focused history regarding cognitive issues.

Medication review:

All patients had their medications reviewed during the admission. Two patients were on long-term sedatives (fall risk) and one patient was on long-term lamotrigine (osteoporosis risk).

## **DISCUSSION:**

According to the British Orthopedic Association guidelines, all patients presenting with a fragility fracture should be managed on an orthopaedic ward with routine access to acute orthogeriatric medical support from the time of admission and should be offered multidisciplinary assessment and intervention to prevent future falls [5]. Studies have shown that patients with hip fractures had better outcomes when there was integrated care from orthopedics and geriatricians [6-8].

There are different types of orthogeriatric care models in different countries. Baroni et al. showed that patients under orthogeriatric co-management (OGC) had better outcomes compared to those under a geriatric consultant service (GCS) [9]. Patients in the OGC model received joint care from orthopedic surgeons and geriatricians daily from the time of

admission, while patients in the GCS model were mainly under the management of traumatologists, who referred to geriatricians according to the patients' condition, without a standard multidisciplinary treatment plan. Our local orthogeriatric service was initially closer to the GCS model, which then transitioned more towards the OGC model. However, due to the limited number of geriatricians, patients are reviewed twice weekly, and contacted as required on the remaining days of the week.

In terms of falls history, only 53.6% were asked about a history of previous falls over the past six months. While this is less than the findings from a national UK audit of inpatient falls [10], more than 95% of our patients had the nature of the fall resulting in the hip fracture documented. Previous history of falls is a strong risk factor for further falls, while knowing the nature of falls would assist in fall risk assessment and rehabilitation planning [11].

Although postural hypotension is a risk factor for falls in older adults, only a minority of our patients (17.9%) had orthostatic blood pressure checked. This was also found to be an area of potential improvement in the national UK audit, which found only 16% (in 2015) and 19% (in 2017) of patients had lying and standing blood pressure checked [10].

A majority of patients received care from OT (89.3%), PT (96.4%) and had a home assessment performed (71.4%). However, the timeframe for review was not included as a standard for our audit. According to the

National Institute for Health and Care Excellence (NICE) guidelines, it is recommended that patients receive PT assessment and mobilise on the first postoperative day and then at least once daily [12]. This improves the prognosis of gaining pre-morbid mobility on discharge. Unfortunately, none of our patients in this audit regained baseline mobility.

An audit as part of UK National Hip Fracture Database Report in 2011 had early mobilization started from the day of surgery (25% of the patients) to the following day of surgery (100% of the patients). A prospective study also showed that inpatient OT and PT benefits patient outcomes upon discharge but did not help with recovery and risk of future falls after a month [13]. Thus, it is recommended that patients have continuous rehabilitation after discharge, with follow-up organized to assess their progress [14,15].

Nearly 70% of our patients had screening for cognitive impairment. According to NICE guidelines, patients should be assessed for cognitive impairment when presenting with a hip fracture [12]. Patients with Alzheimer's dementia have a higher risk of falls and sustain hip fractures [16]. A study from Norway showed that orthopaedic surgeons may also be able to identify chronic cognitive impairment [17]. It is also important to identify delirium, which is common following hip fractures. A potential area of improvement is screening for delirium, and applying objective measures of cognition,

such as cognitive testing during the orthopaedics admission. However, this is currently not done due to staffing restrictions, and the preference to put patients through detailed cognitive testing after recovery (in outpatient clinic settings). All our patients had medications reviewed during admission.

It would be beneficial to introduce a standardized checklist for fall risk assessment following hip fractures. This would help ensure all patients receive basic assessment for secondary fall prevention, which is a standard for hip fracture care. This would also assist and guide other specialties to perform the necessary assessments and / or interventions for patients with hip fractures.

Limitations:

The main limitation of this audit is the small number of patients. Data was also retrospectively collected from medical notes, which is limited by adequacy of documentation.

#### CONCLUSION:

Our audit showed that the main aspects to improve on were history taking of previous falls, evaluation for orthostatic hypotension and assessment for cognitive impairment. Other aspects related to standards of care for hip fracture patients such as fracture prevention should also be evaluated to improve outcomes.

Conflicts of Interest

The authors have no conflicts of interests to declare.

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**Appendix I Audit:  
Fall assessment in older patients with NOF fracture (Self-designed proforma)**

1.	BN			
2.	Age / DOB			
3.	Gender	Male	Female	
4.	Pre-fall mobility	Without walking aid		
		With walking aid	If yes, what & how many	
		Bedbound		
5.	Length of stay			
6.	Previous history of fall in past 6 months documented	Yes, how many	No	Unavailable
7.	Nature of falls documented	Yes	No	Unavailable
8.	Postural BP documented	Yes		N/A
			No	
9.	Dstix documented	Yes	No	N/A
10.	OT assessment done	Yes	No	N/A
11.	PT assessment done	Yes	No	N/A
12.	Home visit done	Yes	No	N/A
13.	Cognitive assessment done	Previous hx of dementia	Not known previously, was it done?	Yes
				No
14.	Medications	Benzodiazepines	Stopped?	Yes
				No
		Sedatives	Stopped?	Yes
				No
		Antipsychotics	Stopped?	Yes
				No
Antidepressants	Stopped?	Yes		
		No		
15.	Pre-discharge mobility	Back to baseline	Deteriorated	