

# Experiences of setting up an acute orthogeriatric service in a tertiary hospital in Australia

## Abstract

Falls are common in the older population and can lead to increased morbidity and mortality. Fall related injuries impose a substantial burden on the health care and aged care systems. Falls can also result in reduced quality of life, independence, restriction of activities and fear of falling as well as disability, decreased mobility and increased risk of being admitted to residential aged care facilities. Hip fracture is a common injury associated with falls in the older person which has implications on prolonged recovery time and increased morbidity. Over the recent years, several care models incorporating a Geriatric Medicine Team in the preoperative management have been trialled across the world aiming to optimise the management of older patients admitted to hospital with a hip fracture. The Acute Orthogeriatric Service was initiated in the John Hunter Hospital, Newcastle, New South Wales (NSW) with this objective in mind. This article describes the background and supporting evidence for commencing the Acute Orthogeriatric Service and Performance Data over the first 9 months of the service, as well as issues identified and scope for improvement.

Since commencement in 2014, the service has managed approximately 400–500 patients annually with an average age range of 84.6 years. Review of performance data over the first 9 months of the service showed that the average length of stay for a patient managed by the orthogeriatric team (including rehabilitation) is 20 days while the average length of stay for the acute admission is 9.6 days. This is significantly lower than the NSW public hospitals data for 2009–2011 for similar a patient which was noted to be 26 days on average.

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## Introduction

Falls are a common occurrence in the older population. A NSW falls prevention baseline survey in 2009 reported that in 2009 25.6% of older people fell at least once in the preceding 12 months and 20% of those had to visit a hospital as a result of their fall.<sup>1</sup> Fall related injuries impose a substantial burden on the health care and aged care systems. In 2009–10 falls among older people led to approximately 32,000 hospitalisations according to NSW Department of Health statistics. An Australian Institute of Health and Welfare (AIHW) National Hospital Morbidity Database showed 96,385 people aged 65 and over were hospitalised following a fall related injury in 2011–12.<sup>2</sup> The length of time spent in hospital as a result of a fall increases with age. In 2011–12 females over 85 years of age spent 5 times longer than a female aged 65–69 years admitted for a fall related injury. 1 in 4 of those who were admitted to hospital after a fall in 2011–12 had sustained an injury to the hip or thigh (27%, 25,676 cases).<sup>2</sup>

Hip fractures typically carry a worse morbidity and mortality outcome when compared with other common fractures associated with osteoporosis.<sup>3–5</sup> with the reported 1 year mortality after sustaining a hip fracture estimated to range between 14% to 58%.<sup>6–8</sup> Hip fractures are also associated with significant morbidity, mortality, loss of independence, and financial burden.<sup>9–11</sup> In Australia, It has been shown that older patients with hip fractures have longer lengths of stay compared to younger patients.<sup>12</sup> Post-operative complications are also more frequent in the older population with up to 60–70% of older patients encountering postoperative complications following a hip fracture.<sup>13,14</sup> The combination of increased risk of complications

and prolonged hospitalisation with associated disability has an impact on the patients' ability to return to their previous function and independent community living, highlighting the importance of early focus on mobilization and rehabilitation. Accelerated rehabilitation has also been shown to decrease average length of stay by 20% in a randomised controlled trial.<sup>15</sup>

Comprehensive geriatric assessment and management delivered through an Orthogeriatric Service aims to identify concurrent medical and social issues, providing pre-emptive management of medical comorbidities to minimise or avoid post-operative complications, early focus on rehabilitation and discharge planning initiated at an early stage of the admission and ensuring multidisciplinary team involvement. Other areas of focus include management of Vitamin D deficiency and Osteoporosis, planning for fracture prevention as well as assessment of falls risk and prevention strategies. The orthogeriatric management requires a collaborative and multidisciplinary approach with effective teamwork and coordination as well as clear communication and working partnerships between various specialties and allied health providers in order to manage the complex needs of the orthogeriatric patient. Several models have been used across various facilities and these include: Consultative Orthogeriatric Care, Shared Care Model and Orthogeriatric Liaison Service.

A collaborative orthogeriatric model of care has been demonstrated to lead to a 45% decrease in probability of major complications such as delirium, pneumonia, deep vein thrombosis, pulmonary embolism, congestive cardiac failure, pressure ulcers and myocardial infarction as well as mortality.<sup>13</sup>

In Australia, a prospective trial of the collaborative orthogeriatric model compared with a historical control population showed a reduction in medical complications by 21% and mortality by 3%<sup>16</sup> as well as 20 % reduction in readmission rate for medical reasons at 6 months.<sup>17</sup>

## Our experience

A typical journey of an elderly patient presenting to emergency department with a fall and fracture of hip follows the course of pre-operative assessment by Orthopaedic Surgeons, Anaesthetists, Physicians, followed by surgery to repair the fracture, post-operative stabilisation and recovery, rehabilitation and discharge from hospital.

A comprehensive assessment and management plan involving geriatricians, orthopaedic surgeons, anaesthetists and other multidisciplinary teams can minimise the complications and assist with smooth transition of an older patient through this journey in a timely manner.

The John Hunter Hospital is the principal referral centre and a tertiary hospital for Newcastle, Lake Macquarie and northern New South Wales, Australia with over 500 beds and is one of the state's busiest trauma centres.

The Acute Orthogeriatric Service at John Hunter Hospital was established during 2014. It operates in a shared care model where patients over 65yrs of age presenting to hospital with a hip fracture are admitted to a dedicated ward as a joint admission under Orthopaedic Surgeons and Geriatricians where both services take responsibility for pre and post-operative multidisciplinary care.

The Orthogeriatric team currently includes a Geriatrician, Clinical Nurse Specialist, an Advanced Trainee in Geriatric Medicine, a Basic Physician Trainee registrar and a Resident Medical Officer who is shared with the Orthopaedic Team, supported by a multidisciplinary team including a physiotherapist, occupational therapist, pharmacist, nutritionist and a social worker.

The management is guided by best practice guidelines and minimum standards of care as outlined by Agency for Clinical Innovation (ACI) in NSW.<sup>17</sup> These standards outline orthogeriatric clinical management, pain management, ensuring timely surgery, early mobilisation, re-fracture prevention and local ownership of data systems. The clinical and demographic data is recorded in the Australia and New Zealand Hip Fracture Registry and constantly used for local and national auditing purposes. Since commencement in 2014, the service has managed approximately 400–500 patients annually with an average age range of 84.6 years.

Between February 2015 and October 2015, a total of 286 patients were admitted to the Acute Orthogeriatric Service, averaging 28 patients per month. 285 patients underwent surgery while surgery was deferred in one patient due to impacted intracapsular fracture.

Majority of admissions were via Emergency Department (268) while 14 patients were transferred from other hospitals. 3 patients were already admitted to hospital and suffered an inpatient fall leading to their hip fracture (Table 1).

While 67% of the patients were community dwellers at the time of the admission, only 54% returned to private residences following the acute admission and rehabilitation (Table 2).

**Table 1** Route of admission

Via Emergency Department	268
Transferred from other hospital	14
In-patient fall	3
Other / Not known	1

**Table 2** Place of admission and discharge destination

Place of admission	Discharge destination	
Residential Aged Care Facility	88	116
Private residence	194	156
No data available	4	1
	Deceased	13

The time of admission via Emergency Department was reviewed. Only 33% of the admissions were noted to present to Emergency Department during the regular working hours of the Acute Orthogeriatric service, which was Monday – Friday 08.00 till 16.30. Majority of the admissions were received either after hours or during the weekends, which highlighted the importance of close clinical liaison between the Emergency Department, Admitting Medical Officers during after hours, Orthopaedic team and Orthogeriatric team to ensure effective clinical handover and continuity of care. This pattern also highlighted a potential for delay in Orthogeriatrics team review following an admission (Table 3).

**Table 3** Emergency Department Arrival Time

Emergency department arrival time	No. (%)
Monday – Friday (08.00 – 16.30)	97 (33%)
Monday – Friday (after hours)	111 (38%)
Weekends	78 (27%)

The Agency for Clinical Innovation (ACI) recommends assessment and management of osteoporosis in all patients admitted to hospital with a fragility fracture such as a hip fracture.<sup>17</sup> It recommends that 25-Hydroxy Vitamin D, corrected Calcium, Phosphate and Thyroid function levels are measured in all patients. Combined treatment with calcium and Vitamin D has been shown to significantly reduce non vertebral fractures by 32% and hip fractures by 43% in women living in French Nursing Homes or Apartment Blocks.<sup>18</sup> A meta analysis of twelve trials of hip and non vertebral fractures in people aged over 60 years concluded that a higher dose of Vitamin D (700–800 International Units daily reduced the relative risk (RR) of hip fracture by 26% and non vertebral fractures by 23%.<sup>19</sup> The ACI recommends replenishment of Vitamin D levels if <75nmol/L along with calcium supplementation and ensuring Calcium and Vitamin D levels are replete prior to commencing osteoporosis treatment. An oral or intravenous bisphosphonate or Denosumab are used as anti resorptive therapy.

We reviewed the Osteoporosis treatment in the patients admitted to the Acute Orthogeriatric Service. 50% of the patients admitted to the Acute Orthogeriatric Service were not receiving any form of treatment for osteoporosis at the time of admission while 12 % were on anti resorptive therapy in the form of a bisphosphonate or Denosumab. On discharge, 62% of the patients were commenced on Calcium and Vitamin D supplements while 18 % were on anti resorptive therapy.

While the commencement of antiresorptive therapy seems modest, the reasons included awaiting replenishment of Vitamin D levels, planned to commence treatment with General Practitioner or transfer to another facility. In some patients, a clinical decision was made not to commence anti resorptive therapy based on patient's medical conditions, prognosis and life expectancy (Table 4).

**Table 4** Treatment of Osteoporosis

On admission	No. (%)	On discharge	No. (%)
No Treatment	145 (50%)	46 (16%)	
Ca + Vitamin D only	106 (37%)	180 (62%)	
Anti resorptive treatment	35 (12%)	54 (18%)	
Not recorded		6	

Review of performance data over the first 9 months of the service showed that the average length of stay for a patient managed by the Acute Orthogeriatric Team (including time spent in rehabilitation) was 20 days with the longest admission recorded as 161 days. The average length of stay for the acute admission was 9.6 days, ranging from 1–87 days. This is noted to be lower than the NSW public hospitals data for 2009 – 2011 for similar patients which were 26 days on average,<sup>20</sup> highlighting the effectiveness of the Acute Orthogeriatric Service in reducing the hospital length of stay. The calculated 30 day all cause mortality rate during this period was 10.5%, which is comparable to other international data,<sup>4,5</sup> however higher than NSW public hospitals data for 2009–2011 which was 6.5%.

## Discussion

The commencement of the Acute Orthogeriatric Service at the John Hunter Hospital has contributed to effective management of the older patients presenting to hospital following a hip fracture, ensuring efficient preoperative management and transfer through acute and rehabilitation programs with the total length of stay noted to be shorter than the state average for comparable services. While the 30 day mortality rate was noted to be higher than the other hospitals in the State, this number is comparable to other international data reported. The reasons for this difference has not been reviewed, however, if this continues to be a persistent occurrence further evaluation would be warranted to optimise the outcomes in this patient group.

The review of the timing of admission highlights the fact that effective clinical handover is essential to maintain smooth patient transition and collaborative care.

While the initial data highlighted less than optimal uptake of Osteoporosis treatment, several programs have been put in place to ensure the plans for continuous treatment and follow up with regards to anti resorptive therapy and Bone Mineral Density testing is followed up by the General Practitioner (GP). These included a letter addressed to the GP as well as instructions added to the discharge letter.

Further quality assurance audits are required to compare the effects on complications such as delirium management and post-operative complications.

Improved collaboration and communication between focus groups and stake holders in the multidisciplinary team including the Orthopaedic team, Anaesthetists, Nursing staff and other Allied

Health professionals will help to further optimise the patient care and facilitate achievement of the management goals.

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## Conflicts of interest

The authors declare there is no conflict of interest.

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