The SCHHS hip fracture clinical network experience–Improving care and outcomes through an interprofessional approach

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Table 1.0
The SCHHS Hip Fracture Clinical Network Experience - Improving care and outcomes through an interprofessional approach.

Abstract

Background

Hip fractures are a major global health care issue, with the 1.26 million estimated cases in 1990 predicted to increase to 4.5 million by 2050. Varying models of care have been developed to improve outcomes following fragility hip fractures. Most of these care models embrace an interprofessional approach to care. Specialist orthopedic nurses play an important role in the management of fragility hip fracture patients and their contribution to the interprofessional health care team is an important predictor of patient outcomes.

Assessment of the problem

The Sunshine Coast Hospital and Health Service (SCHHS) compromises of four hospitals in South East Queensland, Australia however only one large regional hospital provides specialist hip fracture services. Approximately, 350 older hip fracture patients present to the Sunshine Coast Hospital & Health Service (SCHHS) each year. We used Hospital Health round table (HHRT) data to identify and assess key performance care and management of hip fracture patient and outcomes at SCHHS. The HHRT is a nonprofit membership organisation of health services across Australia and New Zealand that aims to provide opportunity for Health Services to achieve best practice, collect analyse and publish information, identify ways to improve and promote collaboration and networking. Exemplars of best practice are also identified in the data so that organizations can adopt similar models of care. HHRT data identified underperformance in management of hip fracture patients in a number of quality indicators at the study site, including length of stay (LOS), time to surgery and relative stay index (RSI).

Strategies for quality improvement

Following review of HHRT data key stakeholders undertook a quality improvement project and formed the Hip Fracture Clinical Network Group (HFCNG). This was established in 2013 with the aim of improving outcomes and achieving key performance indicators for all elderly patients who sustain a hip fracture through active collaboration and regular communication between a broad group of key clinical stakeholders.

Results of the quality improvement project.

Following the implementation of the initiative the Relative Stay Index reduced from 88% in 2012/13 to 78% in 2014/15, and the average LOS reduced from 10.4 days to 8.6 days. The percentage of patients receiving surgery within 2 days rose from 85% to 96%; demonstrating consistent outperformance of the time to surgery key performance indicator of 80%. The percentage of patients discharged to their place of usual residence increased from 45% to 54%. The rate of complications reduced slightly from 69% to 66%. Rates of hospital acquired anaemia reduced from 20.7% to 15%.
Detection of delirium rose over the reporting period from 22% to 34%, enabling rapid management. We noted during this period that there was no corresponding increase in readmission rates for this group of patients. These data reflect improvement to clinical documentation and the appropriate identification of cognitive changes.

**Conclusion**

In this quality improvement report, we describe how key stakeholders were engaged to improve communication and collaboration, and how the use of a national benchmarking dataset enabled health care providers to identify care gaps and inconsistencies in clinical practice. This quality improvement project markedly improved collaboration, clinical practice and patient outcomes.

**Background**

Hip fractures are a major global health care issue, with the 1.26 million estimated cases in 1990, predicted to increase to 4.5 million by 2050 (Chang, Center, Nguyen, & Eisman, 2004). In Australia, 91% of hip fractures occur in patients aged 65 years and over, and 40% are aged over 80 years (Kreisfeld, 2006; Kumar, Mbako, Riddick, Patil, & Williams, 2011). They account for more hospital days than any other musculoskeletal injury and represent two of every three hospital days due to fracture (Kumar et al., 2011), this finding is replicated internationally (Mitchell et al, 2016, Odén et al., 2015). These fractures, particularly in those aged over 65 years are associated with significant morbidity and mortality risk (Braithwaite, Col, & Wong, 2003; Spahn, 2010). Mortality rates are reported as high as 8.3% in the perioperative period and 36% at one year (Imoto et al., 1999; Luo, He, Li, & Huang, 2012). Up to 20% of post fragility hip fracture patients require long term care and 30% of patients will be unable to return to the pre injury level of function and independence (National Institute for Health and Clinical Excellence, 2011).

Hip fracture care is complex (Maher et al., 2012, 2013) and while national and international guidelines for the interprofessional management of hip fractures exist (ANZHFR, 2014; NICE, 2011), there are often discrepancies between actual clinical practice, evidence based guidelines and protocols and guidelines are not always translated into clinical practice. Differences in values, processes and procedures create fragmented and disjointed silos of care, that negatively influence patient outcomes (Christie, Macmillan, Currie, & Matthews-Smith, 2015). Varying models of care have been developed to improve outcomes following fragility hip fractures and the majority of these care models embrace an interprofessional approach to care (Christie et al., 2015; Liem et al., 2013; Lynch, Tower, & Venturato, 2015). The interprofessional approach to the management of hip fractures enhances communication between different care providers, and enables practitioners from different professions to learn from each other, improving collaboration, quality of care, identification of alternative approaches to complex clinical challenges and most critically, improved patient outcomes (Lawlis,
Anson, & Greenfield, 2014; McPherson, Headrick, & Moss, 2001). Orthopaedic nurses play an important role in the management of fragility hip fractures and their contribution to the interprofessional health care team is an important predictor of patient outcomes (Aiken et al., 2011; McHugh et al., 2013; Needleman et al., 2011).

Assessment of problems

The Sunshine Coast Hospital and Health Service (SCHHS) is a busy regional hospital located in South East Queensland, Australia. It serves a population of approximately 390,000 with those aged over 65 comprising 18% of the population (Regional Development Australia Sunshine Coast Incorporated, 2012). Patients over 60 admitted with hip fractured are admitted into a dedicated orthopaedic ward under the care of an orthogeriatrician who is supported by an orthopaedic surgeon and the multidisciplinary team, which coordinates the care of the patient from admission until discharge. Under this model the orthogeriatrician and multidisciplinary team assess the patient’s overall health status, optimize the patient for surgery and coordinate care until discharge, while the orthopaedic surgeon and anaesthetist provide surgical intervention and perioperative support. The SCHHS orthogeriatrician model of care differs from other reported orthogeriatrician models. In the more traditional orthogeriatrician model patients are admitted under care of orthopedic services with orthgeriatric teams providing a consultancy or shared care service, evaluation of this model is evident in the literature (Liem et al., 2013). In the Hip Fracture Clinical Network Group (HFCNG) model presented, patients are admitted under the care of the orthogeriatrician with specialized input from surgical services.

Locally, clinicians involved in the care of older patients with hip fracture supported the orthogeriatric model of care. However, prior to the implementation of the HGCNG model concerns were voiced regarding discrepancies between actual and reported data and outcomes for example, hospital-acquired anemia. In response to these concerns and the data from the HHRT, clinicians, from healthcare disciplines involved in the care of older patients with hip fractures commissioned a series of internal and external reviews to identify factors associated with the suboptimal outcomes. While no significant clinical issues were identified in these clinical reviews, the management of hip fracture patients was disorganised, coordination of hip fracture care, and communication between the interdisciplinary teams lacking and clinical teams were working in isolation from each other. As noted above, communication and collaboration are important predictors of postoperative outcome in hip fracture patients (Christie et al., 2015). The findings from the clinical reviews identified an urgent need to improve communication and collaboration between members of the interprofessional teams. To address this, key stakeholders were engaged to support health care providers to identify gaps and inconsistencies in clinical practice, and ultimately ensure that this quality improvement activity increased collaboration, clinical practice and improved patient outcomes.
In this paper, we first present the processes undertaken in this quality improvement project, with the aim of providing a framework for specialist orthopaedic nurses to lead and develop similar interprofessional activities. Second, the results of a locally implemented hip fracture improvement program are presented with the aim of outlining and demonstrating the value of locally implemented quality improvement projects in the older hip fracture population, improving collaboration and communication and developing a more cohesive interprofessional clinical team.

**Strategies for quality improvement**

In the 2012/13 financial year the SCHHS treated 256 patients aged 60 or over who sustained a hip fracture. Through the review of local data reports and the Hospital Health Roundtable (HHRT) hip fracture dataset we identified that the SCHHS was underperforming in a number of quality indicators, including LOS, time to surgery and RSI. The HHRT is a nonprofit membership organisation of health services across Australia and New Zealand that aims to provide opportunity for Health Services to achieve best practice, collect analyse and publish information, identify ways to improve and promote collaboration and networking. It also identifies exemplars of best practice so that other organization may adopt similar methods and processes (HHRT). Previous studies have used HHRT datasets to improve hip fracture care (Lynch et al., 2015).

The HFCNG was established with the aim of improving outcomes and achieving key performance indicators for all elderly patients who sustain a hip fracture through collaboration and regular communication between diverse clinical teams. Clinicians from all disciplines involved in the acute care of hip fracture patients formed a local clinical network. Membership of the HFCNG group included orthopedic Surgeons, orthogeriatricians, anaesthetists, emergency physicians, orthopaedic specialist nurses, allied health practitioners and clinical coders, all of whom were involved in the care of hip fracture patients.

The HFCNG was committed to the shared vision of improving care and outcomes for all elderly patients that sustain a hip fracture. We utilised the ‘plan, do, study, act’ (PDSA) quality cycle methodology (Donnelly & Kirk, 2015), undertaking a review of all aspects of clinical practice, communication and patient outcomes. Interprofessional monthly meetings were established as a forum for the group to plan, prioritise, implement, monitor and evaluate all activities pertaining to patients with hip fractures. Terms of reference were developed; key performance indicators and outcome measures identified and defined. The HFCNG developed escalation processes for risks and issues, and a clinical governance structure developed to ensure accountability.

The HFCNG worked together to develop a priority list and process change. Outcomes were disseminated at the clinician, service director and executive level. The HFCNG reviewed care processes, performance and quality indicators against HRT data reports and the ANZHFR Hip
Fracture Guidelines (ANZHFR, 2014). Following this review of care processes the HFCNG identified that a number of key elements in the management of the hip fracture patient were inadequate, specifically; a lack of definition, standardisation and points of accountability.

Including:

- Surgical prioritisation and time to surgery
- Patient journey through the emergency department
- Preoperative analgesia & the use of nerve blocks
- Identification of anaemia and blood transfusion
- Postoperative wound care
- Identification and documentation of complications

The HFCNG collaboratively reviewed the care processes to identify the root cause/s of issues, reviewed the current evidence and standards for care, and then designed solutions and implemented changes to ensure these complex patients received timely evidence-based care processes that addressed previous oversights/inequacies in care. Some of the solutions implemented include:

**Time to surgery algorithm:** Prior to implementation of the HFCNG patients were routinely booked for surgery in the emergency theatre, which led to significant delays due to competing emergency surgery demands. Delay to surgery is associated with negative outcomes (ANZHFR, 2014, Lefaivre et al., 2009). The time to surgery algorithm guided surgeon’s decision-making regarding booking surgery for the patient. This algorithm provided a means to escalate the priority of surgery for hip fracture patients, and to a standardised theatre booking process for elderly hip fracture patients.

**Patient journey through the emergency department:** Patients were identified as having to wait extended periods of time for radiological investigations to confirm the presence of fracture. This delayed time to surgery, which is an important factor in patient’s recovery and rehabilitation (Lefaivre et al., 2009). Prior to implementation of the HFCNG model patients waited for diagnostic tests, received no further investigations and minimal analgesia whilst they waited for radiological investigations. Driven by the Emergency Physician HFCNG representative, an Emergency Department pathway was developed that included early x-ray, referral to the orthogeriatric team based on mechanism of injury and clinical assessment rather than x-ray confirmation of fracture. Effective analgesia with the use of fascia iliaca nerve block and timely transfer to the inpatient unit was also completed.

**Preoperative analgesia & the use of nerve blocks:** Suboptimal analgesia both prior to and following surgery was evident via the case reviews undertaken by the HFCNG. Adequate pain relief is an important component of patient satisfaction (Farooq, Khan, & Ahmed, 2016) and is therefore an important element of patient centred care. It is also associated with improved recovery post
operatively (Husain & Lee, 2015). In collaboration with the Department of Anaesthesia, a model of
care was developed and implemented which aimed to ensure consistent and effective analgesia for all
patients who sustained a hip fracture. Patients who received a nerve block in the emergency
department automatically received a written referral from the treating practitioner to the acute pain
service for ongoing follow up. A, 24 hour a day, 7 day a week referral pathway for all hip fractures to
receive timely analgesic review by a member of the Anaesthetic team was implemented. This service
includes access to a dedicated anaesthetic advanced trainee whose primary role is to perform nerve
blocks. In addition, a significant percentage of patients now receive an intraoperative nerve block to
ensure adequate postoperative analgesia, successfully minimising the use opioid medication in this
vulnerable patient group. The effectiveness of this service is assessed, reviewed and reported on a
continual basis using quality data indicators collected within the ANZHFR (ANZHFR, 2014) for
example provision of and effectiveness of analgesia. In future we aim to develop an interactive real
time data platform to support more efficient and effective reporting.

Anaemia & Blood Transfusion: Historically, the threshold for packed red blood cell (PRBC)
transfusion in hip fracture patients was defined as a haemoglobin (Hb) level between 90-100 g/L, with
the routine prescription of 2 units of PRBC if the Hb dropped below 90g/L (National Blood Authority,
2012). The HFCNG reviewed current evidence and National Blood Authority guidelines (National
Blood Authority, 2012) and following this review, implemented symptomatic transfusion thresholds.
Each patient is assessed for symptoms associated with anaemia, for example, dizziness, postural blood
pressure drop or shortness of breath. Patients are and then assessed for how these may affect the
patient’s ability to rehabilitate and to assess individual risks associated with a transfusion versus no
transfusion. When a transfusion is required, a single unit transfusion policy is utilised until further
symptom and risk assessment undertaken and the outcome of transfusion evaluated. This change
process has significantly reduced blood product usage; reduced adverse events associated with blood
and blood product administration, and reduced SCHHS blood product expenditure.

Postoperative Wound Care: Postoperative wound care and review of surgical wound was previously
the responsibility of the orthogeriatric team. However, the orthogeriatric medical team identified that
they often felt poorly equipped to identify, manage and treat complex wounds. For example, normal
surgical inflammation misinterpreted as early infection and use of antibiotic and wound swabs
increased and often relied on nursing staff to assist with wound care management. Following
discussion within the HFCNG a simple post-surgical review schedule was developed to ensure all
patients who underwent surgery for hip fracture received regular and consistent surgical review by the
operating orthopaedic surgical team and specialist orthopaedic nursing staff.

Identification and documentation of complications: Prior to implementation of the HFCNG
identification and documentation of complications for example, wound infections, pressure injuries,
bleeding and chest infections was identified as suboptimal, in particular pre-existing conditions like chronic anaemia were not recorded and subsequently miscoded as a hospital acquired complication. A meeting was arranged with a clinical coder and the HFCNG was educated about the importance of accurate documentation, areas of over reporting and underreporting were identified and highlighted for future correction.

Ethics approval

Ethical approval for the study was gained from the Human Research Ethics Committee of the local hospital: HREC/15/QPCH/275. All data was collected and reported in de-identified form to maintain anonymity and privacy. Approval to publish data was sought and gained from HHRT.

Results of assessment/measurement

Local Hospital and Health Service (HHS) data and HHRT reports were used to measure outcomes and monitor performances. Progress was tracked monthly at the HFCNG meetings and reported yearly. Baseline measures from 2012 were compared and reported through the HFCNG meetings to gauge success and review progress. HHRT data was also used for ongoing comparison and benchmarking. Data was collected pre and post HFCNG and compared at yearly time points. The main outcome measures are summarised in table 1.
### Table 1. Outcome measures

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The Relative Stay Index (RSI) as reported by the HHRT dataset reduced from 88% in 2012/13 to 78% in 2014/15, and the average length of stay reduced from 10.4 days to 8.6 days over the same time period. The percentage of patients receiving surgery within 2 days of admission rose from 85% to 96% showing consistent achievement of the ‘time to surgery’ key performance indicator of 80%. The percentage of patients discharged to their place of usual residence increased from 45% to 54%. The rate of complications reduced slightly from 69% to 66%. Hospital acquired anaemia reduced from 20.7% to 15% likely due to better identification through appropriate documentation of the presence of anaemia on admission as opposed to hospital-acquired anaemia. Reported rates of delirium rose over the focus period from 22% to 34%, reflecting improvement in clinical documentation and more accurate identification and documentation of cognitive changes. The economic impact of this project was not measure however the documented reduction in length of stay, and improvement in documentation related to activity based funding would be worthy HFCNG of further data analysis.
Lessons and Limitations

The orthogeriatric model of care and interprofessional collaboration described in this quality improvement initiative is under reported in the literature. Our description of this type of model demonstrates its value, effectiveness, and its benefit and usefulness in improving practice and outcomes for elderly hip fracture patients. This report makes an important contribution to understanding this alternative model of care and indicates how such quality improvement projects may influence patient care, processes and outcomes. Through the project our clinical teams have learnt and demonstrated the processes involved in interprofessional and collaborative service delivery and outcomes review can be cost effective, transferable across different patient cohorts and easily embedded into standard care processes. However, the implementation of such models requires significant commitment, collaboration, and communication from all health care disciplines. This is time and resource intensive and for future projects, a dedicated project manager or team leader may improve the processes and enable more effective and efficient.

Following the implementation of the HFCNG, communication channels and processes between the different clinical departments improved and more importantly, led to other collaborative projects outside the sphere of hip fractures, for example, collaborative research projects. Collaborative working relationships positively affect staff and patient outcomes, and processes and practices that encourage and nurture these relationships in the clinical arena should be promoted.

As part of the quality improvement cycle (Donnelly & Kirk, 2015) the HFCNG continues to meet monthly to review performance and outcomes. Successes and lessons learnt are reported locally through service lines and quality of care reports, and nationally through the Health Roundtable Innovations Awards. The project team presented these findings internationally, at the International Forum on Safety and Quality in Sweden. In addition, to on-going review of performance and reporting outcomes the HFCNG continue to identify areas for improvement. The HFCNG have recently implemented a quarterly interprofessional team morbidity and mortality review. The aim of these meetings is to review all hip fracture morbidity and mortality data and to involve all disciplines involved in the care of patients with hip fracture in analysis and consensus planning around performance improvement. As a result of these meetings deficits in care processes are identified and areas for improvement agreed, and new projects generated.

In the quality improvement initiative reported here, there was an improvement in all the quality indicators identified as underperforming in the clinical datasets, with the exception of time spent in emergency department and time to medical imaging. This finding is concerning since time spent in the emergency department can be an important predictor of patient outcomes (Bernstein et al., 2009).
A number of factors may be associated with time spent in the emergency department, that were beyond the scope of this project, including departmental culture, turnover of staff and access to inpatient beds may have impacted on this quality indicator. These factors may be important variables influencing the care and management of the elderly hip fracture patient and are worthy of further exploration. Time to medical imaging did not improve; again this may be due to other confounding variables that we were not aware of and therefore unable to influence.

This quality improvement project was designed to be patient centered, evidenced based and sustainable. Fundamental to the success of this project has been interprofessional collaboration between diverse teams of healthcare practitioners. Effective and sustained change, and quality improvement requires collaboration and effective communication within a culture of improvement. The HFCNG was committed to fostering such a culture with the ultimate aim of improving patient care. The collection of accurate and reliable data enabled the HFCNG to monitor and understand the model, care processes and pathways and identify gaps in these. Reflecting on this process we have identified a number of quality improvement initiatives that could be developed. These include specialist nurse coordinators to facilitate the planning and provision of care throughout the patient journey this specialist nurse could also perform nerve blocks. There is also opportunity to review the current patient flow through the emergency department and design a streamlined, fast track journey to improve time to diagnosis, analgesia and admission.

We have identified that whilst the use of local data reports and a national dataset enable deficiencies in care to be identified and improvement processes to be implemented, it would be naïve not to also recognise the limitations of this type of data. Such limitations include that the data, whilst highlighting gaps in care of hip fracture patients, may not have been specific to frailty hip fractures. Whilst we demonstrate that HFCNG appeared to improve the outcomes of frailty hip fractures other confounding variables may also have influenced these outcomes.

Conclusion

This quality improvement project highlights the importance of interprofessional working practices. Management of the elderly patient with a hip fracture is complex and involves diverse groups of healthcare professionals working together to deliver safe and effective care. Only by collaborative work between all these groups in a culture of quality care provision, can improvements in patient care be achieved and sustained. The most effective outcomes for patients are reached when health care professionals work and learn together, participate in quality improvements, and create innovation to ensure the best care for patients.

No funding sources to declare and no competing interest to declare.


