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Describing variation in the delivery of secondary fracture prevention after hip fracture: an overview of 11 hospitals within one regional area in England

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Abstract

Purpose—Hip fractures are usually the result of low impact falls and underlying osteoporosis. Since the risk of further fractures in osteoporotic patients can be reduced by between 20 - 70% with bone protection therapy, the NHS is under an obligation to provide effective fracture prevention services for hip fracture patients to reduce risk of further fractures. Evidence suggests there is variation in service organisation. The objective of the study was to explore this variation in more detail by looking at the services provided in one region in England.

Methods—A questionnaire was designed which included questions around staffing, models of care and how the four components of fracture prevention (case finding, osteoporosis assessment, treatment initiation and adherence (monitoring) were undertaken. We also examined falls prevention services. Clinicians involved in the delivery of osteoporosis services at 11 hospitals in one region in England completed the questionnaire.

Results—The service overview showed significant variation in service organisation across all aspects of care examined. All sites provided some form of case finding and assessment. However, interesting differences arose when we examined how these components were structured. Eight sites generally initiated treatment in an inpatient setting, two in outpatients and one in primary care. Monitoring was undertaken by secondary care at seven sites and the remainder conducted by GPs.

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Ethical Approval: Approval of this work by an ethics committee was not required. This study was registered as a service evaluation with the relevant NHS Trusts.

Conclusions—The variability in service provision was not explained by local variations in care need. Further work is now needed to establish how the variability in service provision affects key patient, clinical and health economic outcomes.

Keywords

Epidemiology; Osteoporosis; fracture; hip; femur; fragility

Introduction

Hip fractures present a global public health problem due in part to an increasingly elderly population. About 87,000 hip fractures occur annually in the UK, with a cost (including medical and social care) amounting to about £2.3 billion per year[1, 2]. They usually occur as result of low impact falls in individuals with underlying bone fragility often due to osteoporosis[2, 3]. The onset of osteoporosis may be asymptomatic and it is often only recognized after a fracture. Patients experiencing hip fracture are at considerable risk of subsequent falls, osteoporotic fractures and premature death[4-6]. As almost half of all hip fracture patients have had a prior fracture[4], responding to the first fracture provides an ideal opportunity to prevent the second. Since evidence shows that the risk of further fracture can be reduced by up to half with bone protection therapy[1, 7-9], there is a growing body of evidence for how to improve the identification and treatment of hip fracture patients[1, 4, 10].

Over the past decade national guidance from a number of professional bodies has been published for the management of hip fracture patients including guidance from Canada[11-13], America[14-16] and the UK [1, 17-19] in addition to international guidance such as the ‘Capture the Fracture’ initiative from the International Osteoporosis Foundation[20]. According to this guidance, a comprehensive secondary fracture prevention service should consist of four main components: *case finding*; *osteoporosis assessment* including a dual energy X-ray absorptiometry (DXA) scan to measure bone density if appropriate; *treatment initiation* with bone protection therapy in osteoporosis patients; systems to improve *adherence and persistence with therapy*[1], in addition to falls risk assessment and management. Organising such services is challenging due to the multidisciplinary care patients require[2]. As a result, the delivery of effective secondary fracture prevention services in hospitals that receive acutely fractured patients often requires a coordinator based system of care. That is, a service with a dedicated coordinator who provides a link between all the multi-disciplinary teams involved in fracture prevention, including the orthopaedic team, osteoporosis and falls services and primary care[10]. This coordinated, multi-disciplinary approach to patient care is known as a Fracture Liaison Service (FLS) [21]. The model proposed by the Department of Health in the UK is that delivered by a Nurse Specialist supported by a Lead Clinician (‘Champion’) in osteoporosis[22]. However, despite this national and international guidance there is no consensus on how best to organise these services and a single model incorporating all components of secondary fracture prevention has not been mandated.

Studies have shown that there is major variation in the care pathway for the treatment and management of hip fracture patients and in the way secondary fracture prevention services are organised[23-30]. In the context of England, fewer than 40% of hospitals had established a FLS as of 2010[31]. However, even within these co-ordinator based systems of care, the structure of these services can vary between hospitals, more than one would expect given local differences in volume and case-mix of hip fracture care. Exploring the similarities and differences between these services in more detail will help clinicians and commissioners in England to identify gaps in care and provide them with information about which services to develop if necessary, which may help to reduce unwarranted variation. More generally, it will add to the body of descriptive literature which has explored the different ways that fracture prevention services can be set up and run by examining how these services can vary in greater detail. This could have implications for studies that aim to evaluate the performance of different models of care as it suggests these additional factors should be taken into account.

The aim of this paper is to comprehensively explore the similarities and differences in secondary fracture prevention services offered to hip fracture patients across 11 hospitals that receive acute fracture patients in one regional area in England. Since fracture prevention services are often under the process of development, it is important to note that this study relates to the services as they existed in April 2013.

Methods

One regional area in England was identified for the study. Within this region, 11 hospitals that receive patients with acute hip fractures were selected. For the purpose of the service overview a questionnaire was developed to characterise, in detail, the secondary fracture prevention services provided to patients admitted with a hip fracture in each hospital. Information was captured on specialist staffing and their role in the care of hip fracture patients (e.g. Orthogeriatricians, Fracture Liaison and Osteoporosis Nurses) and facilities (e.g. DXA scanners, Geriatric Orthopaedic Rehabilitation Unit). Staffing levels were calculated as whole time equivalents (WTE) and as ratios in terms of the numbers of hip fracture patients admitted at a hospital in 2013[24] to emphasise the variations in the levels of service provision across the region. These were based on the annual number of hip fractures reported for each hospital in the 2013 National Hip Fracture Database (NHFD) report[24]. Questions were also structured around the broad types of coordinator based models of care and the four components of a Secondary Fracture Prevention service: (1) Case finding, (2) Osteoporosis assessment, (3) Treatment initiation, and (4) Monitoring (treatment adherence). Falls assessment and prevention were also included. These were derived from recent international guidance which defines thirteen standards for delivering an effective FLS[20]. Because of the differences between the strategies of case finding, osteoporosis assessment, treatment initiation, monitoring and falls prevention used by each hospital, data was collected using face-to-face structured questionnaires. Conducting these questionnaires face-to-face enabled participants to elaborate on methods of undertaking each of the components of care.

Health care professionals were identified to complete the questionnaire through a network of clinicians involved in the delivery of osteoporosis services within the region. These came from hospitals with fracture prevention services in various stages of development and included a wide range of clinicians such as Rheumatologists, GPs with a Special Interest in Osteoporosis, Trauma Surgeons, Fracture Liaison Nurses, Anaesthetists, Geriatricians, Orthogeriatricians, Endocrinologists and Nurse Trauma Consultants. Through this network, we approached one healthcare professional involved in the frontline care of hip fracture patients at each of the 11 hospitals. Further healthcare professionals were approached to complete the questionnaire if needed.

Results

Below we provide a brief summary of the different care settings of each service. We then describe variation in these service models for the 11 hospitals in detail. This includes a description of the types of coordinator based models of care at the hospital and the four main components of a secondary fracture prevention service: case finding, osteoporosis assessment, treatment initiation, and treatment adherence (monitoring). We also describe the services provided by hospitals to assess and prevent the risk of future falls.

Care settings of each service

Table 1 provides a brief overview of the care settings where the four components of secondary fracture prevention are conducted. This highlights where the broad differences in services lie, including the proportion of specialist staff per 100 patients and the facilities provided. Notably, two of the hospitals had no Orthogeriatric Consultants working with hip fracture patients, whereas at another hospital, Consultant Orthogeriatric support was 2.3 per 1000 hip fractures, with cover provided by a second Geriatrician and additional support from a foundation doctor. That is, a doctor undertaking a medical training programme within two years of graduation. The difference in levels of specialist nursing were even more dramatic, with an almost 8-fold variation across the hospitals. Several hospitals had no Specialist or Fracture Liaison Nurses.

Coordinator based models of care

We identified a number of different types of coordinator based models of care. Within some hospitals this was very much a nurse-led model, whilst in another the preference was for a consultant-led model. In others we found that Orthopaedic Nurse Specialists were essentially performing the role of Fracture Liaison Nurses. In most hospitals the majority of case finding, assessment and treatment took place in an inpatient setting. Only two of the hospitals operated a service model which was mainly outpatient led.

Coordination of care between multi-disciplinary teams

In accordance with NICE implementation guidance, the hospitals established additional systems to coordinate the multi-disciplinary care of patients[32]. As recommended, most of the hospitals held regular multi-disciplinary team meetings and some used multi-disciplinary paperwork. Only two hospitals undertook multi-disciplinary ward rounds. In one of the

hospitals there was little coordination of care, with a lack of agreed protocols and multi-disciplinary team meetings.

Case finding

Case finding in all the hospitals was undertaken in an inpatient setting. Fracture Liaison Nurses and Orthogeriatricians tended to be responsible and it was mostly done by undertaking ward rounds and communicating with other healthcare professionals in multi-disciplinary team meetings. At one hospital, healthcare professionals attended joint trauma meetings which were followed by a joint trauma round that included an Orthogeriatrician, Orthopaedic Surgeon and a Registrar five days a week. At another, a computer system was used to log all trauma referrals and admissions. This allowed Fracture Liaison Nurses to search the database by fracture type. The Nurses were then able to go through patient notes by hand to identify low impact from the high impact fragility fractures using locally agreed criteria. There was a degree of flexibility in methods of case finding and it was often done informally by liaising with colleagues such as the trauma/orthopaedic surgeons.

Osteoporosis assessment

An initial osteoporosis assessment generally took place in an inpatient setting. In a number of the hospitals this process began pre-operatively, although for most this took place approximately two days post-operatively. Notably, the timing of the assessment varied depending on the needs of the patient although the degree of flexibility varied between hospitals. The assessment tended to be done by Fracture Liaison Nurses or an Orthogeriatric team, many of whom followed protocols to assess the patient's risk of sustaining a second fracture and identifying co-morbidities that may influence treatment choice. In more complex cases clinical support was provided to Fracture Liaison Nurses from Orthogeriatricians or Rheumatologists. Only two hospitals undertook this initial assessment in an outpatient setting for hip fracture patients. The duration and content of these outpatient assessments also varied. In one of the hospitals this was undertaken by a Rheumatologist in a 30 minute assessment for all patients. In the other, an Osteoporosis Nurse Specialist performed a 15 minute assessment with more complex patients receiving a 30 minute assessment if necessary.

All of the hospitals included in the study adhered to guidelines regarding DXA scans. Apart from exceptional cases, all those aged under 75 were referred for a DXA whilst those aged over 75 had their treatment initiated without a scan[1]. There were a variety of different referral pathways. Clinicians who had undertaken the assessment often referred patients directly. A clinician in one hospital made recommendations for DXA scans on patients' notes which were then followed up by more junior members of the team. In two cases DXA referrals had to be separately approved by their local Rheumatology department. In another, a proforma letter was sent to the patient's GP for them to sign for the DXA referral. Scanners tended to be located in outpatient settings or at community hospitals. The delay between discharge and scanning also varied. For instance, for patients at one hospital this was between 2-3 weeks whilst at another this was between 8-12 weeks depending on availability. Only one hospital had a DXA scanner permanently on site which was accessible for patients within an inpatient setting if they were well enough.

DXA results were generally reported to the clinicians responsible for making treatment recommendations. These included Orthogeriatricians, Fracture Liaison Nurses, GPs and Rheumatologists. Fracture Liaison Nurses at one hospital received the result on the same day as the scan which enabled them to make treatment decisions immediately. Results also tended to be communicated to GPs. The exception to this was one hospital that reported results on a digital reporting system which was accessible to all the healthcare professionals at the hospital rather than being reported directly to individual clinicians.

Falls assessment and prevention

A basic falls assessment took place alongside the initial osteoporosis assessment. Since falls risk is multi-factorial[1], this assessment enabled clinicians to streamline patients into a number of different services for comprehensive multi-factorial risk assessments and interventions. These included Falls Clinics operating in an outpatient setting which could look at intrinsic risk factors such as balance and gait and environmental hazards in the home[18]. Patients were also streamlined into other speciality clinics to assess and treat medical reasons for falling if they had suspicious features such as syncope. One hospital undertook this multi-factorial risk assessment in an inpatient setting. This began on admission and was conducted by a multidisciplinary falls team. There was also a specialist falls nurse in the hospital, and each ward had a falls champion.

Treatment initiation

For eight of the 11 sites, osteoporosis treatment was prescribed within inpatients for those aged over 75 as per clinical guidelines[1]. Treatment recommendations were generally made by the Orthogeriatricians or Fracture Liaison Nurses. Treatment was either prescribed by the Orthogeriatricians or in the case of Fracture Liaison Nurses, recommendations written in notes and prescribed by doctors. In the two hospitals that operated an outpatient's model of care, the Rheumatologist prescribed medication to all patients within this setting. By contrast, in the outpatient's model run by the Osteoporosis Nurse Specialist, all recommendations were sent to GPs who initiated treatment. For patients aged under 75 who had received a DXA scan or for those who had been unable to begin treatment in an inpatients setting, treatment recommendations and initiation took place in outpatient clinics or in primary care. In order to assist GPs in initiating treatment, recommendations were usually communicated to GPs on a discharge summary.

Monitoring (treatment adherence)

Monitoring was undertaken by secondary care at seven sites and the remainder conducted by GPs. Monitoring by secondary care included telephone calls and questionnaires. In one hospital all patients who had not been discharged to nursing homes were seen six weeks post discharge in a hip fracture clinic run by an Orthogeriatrician. In most of the hospitals patients were only referred to outpatients clinics in complex cases such as those who were more severely osteoporotic or who had fractured on treatment. Most of the monitoring was conducted in primary care.

Discussion

This service overview has shown that there was significant variation in how 11 NHS hospitals within one regional area in England structured the delivery of secondary fracture prevention services for hip fracture patients. This was reflected in the care settings of each service including the levels of staffing of professionals involved in providing fracture prevention services at the hospitals. The evaluation also identified different types of coordinator based models of care, whether this be a consultant or nurse led service, and the level of specialist staff that were in post such as Specialist Nurses and Orthogeriatricians. Within this, there was also variation in the processes used by each hospital to case find, assess for osteoporosis and risk of future falls, initiate bone protection treatment and undertake falls prevention and monitor patients.

The interpretation of national guidelines [1, 9, 18, 19, 22] differed between hospitals. The importance of this overview has been to highlight, in detail, where the similarities and differences lay, and where the gaps existed within a hospital's model of care compared to other hospitals in the region. Even where two hospitals appeared similar, such as reporting to the NHFD they had Orthogeriatric input, the role of the Orthogeriatrician could differ greatly in terms of their roles in treating hip fracture patients.

Since hip fracture patients may need to access additional services whilst in inpatients such as cardiology, their experiences of accessing fracture prevention services may differ. In addition, the results from this service evaluation are based on the understanding of clinicians on how their services operate and may therefore be limited.

It is important to note that this paper is intended to provide an overview characterising these services and does not, therefore, explain why the similarities or differences exist between these services or how they impact on performance. In order to provide effective service models for secondary prevention of hip fracture, health professionals, commissioners and service managers require an evidence base on both the cost-effectiveness and clinical effectiveness of these different elements of care. Currently this evidence base does not exist. As part of an NIHR hip fracture study our current programme of work will take forward the findings from this work in order to provide an evidence base on the effectiveness, in terms of patient outcomes, and cost-effectiveness of specific elements of coordinator based models of care. .

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Summary

There is variation in how services to prevent second fractures after hip fracture are organised. We explored this in more detail at 11 hospitals. Results showed that there was unwarranted variation across a number of aspects of care. This information can be used to inform service delivery in the future.

Table 1
Secondary fracture prevention services in place at the 11 hospitals as of April 2013.

This table provides a brief overview of the care settings in which at least one of the four components of secondary fracture prevention are conducted. Ratios of staffing levels per 100 patients were calculated from the estimated annual numbers of hip fractures reported in the 2013 NHFD report[24].

Hospital	Staff (levels expressed as Whole Time Equivalents (WTE))					Facilities		Service
	Consultant orthogeriatrician (OG)	Other orthogeriatric support	Fracture liaison nurse (FLN)	Orthopaedic/specialist nurse	Lead clinician	Falls service	DXA	
1	0.9 WTE 2:1000 patients	1 WTE 2:1000 patients	1.6 WTE 3:1000 patients	2.2 WTE 4.6:1000 patients	1 (rheumatologist)	FLN assessment on ward. May be referred to community falls service	Off-site	Inpatient, outpatient, community care
2	0.4 WTE 2.3:1000 patients	1 WTE 5.7:1000 patients	0.2 WTE 1:1000 patients	0	1 (orthogeriatrician)	OG assessment on ward. May be referred to community falls service	Off-site	Inpatient, outpatient, community care
3	1.0 WTE 2:1000 patients	1 WTE 2:1000 patients	0	Ad hoc	1 (orthogeriatrician)	OG and multidisciplinary team assessment on wards	Off-site	Inpatient
4	0.1 WTE 0.3:1000 patients	1 WTE 3:1000 patients	0	0	0	ST3 assessment on ward. OG can refer to clinic	Off-site	Inpatient
5	1 WTE (1.6:1000 patients)	5 WTE 8:1000 patients	0	0	1 (orthogeriatrician)	OG assessment on ward. May be referred to community service	On-site	Inpatient/outpatient
6	0	0.25 WTE 1:1000 patients	0	2 WTE 8:1000 patients	2 (specialist nurse-outpatient, orthopaedic surgeon-inpatient)	Outpatient clinic run by falls nurse and OG	Off-site (private)	Inpatient/outpatient
7	0.5 WTE 1.3:1000 patient	0.2 WTE 0.5:1000 patients	0.5 WTE 1.3:1000 patients	0	1 (rheumatologist)	FLN assessment on ward. Can be referred to community service	Off-site	Inpatient
8	0.7 WTE 1:1000 patients	0.75 WTE 1:1000 patients	0	1.8 WTE 2.6:1000 patients	1 (rheumatologist)	Comprehensive multidisciplinary assessment on ward with falls coordinator. Community classes.	On-site	Inpatient

Hospital	Staff (levels expressed as Whole Time Equivalents (WTE))					Facilities		Service
	Consultant orthogeriatrician (OG)	Other orthogeriatric support	Fracture liaison nurse (FLN)	Orthopaedic/specialist nurse	Lead clinician	Falls service	DXA	
9	0	0.5 WTE 2.3:1000 patients	1 WTE 4.5:1000 patients	0	1 (rheumatologist)	Community falls prevention service	Off-site (private)	Outpatient (inpatient in development)
10	0.5 WTE 2.1:1000 people	0	0	1 WTE 4:1000 patients	1 (rheumatologist)	OG assessment on ward. May be referred to outpatient clinic.	Off-site	Inpatient
11	0.33 WTE 1.5:1000 patients	0.6 WTE (trust grade orthogeriatrician) 3.7:1000 patients	0	0	0	Multidisciplinary clinic as an inpatient (OG, physios, nurses)	Off-site	Inpatient/outpatient