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A comparison of acute versus inpatient hip fractures

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The aim is to identify any difference in patient populations and outcomes for those admitted acutely versus those who fracture their hip as an inpatient. Retrospective data was collected from the Scottish MSK audit. 18 months were analysed (01/2017-06/2018) to identify patient demographics and outcomes. It discovered 10,140 patients: 92% (9320/10,140) admitted acutely: 81% (7535/9320) own homes, 19% (1755/9320) care homes, <1% (31/9320) from other non-NHS origins. Inpatients accounted for 8% (820/10,140): 70% (578/820) were on acute wards, 20% (167/820) rehab, 9% (76/820) NHS Continuing Care. No difference in ages: 80.1 years acutes vs 80.2 years inpatients, p=0.73. Gender was significant amongst inpatients: males 11% (317/3009) vs females 7% (504/7133), p<0.001. The inpatient hip fractures had longer inpatient stays than the acutely admitted hip fractures (40 vs 17 days, p<0.001) and spent a longer time in rehabilitation (32 vs 25 days, p<0.001). They were less likely to return to their home/carehome in 30 days (23% vs 60%, p<0.001), or, at 60 days post-admission (41% vs 74%, p<0.001). Mortality rate was higher at 30 days (13% vs 6%, p<0.001) and at 60 days post-admission (21% vs 10%, p<0.001). There was no difference in readmission rates within 14 days. Inpatient hip fractures constitute a much smaller proportion compared with acute admissions, yet they've significantly worse outcomes. This may be because the acute fractures have been admitted following the recommended standards of care. Meanwhile, inpatients have already been admitted medically unwell and may have more co-morbidities.

Keywords: Inpatient Hip Fractures, Neck of Femur Fractures.

INTRODUCTION

With an ever-increasing aging population with more co-morbidities and a higher BMI, we are seeing growing numbers in patients with neck of femur (NOF) fractures. Each year, in the UK, there are an estimated 80,000 patients with NOF fractures at a healthcare cost of £2bn[1]. Added to this, their mortality risk is 10% increasing to 30% within the first year following surgery[2,3]. Initiatives that have actively sought to improve standards and, thereby, outcomes include: a more co-ordinated and integrated multidisciplinary approach; standards of care; national guidelines and audit; the Best Practice Tariff[4-7]. In spite of these best efforts, are we missing a special subgroup of patients who fall out with these Standards and whose outcomes are worse?

There is evidence to substantiate that patients sustaining NOF fractures as an inpatient have a higher mortality, delayed surgery, and longer length of inpatient stay[8-12]. There is also the potential medicolegal aspect, with reports of compensatory payouts by hospital trusts, to patients and their families, where fractures following inpatient falls have been missed[13,14].

Currently, no established guidance or protocol is in place on the identification, early diagnosis, and treatment for these patients.

Aims

Our study sets out to compare patient populations and outcomes for those admitted acutely (from outside the hospital setting: their own home, care homes or other non-NHS residences) versus (vs) those who fractured their hip as an inpatient (from acute hospital wards, rehabilitation wards and facilities, NHS Continuing Care).

METHODS

Data was retrospectively collected from the Scottish MSK audit. A period of 18 months was analysed

(January 2017 - June 2018) to identify patient demographics (age, gender, origin of referral), to compare standards of care and outcomes (including length of stay, discharge, mortality, readmission). body mass: 70.4 (4.9)

RESULTS

Inpatient fracture rates

During the eighteen-month period, 10,140 hip fractures were audited by the Scottish MSK Audit. This accounted for 94% of all identified hip fractures admitted to Scottish surgical hospitals during that time. The majority of these (7535/10140, 74%) were patients admitted from their own homes, 17% (1755/10140) were admitted from care homes, and <1% (31/10140) were from other non-NHS origins.

Inpatient fractures accounted for far fewer at 8% (820/10140) of all hip fractures, with 70% (578/820) occurring on acute wards, 20% (167/820) on rehab wards or facilities, and 9% (76/820) in NHS Continuing Care.

Inpatient hip fractures comprised 5-13% of all hip fractures across hospitals but reduced to 5%-10% (p=0.06) when one hospital was removed owing to a coding issue.

Demographics

There was no significant difference in the mean age between the inpatient (80.2 years) vs the acute (80.1 years) hip fractures (p=0.73). There was a significant difference in gender amongst the inpatient NOF fractures, with more men (317/3009, 10.5%) than women (504/7133, 7.1%), p<0.001.

Management

Altogether, 40% (327/820) of the audited inpatient hip fractures had sustained their fracture in another hospital: of these, 34% (112/327) were transferred to the surgical hospital via the surgical hospital's ED; and 6% (493/820) of patients who had not fractured in hospital had originally presented at a different hospital.

For those patients who went through the surgical hospital's ED, inpatient fractures averaged a similar length of time in ED compared to patients who fractured outside hospital and were no more likely to spend more than four hours in ED (Table I). However, inpatient fracture was less likely to have all six ED Bundle elements completed in ED due to being less likely to be given analgesia, have IV fluids commenced or delirium screened, and were less likely to be given a nerve block (Table I).

Inpatient fractures were defined as being 'admitted' to acute orthopaedic care as soon as they were referred to the orthopaedic team – even though some patients may have remained on their original acute medical ward for continued treatment in parallel with their treatment for the fracture. Similarly, patients admitted acutely may have gone to a medical ward first (rather than to orthopaedics) if they had other conditions warranting medical treatment/optimisation first.

Discharge occurred once the patient no longer received any acute orthopaedic care. Table II shows

Table I. — Management in ED.

	Inpatient hip fractures	Hip fractured out with hospital	P
Number of patients in ED	238	8842	
Mean time in ED (hours)	3.1	3.2	0.18
% in ED > 4 hours	11%	12%	0.88
ED Big 6 completed			0.16
All 6	23%	23%	
4-5	58%	63%	
3 or less	19%	14%	
Bundle elements			
Analgesia given/offered	95%	99%	<0.001
Bloods taken	90%	91%	0.96
IV fluids commenced	65%	74%	0.003
Pressure areas recorded	59%	61%	0.76
EWS recorded	96%	97%	0.41
Delirium screened	49%	42%	0.04
Nerve block given	42%	51%	0.006

post-'admission' management of these patients, irrespective of whether they were admitted to an orthopaedic or medical ward.

Inpatient fracture patients were found to be significantly less likely to meet almost all of the inpatient standards (Table II).

Outcomes

Patients sustaining inpatient fractures were found to have significantly poorer outcomes compared with the acute fractures: longer inpatient stays (40 vs 17 days, p<0.001); a longer duration in rehabilitation (32 vs 25 days, p<0.001); they were less likely to return to their own, or care, home in 30 days (23% vs 60%, p<0.001), or, at 60 days post-admission (41% vs 74%, p<0.001). Inpatient fractures had a higher mortality rate at 30 days (13% vs 6%, p<0.001), as well as at 60 days post admission (21% vs 10%, p<0.001). There was no difference, however, in their readmission rates within 14 days.

DISCUSSION

In terms of demographics, age has no bearing on acute nor inpatient fractures. Gender is significant with more men sustaining inpatient fractures. Beyond this, there are startling differences between the two cohorts in terms of management and subsequent outcomes between the two groups. It is possible to extrapolate reasons for their poorer outcomes with reference to the literature.

First, it is not known to what extent this was due to the original pre-fracture status and capabilities of the patient. Further adjustment for pre-fracture status is not possible from the current hip fracture dataset, but consideration of whether more standards could have reasonably been met might be possible from a case note review. The Nottingham group analysed 5879 hip fractures over an 8-year period: 327 were inpatient NOF fractures and they had statistically significantly higher rates of cerebrovascular, chronic obstructive airway and renal disease, diabetes, malignancy, and polypharmacy in this cohort (p<0.001)[15].

The Aintree group examined outcomes for 1156 patients (1086 acute, 70 inpatient) using data from a 2-year period from a trauma centre in England, they included ASA, mobility (walking indoors and outdoors) and AMT in their analysis and quantified the odds of inpatient death being 2.25 times higher for impatient NOFs (p=0.012)[9]. In addition to basic

Table II. — Post-admission management.

	Inpatient hip fractures	Hip fractured out with hospital	P
Number of patients admitted to acute orthopaedic care	820	9320	
Inpatient bundle completed within 24 hours			<0.001
All 4	42%	68%	
3	21%	24%	
2 or less	37%	8%	
Bundle elements			
Falls assessment	74%	95%	<0.001
Nutrition assessment	54%	85%	<0.001
Pressure areas assessment	79%	96%	<0.001
Cognition assessment/Delirium screened [a]	64%	80%	<0.001
Comprehensive geriatric assessment within 3 days [b]	72%	80%	<0.001
Managed conservatively	5.0%	2.1%	<0.001
Surgical repair within 36 hours [c]	65%	71%	<0.001
Delay as patient medically unfit	19%	12%	
Delay for other reason	17%	17%	
Oral fluids given to with 4 hours of surgery [c]	32%	36%	0.01
Fasting cycle repeated [c]	18%	18%	1.00
Cement used for hemiarthroplasty [e]	94%	92%	0.09
Mobilised by first day post-op [cf]	60%	70%	<0.001
Physio assessment by 2 days post-op [cd]	90%	93%	0.001
OT assessment by three days post-admission [g]	47%	62%	<0.001
Bone health assessed or referred for FLS/Dexa/OS	82%	87%	<0.001

[a]Any cognition assessment was allowed until January 2018, thereafter only a 4AT delirium screen; [b]Excludes patients under 60 and those where a local protocol determined they did not require CGA; [c]Excludes patients managed conservatively; [d]Excludes patients who died within two days of surgery; eOnly includes patients undergoing hemiarthroplasty where use of cement is known; [f]Excludes patients who died within three days of surgery; [g]OT Standard was amended at end of 2017, formerly only applied to surgical patients; so, data excludes 2017 patients managed conservatively and patients who died within three days of admission.

Table III. — Outcomes.

	Inpatient hip fractures	Hip fractured out with hospital	P
Number of patients admitted to acute orthopaedic care	820	9320	
Discharged from acute orthopaedics within 14 days [a]	73%	79%	0.001
Discharged to hospital setting (rehab, acute ward or NHS Continuing Care) if discharged within 21 days [b]	82%	48%	<0.001
Number of patients reviewed at 60 days post-admission	787	8883	
Median length of stay (days) in hospital	40	17	<0.001
Median length of stay (days) in rehab if patient went to rehab	32	25	<0.001
Transferred to rehab prior to hospital discharge	51%	44%	<0.001
Back at home or in care home by 30 days post-admission [c]	23%	60%	<0.001
Back at home or in care home by 60 days post-admission [c]	41%	74%	<0.001
Alive at 30 days post-admission	87%	94%	<0.001
Alive at 60 days post-admission	79%	90%	<0.001
Re-admitted within 14 days of hospital discharge [d]	11%	7%	0.006

[a]Excludes patients who died within three days of admission; [b]Excludes patients still in acute orthopaedic care at 21 days after admission, and patients who died before 21 days whilst still in acute orthopaedic care; [c]Includes patients who died; [d]Excludes patients who died in hospital prior to discharge or within 14 days of discharge; also excludes patients who were not discharged within 46 days (as 14-day readmission follow-up period incomplete.

patient demographics, one study used the Charlson co-morbidity index, BMI, previous fall with fracture, medications (including opioids, benzodiazepines, other CNS agents) to analyse preadmission status and these factors would all be useful to quantify risk[16].

Secondly, 70% of inpatient fractures were sustained on acute wards compared to the majority of the acute NOFs who were admitted from their own homes. The Nottingham group identified 55% on medical / geriatric wards and the Aintree group report 48% occurring on medical wards and 38% on care of the elderly/medicine/rehab wards[9,15].

Thirdly, although already in hospital the inpatient cohort were less likely to have been given the recommended hip fracture standards of care in a prompt and timely fashion. This may be due to unfamiliarity with managing NOF fractures by medical and nursing staff on medical wards; lack of awareness of the initial treatment and work up for theatre to prevent delays; reluctance to give opiates to elderly patients with delirium and risk of toxicity (and lack of awareness of, or experience in doing, a Fascia Iliaca Block). One way to address this is to promote awareness through a hip fracture pathway and guidance for analgesia for the over 65s that can be disseminated to wards. One such guide is included here, Appendix A[17], B[18]. It would also be prudent to include a booklet or an electronic guide to wards (where face to face teaching not possible in the more remote hospitals) on how to recognise a patient with a suspected hip fracture. We commend the proposed protocol by Green and Shah that highlights how to make a clinical diagnosis (explained simply with pictures), advice regarding imaging and clinical guidance[10].

We note that our dataset is not complete with a 94% data capture of all hip fractures. Referencing the Scottish MSK audit, there still remains 6% (647 patients) unaccounted for. In a similar way to the Trauma Audit & Research Network (TARN) in England, it could be made compulsory to ensure reporting and, thereby, improve data collection.

It was also noted that Inpatient hip fractures comprised 5-13% of all hip fractures across hospitals, but this number reduced to 5%-10% (p=0.06) when one hospital was removed owing to a coding issue. Stricter guidance could be in place to ensure coding is correct.

There was also some lack of clarity regarding when an inpatient fracture patient was ‘admitted’ to acute orthopaedic care: this appeared to be as soon as the orthopaedic department was informed. Similarly, there were those with delayed surgery. For both these cases, they may have remained on their original acute medical ward for ongoing care that took precedence to their surgical management.

Overall, we concur that that there should be a nationally agreed guideline on the care of NOF fractures sustained as an inpatient to help staff promptly diagnose and treat inpatient NOF fractures[10]. We concur with the earlier study that all hospital patients should be assessed to identify those high risk of falls and risk reduction should be implemented particularly in these areas where there is risk of falling in terms of vigilance and patient risk assessment and prevention, Table IV.

CONCLUSION

Overall, although inpatient hip fractures constitute a much smaller proportion than those acutely admitted,

Table IV. — Recommendations to reduce the risk of inpatient falls.

Falls prevention strategy:
- any patient with impaired mobility,
- prompt recognition of an acutely unwell patient / delirium
Fallen patient:
- Assessment by a doctor or ANP
- Clinical assessment: Look (is the limb shortened and externally rotated?), Feel (is there pain elicited on palpation?), Move (pin rolling, active / passive ROM of hip)
- Imaging (AP pelvis and lateral of the affected side)
Multidisciplinary involvement:
- d/w Orthopaedic team to review
- physiotherapy
- orthotics ? walking aids

they have significantly poorer outcomes. This may be because the acute fracture patients have been admitted following the recommended hip fracture standards of care. It is also likely that the inpatients may already be medically unwell and have more co-morbidities. We recommend further work is done to identify why such a disparity in outcomes exists in order to improve the care we deliver our patients.

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