Hip fracture audit

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(Presented at a departmental audit in 2009)

AIMS AND OBJECTIVES

The main aim of this audit was to investigate whether the Royal Lancaster Infirmary (RLI) was meeting the target of **'patients with a fractured neck of femur having surgery within 48 hours of hospital admission'**. The audit also seeks to find out whether there was any delay in patients having surgery, and if 'yes' the reason for the delay. Finally, postoperative patient hospital stay and mortality were looked into and factors (operation delay, American Society of Anesthetists (ASA) status, pre-operative haemoglobin levels, anaesthetic technique, length of surgery, grade of anaesthetist and surgeon) which could have influenced these outcomes.

Aims of the National Hip Fracture Audit⁽¹⁾

- Promote evidence-based practice for hip fracture anaesthesia
- Promote consistent opinion between professionals across the NHS

In addition, it is a resource for anaesthetists in the NHS to discuss topics related to hip fracture anaesthesia:

- To ensure that all patients get a high quality, consultant-based anaesthetic service
- To encourage audit and research amongst the hip fracture anaesthesia community
- To promote the concept of an 'anaesthesia champion' in each acute trust, with responsibility for hip fracture anaesthesia

Six standards are given for hip fracture care:

- Acute orthopaedic ward within 4 hours of admission
- If medically fit, surgery within 48 hours of admission
- Minimise risk of pressure ulcer
- Managed on an orthopaedic ward, routine orthogeriatric support
- Assess for antiresorptive therapy
- Falls intervention

The Scottish Intercollegiate Guidelines Network (SIGN) makes the following recommendations:⁽²⁾

- Patients should be transferred to ward within two hours of their arrival in the emergency department
- Surgery should not be delayed by antiplatelet therapy, anticoagulation must be reversed. The need for echo cardiogram should not delay surgery (although rapid access to echocardiography service is recommended)
- Anaesthesia should be carried out, or closely supervised, by an anaesthetist experienced in anaesthesia in older people
- Spinal/epidural considered for all patients unless contraindicated
- Use of peripheral nerve blockade may be considered as part of multimodal management of pain post-op

METHODOLOGY

This was a prospective audit. Data were collected using patient casenotes and theatre documentation of operative start and end times of patients having surgery for fractured neck of femur at the RLI. The data presented is a snapshot of the results obtained over a three-month period from 8 March to 4 June 2009. The data collection forms part of an ongoing national audit. (See appendix for the questionnaire.)

RESULTS

Patient demographics

During this three-month period, 70 patients had surgery for fractured neck of femur (#NOF) at the RLI. There were four times as many female as there were male patients (56 women compared to 14 men). The average age was 81 years. Figure 1 illustrates the distribution of patients regarding age. Most of the patients were ASA 2 (36 patients), followed by ASA 3, ASA 1 and ASA 4 (31, 2 and one patient respectively) – see table 1 for ASA scoring system.

Pre- and intra-operative details

The median time taken from Accident and Emergency (A&E) admission to surgery, taken as the start time of the operation noted in the theatre logbook, was 35 hours with a range of 4-139 hours. The results are illustrated by figure 2.

ASA Score	Physical status
1	Healthy patient with no systemic disease
2	Mild to moderate systemic disease
3	Severe systemic disease imposing functional limitation on patient
4	Severe systemic disease which is a constant threat to life
5	Moribund patient who is not expected to survive with or without the operation

Table 1 ASA scoring system

Out of the 70 cases, 23 had suffered a delay to surgery which in most cases was due to organisational reasons (61%), the majority of which were cancellations due to lack of theatre time. Twenty-six percent of delays were due to medical causes; these were taken to be patients who had been referred to the physicians for review prior to surgery. A minimum number of delays were due to cases being cancelled by the surgical or anaesthetic team (6.5% in each case).

The minimum pre-operative haemoglobin (Hb) level was 9.1g/dl; patients with Hb levels lower than this had been transfused pre-operatively. The average drop in Hb between admission levels from the A&E department and the postoperative ward was 2.7g/dl. Figure 3 illustrates the patient distribution regarding drop in Hb levels.

Anaesthetic factors

Most cases were performed either by a consultant or under consultant supervision (60% of cases) – see figure 4.

Forty-four patients had a general anaesthetic compared to 26 who had a regional anaesthetic, which was invariably a spinal. Of those having a general anaesthetic, 32 had an additional

regional block, which was either a fascia iliaca, femoral or lumbar plexus block (see table 2). Only seven patients who had a spinal had a further regional block.

Type of block	Method	Distribution of block
Lumbar plexus	Patient in lateral position. Landmarks: line parallel to spinous processes passing through posterior superior iliac spines and line joining iliac crests (Tuffier's line). LA injected where two lines meet.	Blocks lateral cutaneous nerve of the thigh, femoral and obturator nerves which provide most of the innervation to the hip.
Fascia iliaca	Landmarks: line joining anterior superior iliac spine and pubic symphysis. Divide into thirds, LA injected 1-2cm below point dividing middle and lateral thirds.	Relies on proximal spread of LA beneath fascia iliaca, anterior approach to lumbar plexus block.
Femoral	LA injected below inguinal ligament and lateral to femoral artery.	Incomplete block for hip arthroplasty as blocks only femoral nerve.

Table 2. Different regional techniques used in hip arthroplasty^(3,4)
(LA = local anaesthetic. A peripheral nerve stimulator is required for lumbar plexus and femoral nerve blocks.)

Surgical factors

Consultant orthopaedic surgeons were involved in 22.8% of cases, with most being performed by a staff/associate specialist (SAS) grade (45.7%) – see figure 5.

The average time taken for surgery (time from knife-to-skin to closure, excluding positioning) was 62 minutes (range 20-122 minutes) – see figure 6. Thirty-two patients had a dynamic hip screw (DHS) inserted, three patients had cannulated screws, 24 a hemiarthroplasty and one patient had a total hip replacement. The average surgical time for each of the first three procedures was roughly the same (58, 62 and 65 minutes respectively), whereas the total hip replacement took 99 minutes.

Patient outcome

The average postoperative length of stay was 26 days (range 5-95 days). Out of 70 cases, nine patients died within the first

28 days (ie, 13% 30-day mortality compared with national data, which suggests a 30-day mortality of 10%).

Postoperative deaths

Over a three-month period, out of 70 patients having surgery for a fractured neck of femur, ten of these died postoperatively within the current inpatient episode. Eight patients were of ASA 3 category and two of ASA 2. The age range of the patients was 78-93 years. Three patients had their surgery delayed for organisational reasons and one for medical reasons.

One of the ASA 2 patients was, incidentally, the one whose surgery had been delayed for medical reasons, implying that despite the ASA 2 status there had been some unexpected medical complication. The other ASA 2 patient had died on the same day and had suffered a drop in Hb of 4.2g/dl, suggesting intra-operative complications.

Of the ten cases, seven were anaesthetised by an anaesthetic consultant, two by an SAS grade and one by a specialist registrar.

DISCUSSION

It is believed that the earlier patients suffering from a fractured neck of femur are operated on, the better the outcome. Hence, one of the six standards proposed by the National Hip Fracture Database is that patients are to be operated on within 48 hours of admission. The results of this audit show that one third of patients being admitted are failing in this respect. Of concern is the fact that the most common reason for delays was of organisational nature. Hence, although we can optimise surgical, anaesthetic and medical care, unless the reasons for organisational delays (theatre cancellations due to managerial and logistical issues) are being addressed, there is little scope for improvement in this domain.

It is also worth noting that a quarter of delays were due to patients being referred to the physicians prior to surgery. In our opinion, delays could be reduced by the simple expedient of having a named anaesthetist available to the orthopaedic ward, whose opinions should be sought over cases of difficulty and in advance of the patient being referred to a physician.

There seems to be a bimodal distribution in the time taken for surgery. Most cases appear to take 60 minutes +/- 15 minutes. However, there is another peak when the length of surgery is greater than 90 minutes. This might illustrate the fact that the average surgical time for a straightforward case is about 60 minutes; however, complicated cases are likely to take over 90 minutes.

In most cases, the anaesthetic management had been delivered by a consultant or at least under consultant supervision. Anaesthetists recognise the technical difficulty of these high-risk cases and at the RLI have organised themselves accordingly.

CONCLUSION

The incidence of patients being admitted for fractured neck of femur is on the rise as we face an increasingly ageing population. Patients are, of the majority, elderly and more likely to have multiple comorbidities. It is important to optimise their treatment as failure to do so can lead to prolonged

hospitalisation with its associated risks and costs. One of the ways proven to be of benefit is to reduce the delay to surgery, which at the RLI is mostly due to organisational causes. These need to be addressed if we want to improve the care provided to this group of patients; audit figures are showing that our mortality rate is no better than national figures.

REFERENCES

1. Available at:
<http://www.networks.nhs.uk/networks/page/917>
2. Scottish Intercollegiate Guidelines Network: Prevention and Management of Hip Fracture on Older People. Section 5: Pre-operative care. Guideline No. 111. 2009
3. Nicholls B, Conn D, Roberts A. The Abbott pocket guide to practical peripheral nerve blockade. Abbott Anaesthesia. 2008
4. Grant CRK, Checketts MR. Analgesia for primary hip and knee arthroplasty: the role of regional anaesthesia. Contin Educ Anaesth Crit Care Pain 2008;8(2):56-61

APPENDIX Questionnaire

(This questionnaire was designed by a group looking into hip fractures nationally and forms the basis for our audit standard)

HPFA First National Audit

Patient Identifier (hospital number): _____

Sex (circle): male / female

Age: _____ years

Date & time of admission: _____

Date & time of operation: _____

Admission to operation interval (in hours): _____

Postponed for surgery : yes / no

Reason for postponement: medical / organisational / surgical / anaesthetic / other

ASA status (circle): 1, 2, 3, 4, 5

Pre-op Hb: _____

Post-op Hb: _____

Grade of anaesthetist at surgery (circle): Cons SAS ST I, 2, 3, 4, 5, 6, 7

Grade of surgeon at surgery (circle): Cons SAS ST I, 2, 3, 4, 5, 6, 7

Regional anaesthesia or GA (circle): RA GA

Length of stay: _____

Length of surgery (mins): _____

Type of fracture: _____

Type of prosthesis: _____