Hip Fracture and the Orthogeriatrician

Antony Johansen
The geriatric orthopaedic unit

Management of the fractured neck of femur in the elderly female: a joint approach
Clarke and Wainwright. *Gerontology Clinics* 1966; 8:321-6

“the surgical procedure must never be considered to be the whole treatment but merely an incident in the general rehabilitation of the patient”

*BMJ* 1974; 1:190-2
Effectiveness of geriatric rehabilitation after proximal femur fracture in the elderly

Kennie et al. BMJ 1988; 297:1083-6

GP run, geriatrician led orthopaedic rehab. ward
- earlier discharge, better mortality and independence

Prospective randomised study of an orthopaedic geriatric inpatient service

Gilchrist et al. BMJ 1988; 297:1116-1118

Surgeon run rehab. ward, with weekly combined OG round
- better care of medical conditions, but no effect on outcome
Geriatric rehabilitation following fractures in older people: a systematic review

Cameron et al.  *NHS HTA*  2000;4:2

Specific therapy, nursing, medical input

Miscellaneous hospital programmes

Clinical pathways

Early supported discharge

Prospective payment systems

Geriatric orthopaedic rehabilitation unit

Hip fracture programme
Orthogeriatric Rehabilitation – Hospital-based coordinated MDT care for hip fracture patients

7 Randomised controlled trials

Gilchrist 1988 (Scotland)
Post-surgical – Off-Map -1.5 days

Huusko 2002 (Finland)
Post-surgical – Acute

Kennie 1988 (Scotland)
Post-surgical – acute

Naglie 2002 (Canada)
Post-surgical – Acute

Stenvall 2007 (Sweden)
Post-op. – care in other hospital

Fordham 1986
OG rehab vs. controls

Galvard 1995 (Sweden)
OG rehabilitation trial

Hip Fracture Programme – Orthogeriatrician-led peri-op. care leading into MDT rehabilitation

5 Randomised controlled trials

Swanson 1998 (Australia)
Early intervention – standard orthopaedic care vs. HFP

Vidan 2005 (Spain)
Acute phase HFP vs. standard care

Shyu 2008 (Taiwan)
MDT intervention programme for hip fracture vs. usual care

Marcantonio 2001 (USA)
Acute setting HFP vs. controls (this is definitely an HFP, even though outcome focuses on delirium)

Cameron 1993/4 (Australia)
Acute accelerated hip fracture rehabilitation programme

Case controlled trial

Jette 1987

Cohort studies


Farnworth 1994
### 12.2.1.1 Clinical evidence

#### Table 12-65: Hospital based multidisciplinary rehabilitation vs. Usual care - Clinical summary of findings

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Intervention</th>
<th>Control</th>
<th>Relative risk</th>
<th>Absolute effect</th>
<th>Quality</th>
</tr>
</thead>
</table>

#### Table 12-66: Hospital based multidisciplinary rehabilitation vs. usual care - Economic study characteristics

<table>
<thead>
<tr>
<th>Study</th>
<th>Limitations</th>
<th>Applicability</th>
<th>Other Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameron 1994 45 - HFP</td>
<td>Potentially serious limitations (a)</td>
<td>Partial applicability (b)</td>
<td>Accelerated rehab was compared to usual care. The follow up time was 4 months.</td>
</tr>
<tr>
<td>Farnworth 199491 - HFP</td>
<td>Potentially serious limitations (c)</td>
<td>Partial applicability (b)</td>
<td>Fractured Hip Management Program (FHMP) was compared to usual care. The follow up time was 6 months.</td>
</tr>
<tr>
<td>Galvard 1995107 - GORU</td>
<td>Potentially serious limitations (d)</td>
<td>Partial applicability (e)</td>
<td>Rehabilitation in a geriatric department was compared to usual care. The follow up time was 1 year.</td>
</tr>
<tr>
<td>Huusko (2002)158 - MARU</td>
<td>Potentially serious limitations (f)</td>
<td>Partial applicability (g)</td>
<td>Intensive multidisciplinary geriatric team rehabilitation versus usual care. Follow up was 1 year.</td>
</tr>
<tr>
<td>NCGC economic model</td>
<td>Minor limitations (h)</td>
<td>Direct applicability</td>
<td>Cost-effectiveness analysis of HFP vs. GORU/MARU vs. usual care based on the meta-analysis of the trails included in the clinical review of this guideline.</td>
</tr>
</tbody>
</table>
Figure G-148. Length of hospital stay: hospital MDR versus usual care

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Favours Intervention</th>
<th>Control</th>
<th>Mean Difference</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>9.9.1 Orthogeriatric hospital MDR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kennie 1988</td>
<td>37</td>
<td>33</td>
<td>54</td>
<td>56</td>
</tr>
<tr>
<td>Gilchrist 1988</td>
<td>44</td>
<td>56.14</td>
<td>97</td>
<td>47.7</td>
</tr>
<tr>
<td>Galvand 1995</td>
<td>53.3</td>
<td>47.7</td>
<td>179</td>
<td>28</td>
</tr>
<tr>
<td>Naglie 2002</td>
<td>29.2</td>
<td>22.6</td>
<td>141</td>
<td>20.9</td>
</tr>
<tr>
<td>Stenvall 2007a</td>
<td>30</td>
<td>18.1</td>
<td>101</td>
<td>40</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>572</td>
<td>606</td>
<td>573%</td>
<td>1.32</td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 223.20; Chi² = 46.15, df = 4 (P < 0.00001); I² = 91%
Test for overall effect: Z = 0.18 (P = 0.85)

9.9.2 Hip fracture programme

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Favours Intervention</th>
<th>Control</th>
<th>Mean Difference</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameron 1993</td>
<td>19.5</td>
<td>20.5</td>
<td>127</td>
<td>28.5</td>
</tr>
<tr>
<td>Swanson 1998</td>
<td>20.8</td>
<td>11</td>
<td>38</td>
<td>32.6</td>
</tr>
<tr>
<td>Shyu 2008</td>
<td>10.1</td>
<td>3.7</td>
<td>80</td>
<td>9.72</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>245</td>
<td>240</td>
<td>42.7%</td>
<td>-6.06</td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 46.26; Chi² = 14.58, df = 2 (P = 0.0007); I² = 86%
Test for overall effect: Z = 1.41 (P = 0.16)

Total (95% CI)

<table>
<thead>
<tr>
<th>Total (95% CI)</th>
<th>817</th>
<th>846</th>
<th>100.0%</th>
<th>-1.30</th>
<th>[-8.56, 5.97]</th>
</tr>
</thead>
</table>

Heterogeneity: Tau² = 86.70; Chi² = 75.54, df = 7 (P < 0.00001); I² = 91%
Test for overall effect: Z = 0.35 (P = 0.73)
### Table 98: Incremental resource use for GORU/MARU programme versus usual care!

<table>
<thead>
<tr>
<th>Staff resources</th>
<th>Incremental resources used, based on a LOS of 32.88 days</th>
<th>Source</th>
<th>Unit cost (source: PSSRU 2008/09), £ per hour</th>
<th>Incremental cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthogeriatrician</td>
<td>Initial assessment 0.5 hour per patient, and subsequently 0.25 hour per day: 0.50 + 0.25*24.5 = 6.625 hour per patient</td>
<td>Cameron (1993), Shyu (2008), Marcantonio</td>
<td>£108*6.625 = £715.50</td>
<td></td>
</tr>
<tr>
<td>Physiotherapist or nurse</td>
<td>0.5 hour per patient per day: 0.50*25.5=12.75 hours</td>
<td>Cameron (1993)</td>
<td>£23*12.75 = £293.25</td>
<td></td>
</tr>
</tbody>
</table>

**Total incremental cost of HFP over usual care: £1009**

<table>
<thead>
<tr>
<th>Social worker!</th>
<th>£0.4!hour!per!patient!!!</th>
<th>Naglie!2002!</th>
<th>£29!(from!community!data)!!</th>
<th>£11.6!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietician!</td>
<td>£0.4!hour!per!patient!!!</td>
<td>Naglie!2002!</td>
<td>£23!/</td>
<td>£9.2!</td>
</tr>
</tbody>
</table>

**Total incremental cost for GORU/MARU over usual care:** £721! (with generic!)

### Table 99: Incremental resource use and incremental cost for HFP over usual care

<table>
<thead>
<tr>
<th>Staff resources</th>
<th>Incremental resources used based on a LOS of 25.5 days</th>
<th>Source</th>
<th>Incremental cost (using PSSRU 2008/09 unit costs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthogeriatrician</td>
<td>Initial assessment 0.5 hour per patient, and subsequently 0.25 hour per day: 0.50 + 0.25*24.5 = 6.625 hour per patient</td>
<td>Cameron (1993), Shyu (2008), Marcantonio</td>
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<td>Cameron (1993)</td>
<td>£23*12.75 = £293.25</td>
</tr>
</tbody>
</table>

**Total incremental cost of HFP over usual care: £1009**
NICE economic model – HFP vs. usual care

<table>
<thead>
<tr>
<th></th>
<th>Usual care</th>
<th>HFP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehabilitation costs</td>
<td>-</td>
<td>1,009</td>
</tr>
<tr>
<td>Complications</td>
<td>-</td>
<td>-548</td>
</tr>
<tr>
<td>Health care after discharge</td>
<td>11,793</td>
<td>5,833</td>
</tr>
<tr>
<td>Home care costs</td>
<td>14,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Care home costs</td>
<td>32,000</td>
<td>22,000</td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td><strong>£58,762</strong></td>
<td><strong>£33,595</strong></td>
</tr>
</tbody>
</table>
Multidisciplinary management

- From admission, offer patients a formal, acute orthogeriatric or orthopaedic ward-based Hip Fracture Programme that includes all of the following:
  - orthogeriatric assessment
  - rapid optimisation of fitness for surgery
  - early identification of individual goals for multidisciplinary rehabilitation to recover mobility and independence, and to facilitate return to pre-fracture residence and long-term wellbeing
  - continued, coordinated, orthogeriatric and multidisciplinary review
  - liaison or integration with related services, particularly mental health, falls prevention, bone health, primary care and social services
  - clinical and service governance responsibility for all stages of the pathway of care and rehabilitation, including those delivered in the community.

- Consider early supported discharge as part of the Hip Fracture Programme, provided the Hip Fracture Programme multidisciplinary team remains involved and the patient:
  - is medically stable and
  - has the mental ability to participate in continued rehabilitation and
  - is able to transfer and mobilise short distances and
  - has not yet achieved their full rehabilitation potential, as discussed with the patient, carer and family.
Patients with suspected hip fracture

**Assessment**

**Proforma**

**Hip Fracture Service**

**University Hospital of Wales**
## Hip Fracture Assessment pro forma – initial management protocols – 2012

<table>
<thead>
<tr>
<th>Regular analgesia</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rx</td>
<td>Paracetamol 1g qds <em>and</em> Codeine phosphate 30-60mg qds</td>
</tr>
<tr>
<td></td>
<td>Reduce paracetamol dose to 500mg if liver disease Halve both paracetamol and codeine doses in smaller, frailer individuals</td>
</tr>
<tr>
<td>Rx</td>
<td>Morphone 2.5-5mg po/im 2 hrly</td>
</tr>
<tr>
<td></td>
<td>Exercise caution with morphine if airways disease, respiratory failure, or smaller frail individuals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRN analgesia</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rx</td>
<td>Morphine 2.5-5mg po/im 2 hrly</td>
</tr>
<tr>
<td></td>
<td>Ensure analgesia is sufficient to allow movements necessary for investigations (as indicated by the ability to tolerate passive external rotation of the leg), and for nursing care and rehabilitation</td>
</tr>
<tr>
<td></td>
<td>You may need to ask for help with this and EU staff, Hip Fracture Nurse, or the pain team will be able to advise</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nerve blocks</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider adding nerve blocks if paracetamol and opioids do not provide sufficient preoperative pain relief, or to limit opioid dosage Especially important for those patients in whom confusion or medical comorbidities make effective systemic analgesia difficult</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ensure analgesia is sufficient to allow movements necessary for investigations (as indicated by the ability to tolerate passive external rotation of the leg), and for nursing care and rehabilitation</td>
</tr>
<tr>
<td></td>
<td>You may need to ask for help with this and EU staff, Hip Fracture Nurse, or the pain team will be able to advise</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aperient</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rx.</td>
<td>Magnesium hydroxide 10ml <em>and</em> Senna 2 tablets, bd</td>
</tr>
<tr>
<td></td>
<td>In addition to any aperient the patient normally takes</td>
</tr>
<tr>
<td></td>
<td>Hip fracture and analgesia invariably lead to constipation, and a risk of post-op. problems such as incontinence and confusion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Antiemetic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rx.</td>
<td>Cyclize 50mg po/sc tds</td>
</tr>
<tr>
<td></td>
<td>In order to avoid nausea, vomiting and aspiration risk as a result of opiate analgesia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IV fluids</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal saline – 1 litre over 12 hours, then 1 litre over 24 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thereafter rates of infusion will vary - depending on individual needs, comorbidities and blood test results</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure care</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>All hip fracture patients are at high risk of pressure sores</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check patient is being nursed on a pressure relieving mattress and ensure that pressure relieving boots are in place</td>
</tr>
</tbody>
</table>
# Hip Fracture Assessment pro forma – initial management protocols – 2012

## Secondary prevention
Low trauma fractures (after a fall from a standing height or less) in women aged >75, or in men >85, suggest bone fragility. Prescribe alendronate 70mg po. weekly (after getting up on Sunday, washed down with glass of water, but nil by mouth for half an hour after). Younger patients require confirmation of osteoporosis before treatment – Orthogeriatricians will arrange DXA and OPD follow-up. Patients with memory or compliance problems may need other types of treatment. Avoid alendronate if renal failure, dyspepsia, heartburn, prior oesophageal problems or swallowing difficulties.

### Calcium and vitamin D
Rx. ‘Calcichew D₃ forte’ 1 tab. once a day at breakfast
- Unless hyper-calcaemia, hyper-parathyroidism, renal stones, metastatic disease, myeloma, sarcoid, or drinks >1 pint milk/day

### Paget’s disease?
Rx. Calcitonin 100 units sc. bd. – to reduce bone vascularity and decrease blood loss at the time of surgery
- Review X-ray, ALP, and Ca²⁺. Consider need for iv. fluids to avoid hypercalcaemia, and discuss with Orthogeriatricians - who will assess disease activity and advise on use of bisphosphonates.

### Alcohol withdrawal risk?
Consider prescribing diazepam according to CIWA protocol and Rx. Pabrinex I and II iv bd for 3 days
- Alcohol is the most common secondary cause of osteoporosis identified in patients with hip fracture, and alcohol withdrawal is a common avoidable contribution to post-operative delirium.

### Antibiotic cover
All patients should receive single doses prophylaxis at induction:
Rx. Cefuroxime 1.5g iv. -and-
Teicoplanin 400mg iv.
- Just teicoplanin if penicillin allergic, or any if previous history of *Clostridium difficile* diarrhoea
- May omit teicoplanin if admitted from own home, no hospital admission in the past year, and no history of MRSA carriage.

### Consent
Use consent Form 4 if concern over patient’s capacity
- Mental Test Scores may help to identify cognitive problems, but a failure in these does not necessarily imply inability to consent

### Bluespier
Ensure the patient is entered into Bluespier
# Hip Fracture Assessment pro forma – initial management protocols – 2012

## Blood tests
- FBC, U&E, and bone profile are needed in all patients
- Other blood tests – as indicated by individual circumstances
- Review Hb daily while awaiting surgery and on the following day

## Group and save
- The average fall in Hb is over 2g/dl following hip fracture
- Group and save all patients on admission
- Make sure this remains up to date if there is any delay in surgery

## Pre-operative transfusion
- Send Ferritin, B₁₂ and folate before transfusing if anaemic
- All patients need pre-operative Hb >10
- ‘High risk’ individuals need Hb >11
- Individuals at ‘high risk’ in terms of peri-op. blood loss include:
  - multi-part and sub-trochanteric fracture
  - pathological or Pagetic fracture
  - liver failure
  - coagulation disorders
  - clopidogrel or anticoagulant treatment

## Cross-match
- Ensure 4 units cross-matched for all ‘high risk’ operations

## Clopidogrel (or prasugrel)
- Discontinue clopidogrel on admission (unless for cardiac stent)
- The use of these drugs implies significant vascular disease – seek individual peri-op. orthogeriatrician review
- Restart clopidogrel immediately post-op.
- Early surgery will usually go ahead in spite of these drugs
- Consider delaying surgery until 36-48 hours off clopidogrel in the 'high bleeding risk' injuries listed above
- Liaise with anaesthetist if severe chest disease, as they will wish to consider relative risks of Spinal or early General Anaesthetic

## Other antiplatelet agents
- Continue any aspirin or dipyridamole the patient normally takes.
- Consider starting aspirin if strong vascular risk factors and no contraindications (e.g. allergy, asthma, peptic ulcer history)

## Warfarin
- Discontinue – aiming to reduce INR to 1.5 before surgery
- Prescribe iv. vitamin K₁ (phytomenadione, Konakion MM injection) 1mg (or 2mg if INR >3.5) to expedite surgery
- Determine the indication before reversal of warfarin
- Patients with prosthetic heart valves, recent PE/DVT, or antiphospholipid syndrome or must be established on iv. heparin before their INR is allowed to fall below the therapeutic range
Hip Fracture Assessment pro forma – initial management protocols – 2012

Pre-operative management protocols

Thromboprophylaxis

All admissions with hip fracture should follow the Cardiff and Vale protocol - unless specifically contraindicated (tick box below)

1. Prescribe sc. enoxaparin at 1800 hours each day
   - from admission, continued for 4-5 weeks after operation
   - dose depends on patient weight: 20mg od. if <50kg; 40mg od. if 50-100kg; 40mg bd. if 100-150kg; 60mg bd. If >150kg
   - omit 1800 hours dose if evening surgery planned (and if on bd enoxaparin regime omit both dose on the day of operation)
   - do not operate (or remove any epidural catheter) within 12 hours of enoxaparin
   - delay the post-op. dose until 6 hours after surgery and the removal of any epidural catheter

2. Prescribe below-knee stockings
   - initially just on the un-fractured side, but on both legs once surgery controls pain enough to put on the stockings

Enoxaparin contraindicated

- Active bleeding (eg. GI bleed, ‘open book’ pelvic fracture) delay starting enoxaparin, and reconsider on a daily basis
- Risk of CNS bleed (eg. unstable spinal injury, new-onset stroke, head injury or subarachnoid haemorrhage)
- Severe liver disease, known bleeding disorder, or platelets <70, or already receiving therapeutic anticoagulation
- Caution in renal impairment (eGFR < 30ml/min) – initially reduce dose to 20mg, pending discussion with renal team
- Uncontrolled systolic hypertension > 180mmHg
- Heparin induced thrombocytopenia or heparin allergy
- Other (specify) ..........................................................

Stockings contraindicated

- Local skin problems: infection, ulcer, ‘tissue paper’ skin, trophic changes, recent skin graft, severe oedema
- Possible arterial insufficiency: intermittent claudication, weak foot pulses, slow capillary filling (pinched nail-bed or toe-pad takes >3 seconds to return to normal colour)
- Peripheral neuropathy
- External-fixator, traction or cast, or risk of compartment syndrome because of foot or ankle injury
- Known allergy to material of manufacture
- Other (specify) ..........................................................
Yes – but what does an orthogeriatrician actually do?
Frailty Index – integrating the results of Comprehensive Geriatric Assessment to predict hip fracture outcome

Krishnan, Johansen et al. Age and Ageing (in press)
Reduction delirium after hip fracture: a randomised trial

Marcantonio et al. JAGS 2001; 49:516–522

126 consenting patients with hip fracture aged >65 (mean 79) years

Randomized to ‘usual care’, or

Geriatrics consultation
- pre-op. or <24 hours post-op.
- plus daily geriatrician visits

Offered a mean of 10 management suggestions per patient
- 77% adherence achieved

OBJECTIVES: Delirium (or acute confusional state) affects 35% to 65% of patients after hip fracture repair, and has been independently associated with poor functional recovery. We performed a randomized trial in an orthopedic surgery service at an academic hospital to determine whether proactive geriatrics consultation can reduce delirium after hip fracture.

DESIGN: Prospective, randomized, blinded.

SETTING: Inpatient academic tertiary medical center.

PARTICIPANTS: 126 consenting patients 65 and older (mean age 79 ± 8 years, 79% women) admitted emergently for surgical repair of hip fracture.

MEASUREMENTS: Detailed assessment through interviews with patients and designated proxies and review of medical records was performed at enrollment to ascertain prefracture status. Subjects were then randomized to proactive geriatrics consultation, which began preoperatively or within 24 hours of surgery, or “usual care.” A geriatrician made daily visits for the duration of the hospitalization and made targeted recommendations based on a structured protocol. To ascertain study outcomes, all subjects underwent daily, blinded interviews for the duration of their hospitalization, including the Mini-Mental State Examination (MMSE), the Delirium Symptom Interview (DSI), and the Memorial Delirium Assessment Scale (MDAS). Delirium was diagnosed using the Confusion Assessment Method (CAM) algorithm.

RESULTS: The 62 patients randomized to geriatrics consultation were not significantly different (P > .1) from the 64 usual-care patients in terms of age, gender, prefracture dementia, comorbidity, type of hip fracture, or type of surgical repair. Forty-one percent of geriatrics consultation patients were seen preoperatively and all were seen within 24 hours postoperatively. A mean of 10 recommendations were made during the duration of the hospitalization, with 77% adherence by the orthopedic team. Delirium occurred in 20/62 (32%) intervention patients, versus 32/64 (50%) usual-care patients (P = .04), representing a relative risk of 0.64 (95% confidence interval: CI = 0.37–0.98) for the consultation group. One case of delirium was prevented for every 5.6 patients in the geriatrics consultation group. There was an even greater reduction in cases of severe delirium, occurring in 7/62 (12%) of intervention patients and 18/62 (29%) of usual-care patients, with a relative risk of 0.40 (95% CI = 0.18–0.85). Despite this reduction in delirium, length of stay did not significantly differ between intervention and usual-care groups (median 5 interquartile range = 5 ± 2 days in both groups), likely because of protocols and pathways predetermined length of stay. In subgroup analyses, geriatrics consultation was most effective in reducing delirium in patients without prefracture dementia or activities of daily living (ADL) functional impairment.

CONCLUSIONS: Proactive geriatrics consultation was successfully implemented with good adherence after hip-fracture repair. Geriatrics consultation reduced delirium by over one-third, and reduced severe delirium by over one-half. Our trial provides strong preliminary evidence that proactive geriatrics consultation may play an important role in the acute hospital management of hip-fracture patients. J Am Geriatr Soc 49:516–522, 2001.

Key words: delirium; confusion; hip fracture; older geriatrics consultation

Over 250,000 older Americans fracture a hip each year, leading to direct medical costs in excess of 10 billion dollars.1 Delirium, or an acute confusional state, is common after hip-fracture repair, occurring in 35% to 65% of patients.2 We recently demonstrated that delirium
1. Adequate CNS oxygen delivery:
Supplemental oxygen to keep saturation >90%, preferably >95%
Treatment to raise systolic BP >2/3 baseline or >90 mmHg
Transfusion to keep haematocrit >30%

2. Fluid/electrolyte balance:
Treatment to restore normal Na\(^+\), K\(^+\), Glucose
Treat fluid overload or dehydration detected by examination or blood tests

3. Treatment of severe pain:
Regular paracetamol (1g qds)
Early-stage break-through pain: low-dose subcutaneous morphine
Late-stage break-through pain: oxycodone as needed

4. Elimination of unnecessary medications:
Discontinue/minimize benzodiazepines, anticholinergics, antihistamines
Eliminate drug interactions, adverse effects, modify drugs accordingly
Eliminate medication redundancies
5. Regulation of bowel/bladder function:
Bowel movement by post-op. day 2 and every 48 hours
Urinary catheter out by post-op. day 2, screen for retention/incontinence
Skin care program for patients with established incontinence

6. Adequate nutritional intake:
Dentures used properly, proper positioning for meals, assist as needed
Supplements: 1 can Ensure (3 cans Ensure for poor oral intake)
If unable to take food orally, feed via temporary NGT

7. Early mobilization and rehabilitation:
Out of bed on post-op. day 1, and for several hours daily
Mobilise with nursing staff as tolerated, such as to bathroom
Daily physiotherapy, with OT if needed
8. Prevention, early detection, and treatment of major complications:
- MI/ischemia - ECG, cardiac enzymes if needed
- SVT/AF - rate control, U&E adjustments, anticoagulation
- Pneumonia/COPD - screening, treatment, including chest therapy
- PE - appropriate anticoagulation
- Screening for and treat UTI

9. Appropriate environmental stimuli:
- Appropriate use of glasses and hearing aids
- Provision of clock and calendar
- If available, use of radio, tape recorder, and soft lighting

10. Treatment of agitated delirium:
- Appropriate diagnostic workup/management
- Relieve agitation - calm reassurance, family presence, and/or sitter
  - if absolutely necessary, low-dose haloperidol/lorazepam
Reducing delirium after hip fracture: a randomized trial

Marcantonio et al. JAGS 2001; 49:516–522

Reducing Delirium After Hip Fracture: A Randomized Trial

Edward R. Marcantonio, MD, SM, †‡ Jonathan M. Flacker, MD, †↓ R. John Wright, MD, †↓ and Neil M. Resnick, MD †¶¶

OBJECTIVES: Delirium (or acute confusional state) affects 35% to 65% of patients after hip-fracture repair, and has been independently associated with poor functional recovery. We performed a randomized trial in an orthopedic surgery service at an academic hospital to determine whether proactive geriatrics consultation can reduce delirium after hip fracture.

DESIGN: Prospective, randomized, blinded.

SETTING: Inpatient academic tertiary medical center.

PARTICIPANTS: 126 consecutive patients 65 and older (mean age 79 ± 8 years, 79% women) admitted emergently for surgical repair of hip fracture.

MEASUREMENTS: Detailed assessment through interviews with patients and designated proxies and review of medical records was performed at enrollment to ascertain prefracture status. Subjects were then randomized to proactive geriatrics consultation, which began preoperatively or within 24 hours of surgery, or “usual care.” A geriatrics team made daily visits for the duration of the hospitalization and made targeted recommendations based on a structured protocol. To ascertain study outcomes, all subjects underwent daily, blinded interviews for the duration of their hospitalization, including the Mini-Mental State Examination (MMSE), the Delirium Symptom Interview (DSI), and the Memorial Delirium Assessment Scale (MDAS). Delirium was diagnosed using the Confusion Assessment Method (CAM) algorithm.

RESULTS: The 62 patients randomized to geriatrics consultation were not significantly different (P > .3) from the 64 usual-care patients in terms of age, gender, prefracture dementia, comorbidity, type of hip fracture, or type of surgical repair. Sixty-one percent of geriatrics consultation patients were seen preoperatively and all were seen within 24 hours postoperatively. A mean of 10 recommendations were made throughout the duration of the hospitalization, with 77% adherence by the orthopedics team. Delirium occurred in 20/62 (32%) intervention patients, versus 32/64 (50%) usual-care patients (P = .04), representing a relative risk of 0.64 (95% confidence interval CI = 0.37–0.98) for the consultation group. One case of delirium was prevented for every 3.6 patients in the geriatrics consultation group.

There was an even greater reduction in cases of severe delirium, occurring in 14/62 (12%) of intervention patients and 18/62 (29%) of usual-care patients, with a relative risk of 0.40 (95% CI = 0.18–0.85). Despite this reduction, delirium, length of stay did not significantly differ between intervention and usual-care groups (median ±interquartile range = 5 ± 2 days in both groups), likely because protocols and pathways predetermined length of stay.

In subgroup analysis, geriatrics consultation was most effective in reducing delirium in patients without prefracture dementia or activities of daily living (ADL) functional impairment.

CONCLUSIONS: Proactive geriatrics consultation was successfully implemented with good adherence after hip-fracture repair. Geriatrics consultation reduced delirium by over one-third, and reduced severe delirium by over one-half. Our trial provides strong preliminary evidence that proactive geriatrics consultation may play an important role in the acute hospital management of hip-fracture patients. J Am Geriatr Soc 49:516–522, 2001.

Key words: delirium; confusion; hip fracture; elderly; geriatrics consultation

Controls | CGA
---|---
n | 64 | 62
Delirium | 50% | 32% *
Severe delirium | 29% | 12% *
Duration (days) | 3.1 | 2.9
LOS (days) | 5 | 5
Discharge home | 12% | 8%

Over 250,000 older Americans fracture a hip each year, leading to direct medical costs in excess of $10 billion dollars. Delirium, or an acute confusional state, is common after hip-fracture repair, occurring in 35% to 65% of patients. We recently demonstrated that delirium...
OK – so how are orthogeriatricians actually doing?
Wales

Performance data for individual hospitals compared with Wales and Overall figures

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Hospital code</th>
<th>Estimated number of hip fractures (Facilities Audit)</th>
<th>Number of cases submitted</th>
<th>% Case Ascertained</th>
<th>% Data Completeness of reporting fields</th>
<th>% Admitted to Orthopaedic care within 48hrs. (BB Std.1)</th>
<th>% Surgery within 48hrs. (BB Std.2)</th>
<th>% Preventive assessment by geriatrician (BB Std.3)</th>
<th>% Patients developing pressure ulcers (BB Std.4)</th>
<th>% Falls assessment (BB Std.5)</th>
<th>% Bone health medication assessment (BB Std.6)</th>
<th>Mean (SD) length of stay - acute + post-acute (days)</th>
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</thead>
<tbody>
<tr>
<td>Bronglais Hospital, Aberystwyth</td>
<td>BRG</td>
<td>85</td>
<td>87</td>
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<td>5.1</td>
<td>1.3</td>
<td>84.6</td>
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<td>94.0</td>
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<td>0.2</td>
<td>2.1</td>
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<td>95.9</td>
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<td>73.9</td>
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<td>Withybush Hospital, Haverford West</td>
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<td>131</td>
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<td>90.1</td>
<td>69.2</td>
<td>58.5</td>
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<td>7.0</td>
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<td>40.4</td>
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<td>OVERALL</td>
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<td>59365</td>
<td>93.5</td>
<td>92.6</td>
<td>52.4</td>
<td>83.1</td>
<td>49.5</td>
<td>3.7</td>
<td>91.9</td>
<td>83.8</td>
<td>15.7 (13.1)</td>
</tr>
</tbody>
</table>
Surgery in 48 hours

Excludes patients who were:
- in hospital pre-fracture
- died before 48 hours
- managed conservatively
- medically unfit
Received operation before 48 hours (%)
Web-site data on time to theatre – UHW

The National Hip Fracture Database
Pre-operative assessment

Best Practice Tariff requires assessment by:
- geriatrician or physician
- grade ST3 or above
# Network of Orthogeriatrics in Wales (NOW)

## Survey of existing hip fracture services – December 2012

<table>
<thead>
<tr>
<th>Orthogeriatrician</th>
<th>Majority of hip fracture patients will be offered:</th>
<th>NHFD</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Consultant in post</td>
<td>Pre-op. OG assessment</td>
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<tr>
<td>Abergavenny</td>
<td></td>
<td></td>
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<tr>
<td>Aberystwyth</td>
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<tr>
<td>Bangor</td>
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<tr>
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<tr>
<td>Cardiff</td>
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<tr>
<td>Carmarthen</td>
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</tr>
<tr>
<td>Haverford West</td>
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<tr>
<td>Llantrisant</td>
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<td>Merthyr</td>
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<td>Rhyl</td>
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<td>Swansea</td>
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<tr>
<td>Wrexham</td>
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</tbody>
</table>
Survey of existing hip fracture services – December 2012

Network of Orthogeriatrics in Wales (NOW)
The National Hip Fracture Database

Expansion in OG provision – NHFD Facilities Audit 2012-13
Trend in 30 day mortality: April 2008 to March 2011

**No orthogeriatric input**

**Orthogeriatrician assessment**
1. People with hip fracture are offered a formal Hip Fracture Programme from admission.

2. The Hip Fracture Programme team retains a comprehensive and continuing clinical and service governance lead for all stages of the pathway of care, including the policies and criteria for both intermediate care and early supported discharge.

10. People with hip fracture are offered early supported discharge (if they are eligible), led by the Hip Fracture Programme team.
## Hip Fracture Programme

<table>
<thead>
<tr>
<th></th>
<th>Usual care</th>
<th>HFP</th>
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</thead>
<tbody>
<tr>
<td>Rehabilitation costs</td>
<td>-</td>
<td>1,009</td>
</tr>
<tr>
<td>Complications</td>
<td>-</td>
<td>-548</td>
</tr>
<tr>
<td>Health care after discharge</td>
<td>11,793</td>
<td>5,833</td>
</tr>
<tr>
<td>Home care costs</td>
<td>14,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Care home costs</td>
<td>32,000</td>
<td>22,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>£58,762</strong></td>
<td><strong>£33,595</strong></td>
</tr>
</tbody>
</table>

NICE economic model – room for improvement
QS16 – focus for an NHFD Sprint Audit

- Jointly agreed protocols from admission into EU
- Acute ward with continuity of orthogeriatrician-led MDT care
- Documentation of goals and early discharge planning
- Physio day 1 post-op., then daily mobilisation by physio/nurse
- Named clinician from each speciality leading within the HFP
- Mortality, LOS, and adverse events monitored in HFP meetings
- Follow-up data to show HFP-team influence over IC rehab.