Evidence-based guidelines for fixing broken hips: an update

Michael N Chilov, Ian D Cameron and Lyn M March

ABSTRACT

Objective: To update evidence-based guidelines for the treatment of proximal femoral fractures published in the Journal in 1999.

Data sources: Systematic literature search of MEDLINE, CINAHL and EMBASE from January 1996 to September 2001 and the Cochrane Database of Systematic Reviews (most recent issue searched — Issue 2, 2002).

Study selection: Randomised controlled trials and meta-analyses of all aspects of acute-care hospital treatment and rehabilitation of proximal femoral fractures among subjects aged 50 years and over with proximal femoral fractures not associated with metastatic disease or multiple trauma.

Data extraction: All studies were read independently by two reviewers. Reviewers recorded individual study results, and an assessment of study quality and treatment conclusions according to Cochrane Collaboration protocols. If necessary, a third review was performed to reach consensus.

Results: 93 new studies were identified and 82 met our inclusion criteria. Recommendations for thromboprophylaxis, anaesthesia, surgical fixation of fractures and nutritional status have been altered to incorporate new evidence. Recommendations have been added regarding postoperative blood transfusion, the management of subtrochanteric fractures, and the type of surgical swabs which should be used.

Conclusions: Although there have been few significant changes to the previous recommendations, updating the guidelines has required substantial effort. The common clinical problem of hip fracture should be treated according to the most up-to-date evidence to achieve the best possible outcomes and optimal utilisation of limited resources. Guideline updates also require resourcing.

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HIP FRACTURE is a commonly encountered clinical problem, with the prevalence of proximal femur fractures in Australia predicted to double between 1996 and 2026.[1] Hip fractures are associated with a 12-month mortality rate of about 25%, and most patients who survive do not return to the level of mobility and independence they had before the fracture.[2,3]

Evidence-based clinical practice guidelines, based on the published literature up to December 1995, were published in the Journal in 1999.[4] These guidelines were implemented and evaluated in a study utilising clinical pathway methodology.[5] In brief, we were able to show that implementing the guidelines changed some processes of care, but that there was minimal impact on longer-term outcomes (4-month mortality and nursing home placement).

Here, we update the 1996 guidelines. Hip fractures should be treated according to the most up-to-date evidence to ensure the best possible outcomes and optimal utilisation of limited resources.

METHODS

We identified randomised controlled trials (RCTs) and meta-analyses of interventions for hip fracture management by searching electronic databases (MEDLINE, EMBASE and CINAHL) from January 1996 to September 2001. The Cochrane Database of Systematic Reviews was searched up to Issue 2, 2002. Search terms were "hip fractures" together with specific interventions, which had been identified in the previous review.[4] Searches were limited to RCTs, meta-analyses, subjects aged 50 years or over, and proximal hip fractures not related to metastatic disease. Primary studies which had already been included in Cochrane Collaboration reviews at the time of our literature searching were not re-reviewed.

All articles were read independently by two assessors. Results and data on study quality were recorded on a pro forma developed according to Cochrane Collaboration guidelines for assessment of study quality.[6] Disagreements were resolved by a third, independent assessment and a consensus meeting.

Individual study results and an assessment of the quality of each study's methods were summarised in a table format with author, year, number of subjects, interventions tested, ranking of bias (low, moderate, high), adequate concealment of allocation of patients to groups, and summary of results with relative risk, 95% confidence intervals and conclusions regarding treatment.

These tables were then used to generate a summary for each intervention, which included the previous recommendation, a summary of the evidence provided by the new studies and any new recommendations.

Evidence-based guidelines were then developed, with National Health and

Concord Repatriation General Hospital, Concord, NSW.
Michael N Chilov, MB BS, BOptom, Intern.
Rehabilitation Studies Unit, Northern Clinical School, Faculty of Medicine, University of Sydney, Ryde, NSW.
Ian D Cameron, MB BS, PhD, FAFRM(RACP), Head, Rehabilitation Studies Unit.
Institute of Bone and Mineral Research, Northern Clinical School, Faculty of Medicine, University of Sydney, St Leonards, NSW.
Lyn M March, MB BS, PhD, FRACP.
Reprints will not be available from the authors. Correspondence:
Dr Michael N Chilov, 50 Mi Mi Street, Oatley, NSW 2223. mchilov@gmp.usyd.edu.au

Guidelines (and the evidence levels* on which they are based) for 17 aspects of treatment of proximal femoral fracture (changes to the existing guidelines[4] and new recommendations are given in italics)

1. Time to surgery (Level III-2)[34-38]

No randomised trial evidence is available and observational studies give a range of conclusions. Early surgery (within 24–36 hours) is recommended for most patients once a medical assessment has been made and the patient's condition has been stabilised appropriately. Undue delay to surgery inevitably increases length of stay and may lead to more complications, including more pressure sores, pneumonia and confusion.

2. Preoperative traction (Level II)[39-42]

There is no evidence to support the routine use of preoperative traction. The routine use of preoperative skin and skeletal traction should be abandoned.

3. Prevention of pressure sores (Level I)[43,44]

All patients should be nursed on a pressure-relieving mattress rather than a standard hospital mattress. Patients at very high risk of pressure sores should ideally be nursed on a large-cell, alternating-pressure air mattress or similar device.

4. Oxygen therapy (Level II)[45,46]

Some evidence supports the routine use of oxygen therapy for the first 72 hours after surgery. All patients should have oximetry assessment from the time of emergency admission to 48 hours after surgery, and oxygen administered as necessary.

5. Thromboprophylaxis (Level I)[47-56]

The substantial majority of hip fracture patients should receive heparin, either low molecular weight heparin (LMWH) or unfractionated heparin. Patients being treated with thromboprophylactic regimens other than LMWH may benefit from additional low-dose aspirin. Mechanical devices should be used for patients in whom anticoagulants and antiplatelet agents are contraindicated.

6. Pressure gradient stockings (Level I)[57,58]

Patients should be wearing pressure gradient stockings as soon as possible after admission.

7. Type of anaesthesia (Level I)[59-68]

Regional anaesthesia is recommended for most patients. *Incremental dosing or metaraminol infusions can be employed to reduce hypotensive episodes often seen with spinal anaesthetics (Level II).*

8. Type of analgesia (Level II)[69-73]

Adequate analgesia should be administered before and immediately after surgery. Nerve blocks may be useful in some cases.

9. Prophylactic antibiotics (Level I)[74]

Prophylactic intravenous antibiotics should be given at induction of anaesthesia. Prolonged antibiotic use is of no proven benefit for prophylaxis of wound infection.

10. Type of surgery

Extracapsular (trochanteric) fractures (Level I)[75-84] should be treated surgically. A compression hip screw and plate has less chance of failure, leading to reoperation, compared with a fixed device and may prove to be more cost effective in the long term.

Undisplaced intracapsular fractures (Level I)[85-87] should have internal fixation with a widely used method that is familiar to the surgeon (cancellous bone screws or compression screw and plate).

Displaced intracapsular fractures (Level II)[85-95] have no clearly superior surgical treatment. The options for surgical treatment of this fracture are internal fixation or arthroplasty. Internal fixation is associated with higher risk of implant failure than hemiarthroplasty (femoral head replacement). At present the choice of treatment is best determined by patient factors (including age, presence of arthritis, availability and cost of the different types of treatment, surgeon experience and preference). *No clear benefit of bipolar over conventional hemiarthroplasty has been demonstrated (Level II).*

Subtrochanteric fractures (Level II)[96] *The Medoff sliding plate has been associated with fewer failures of fixation when compared with other screw plates and is recommended for fixation of this fracture.*

11. Surgical wound drains (Level II)[97-99]

Surgical wound drains may not be required as often as currently used and early removal is advised (about 24 hours after insertion).

12. Postoperative blood transfusion (Level II)[100]

Routine transfusion in asymptomatic patients with a haemoglobin level ⩾ 80 g/L may not be required.

13. Surgical swabs (Level II)[101]

Calcium alginate swabs should be considered in hip fracture surgery.

14. Urinary catheterisation (Level II)[102]

Avoid indwelling catheters (where possible). Intermittent catheterisation is preferable and has been shown not to increase the incidence of urinary tract infections.

15. Nutritional status (Level II)[103-107]

Some evidence supports oral protein supplementation for the 6 months after surgery. All patients should have a nutritional assessment, so that protein and energy supplements can be provided as needed. *In very thin patients nasogastric tube feeding could be considered.*

16. Mobilisation

Early assisted ambulation should begin within 48 hours postoperatively (Level III-3).[108-111] *No particular mobilisation strategies can be recommended over others (Level II).*[112]

17. Rehabilitation (Level II)[113-119]

A coordinated rehabilitation program should be available to patients with hip fracture. It should commence early in the hospital admission and provide opportunities for early supported discharge for patients who can manage this.
For more frail patients, a coordinated inpatient rehabilitation program should be provided that is followed by a period of continuing rehabilitation after discharge.

* Levels of evidence are those of the Australian National Health and Medical Research Council.[7]

Medical Research Council (NHMRC) levels of evidence listed for each recommendation.[7]

RESULTS

Ninety-three new studies were identified, of which 82 met our inclusion criteria. Eleven studies were excluded for one of the following reasons: the majority of patients were involved in high-impact trauma (1 study),[8] they were not randomised trials (5 studies),[9-13] and they were published in a language other than English and did not meet our other inclusion criteria (5 studies).[14-18] Fifteen studies were not re-read, as they were included in Cochrane Collaboration reviews at the time of searching.[19-33]

No new RCTs or meta-analyses were found relating to the following interventions: time to surgery, oxygen therapy, pressure-gradient stockings, and urinary catheterisation.

Two new issues in hip fracture management — postoperative blood transfusion and surgical swabs — were included in our review, because studies addressing these issues are now available.

The updated evidence-based guidelines are summarised in the Box (*page 490*).

DISCUSSION

The NHMRC recommends regular review of established guidelines.[7] Our study updates previously published guidelines for the treatment of proximal femoral fractures.[4]

Although we identified a number of new studies and Cochrane Collaboration reviews, there have been few changes to previous recommendations. Recommendations regarding nutritional status and surgical fixation of fractures have been altered to incorporate new evidence. We have also included new recommendations for postoperative blood transfusion and surgical swabs (Box).

Our recommendations are similar to those of the Scottish Intercollegiate Guidelines Network (SIGN), which updated its hip fracture management guidelines in 2002.[120] One difference is in the recommendation for thromboprophylaxis. The SIGN guideline recommends that all patients receive aspirin unless contraindicated. Having found little evidence for the benefit of heparin for the clinically important outcomes of pulmonary embolism, mortality, and bleeding, and benefit over routine early mobilisation, mechanical prophylaxis and aspirin, the SIGN group concluded that heparin be reserved for patients at high risk of venous thromboembolism. Patients are considered high risk according to multiple risk factors or contraindications to routine mechanical thromboprophylaxis and/or aspirin.

Although we have reviewed the same evidence as the SIGN group, we would argue for the use of either low molecular weight heparin (LMWH) or unfractionated heparin in most patients. Patients undergoing surgery for hip fracture are known to be at high risk for venous thromboembolism, with comparatively high rates of deep venous thrombosis and pulmonary embolism.[121,122] In the East Anglian audit, the use of pharmacological prophylaxis was associated with a reduced risk of fatal pulmonary embolism.[123] A meta-analysis of heparin in hip-fracture surgery has shown that heparin is protective against deep venous thrombosis, with a relative risk reduction of almost 60%. While this did not extend to a significant protective effect against pulmonary embolism, we would expect that with larger trials there would be sufficient statistical power to demonstrate this. Indeed, meta-analysis of orthopaedic and surgery trials has shown that heparin reduces the risk of pulmonary embolism, with similar risk reductions across different surgical specialties.[124] Extrapolating these data to hip-fracture patients, we would expect the benefit to be high in these patients, in whom the rates of pulmonary embolism are high.

According to the recommendations of SIGN, a significant number of patients would be receiving aspirin as their only pharmaceutical prophylaxis against pulmonary embolism, even though LMWH has been shown to be superior to aspirin in preventing deep venous thrombosis, the precursor to pulmonary embolism.[52]

Despite a number of studies investigating the use of heparin for thromboprophylaxis in hip-fracture patients, it is apparent that its role has not yet been clearly defined.

Regional anaesthesia is still recommended for most patients during proximal femoral fracture fixation. Potential complications which may have limited its use include hypotension and spinal haematoma. There is new evidence to support a number of interventions aiming to reduce the incidence of hypotension.[62-66,68] In the recent Pulmonary Embolism Prevention trial,[56] no occurrences of spinal haematoma were documented in the 4603 hip-fracture patients who received regional anaesthesia (including those with and without aspirin and other anticoagulant therapy).

Our study has some limitations. Guidelines date quickly. In developing wide-ranging systematic reviews and guidelines, it inevitably takes considerable time to review the primary studies and formulate recommendations. Publishing in a peer-reviewed journal also adds to the time from literature search to date of publication. Summarising complex issues in a review, such as this, can also be difficult. Although guidelines provide a useful resource for clinicians, it is still unclear whether the use of evidence-based guidelines improves outcomes.

Our study has updated previously published guidelines for the management of proximal femoral fractures. Reviewing the evidence accumulated in the 6 years since the last guidelines were produced required substantial effort. Since the development of the original guidelines, the Cochrane Collaboration Musculoskeletal Injuries Group has published reviews or protocols for planned reviews addressing most areas covered by our guidelines. Future updates may be able to draw on the reviews of this group rather than review studies individually, making the future guideline development a more manageable task. Guideline updates also require adequate financial resourcing to identify and appraise all relevant material.

COMPETING INTERESTS

None identified.

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