

Reducing morbidity and mortality in the hip fracture patient group

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Abstract

A review of the literature was undertaken to determine which amenable factors could be identified that would potentially improve the morbidity or mortality after hip fracture. Only two factors were identified that have been reported to be associated with a reduction in mortality, these were early surgery and experience of the surgeon. Other factors identified that may potentially reduce morbidity were early surgery, experience of the surgeon, and peri-operative antibiotics. Four interventions were identified that may reduce mortality or morbidity: nerve blocks, nutritional support, pharmacological thromboembolic prophylaxis, and mechanical intermittent pneumatic compression. A number of other factors were identified for which it remains uncertain if they will reduce mortality or morbidity: Pre-operative assessment, B blockers, blood transfusion, anti-embolism stockings, choice of surgical implant, cardiac output monitoring during surgery, choice of anaesthesia, prevention of intra-operative hypotension, anabolic steroids, multidisciplinary care, and rehabilitation. Continuing research is required to define which interventions are clearly effective and to further identify their potential adverse effects.

Keywords Hip fracture; morbidity; mortality

Introduction

Numerous studies have reported on the mortality after hip fracture. A review of the literature over the last four decades reported that the 6-month mortality was between 11% and 23%, and the 1-year mortality between 22% and 29%. There appeared to be little change in the mortality rate over this last 40 years, despite the mean age of the patient treated increasing from 73 to 79 years.¹ An analysis of the causes of death related to the hip fracture suggested that about a third of the deaths within 1 year from injury could be directly related to the hip fracture.²

Quantifying morbidity from a hip fracture is more problematic. Most patients already have limitation in function prior to the hip fracture and further decline in function is to be expected within this group of elderly people, regardless of the hip fracture sustained. Furthermore, patients who sustain a hip fracture are frailer and more likely to have significant medical co-morbidities than their age-matched peers. Frailer elderly patients may undergo a series of falls prior to death and one of these falls may result in a hip fracture. A study looking at function after a hip fracture reported a 20–25% reduction in mobility levels and a

5% reduction of functional activities not related to the hip fracture over a 1-year period.³

This review specifically looks at those methods that may be used to reduce either mortality or morbidity following a hip fracture and furthermore to consider those areas for which further research is needed.

Patients and methods

All articles published in English were reviewed annually as part of the author's ongoing research into hip fractures over the last 25 years. A Medline search was undertaken each year using the search terms of: hip fracture OR proximal femur fracture OR extracapsular fracture OR trochanteric fracture OR intracapsular fracture; Limit to 1 year; Restrict to humans; Limit to abstracts; Limit to English. Identified articles, which related any therapeutic interventions to mortality or morbidity, were included in this review. Particular emphasis was made to randomized trials and systematic reviews which included the Cochrane reviews on this topic. Following review of all identified studies the interventions under question were divided into those that were associated with a reduction in mortality and or morbidity, those that were possibly beneficial and those that were unproven.

Results

Critical review of the literature reveals that there were few potentially modifiable aspects of treatment clearly identified that may lead to a reduction in the mortality or morbidity. [Table 1](#) lists those factors identified for which it seems there is reasonable evidence to an improved mortality or morbidity with the intervention. [Table 2](#) lists interventions in which there was a possibility that they may reduce mortality or morbidity. [Table 3](#) lists interventions that remain unproven as to whether they would have any effect on mortality or morbidity.

Interventions that have been found to be associated with reduction in mortality and/or morbidity

Timing of surgery: numerous case series have been published which have related the timing of surgery to outcome. The problem with interpreting these studies is there is always a tendency for the fitter, healthier patients to progress easily to surgery and for those who may be frailer or unwell to be delayed. This will therefore bias the results in favour of early surgery. Correction of data sets using case mix adjustment may not fully account for the differences in patient characteristics. Despite these methodological issues a number of studies and systematic reviews have reported that delaying surgery will increase mortality^{4–9} and morbidity.^{6,10} In addition, delaying surgery will increase hospital stay with each 24 hour delay to surgery, resulting in an increased hospital stay of 3 days.¹¹

More recently there have been reports suggesting that even earlier surgery within 6–12 hours of admission may be associated with the largest reduction in mortality.^{4,9} Furthermore the first ever randomized trial on this topic has recently been reported.¹² In this study 30 patients were randomized to early surgery (median time admission to surgery of 6 hours) and 30 to surgery at the 'normal' time for that institution (mean time to surgery of 24 hours). Major peri-operative complications occurred in 9/30 of the early surgery group and 14/30 in the

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Interventions that have been found to be associated with reduction in mortality and/or morbidity

Timing of surgery (early surgery)
Experience of the surgeon
Peri-operative antibiotics

Table 1

normal time to surgery group. Deaths occurred in 1/30 in the early group and 4/30 in the normal group. These promising results have led to a larger multi-centre study being instigated.

Experience of the surgeon: increased 30-day mortality for less experienced surgeons has been reported.⁷ Another study reported increased in-hospital mortality for low-volume surgeons in comparison to high volume surgeons and an increased risk of medical complications for the lesser experienced surgeons.¹³ Further studies have reported that less experienced surgeons will have a higher risk of subsequent fracture, healing complications, wound complications, and re-operations.^{14–16}

Peri-operative antibiotics: the Cochrane review on this topic has clearly demonstrated a reduction in the occurrence of post-operative wound sepsis for those patients who received one to three doses of intravenous antibiotics started just before the start of surgery.¹⁷ It was not possible to say if two or three doses were superior to a single dose given just before the start of surgery.

Interventions that may reduce mortality and/or morbidity

Nerve blocks: peripheral nerve blocks may be inserted at the time of admission or at the time of surgery. A meta-analysis of randomized trials to date has confirmed that these blocks do reduce the degree of pain the patient experiences and the amount of analgesia that is required.¹⁸ A small tendency to a reduced risk of delirium and pneumonia was also reported although further studies are required to confirm these benefits.

Nutritional supplements: a randomized trial of 302 patients with a hip fracture allocated to receive additional nutritional intake with a dietetic assistant reported a reduced mortality for those allocated to receive the supplements.¹⁹ The Cochrane review of all randomized trials on this topic was more guarded in its conclusions. This summarized 24 randomized trials on the topic and concluded there was weak evidence that protein and energy supplements may reduce morbidity and mortality.²⁰

Pharmacological thromboembolic prophylaxis: the whole subject of thromboembolic prophylaxis remains controversial in

orthopaedics. A summary of the very limited randomized trials to date for hip fracture patients comparing low dose heparin with placebo, demonstrated that heparin prophylaxis does indeed reduce the risk of thromboembolic complications but has no significant effect on mortality.²¹ Recent reviews now suggest that the increased risk of bleeding complications incurred with heparin may exceed the reduction in thromboembolic complications.²² Aspirin may be used as an alternative to heparin but it remains questionable if the adverse effects exceed the benefits.²³ In summary it seems that any of the currently available pharmacological methods used will not affect mortality, they will reduce the risk of thromboembolic complications but at the expense of an increased risk of bleeding complications.

Mechanical intermittent pneumatic compression: intermittent compression devices including foot pumps have been used to reduce the risk of thromboembolic complications after hip fracture. To date there is evidence to suggest they reduce the risk of thrombosis, but insufficient data for mortality or rates of pulmonary embolism.²¹

Interventions that remain unproven as to whether they will affect mortality or morbidity

Pre-operative assessment/medical or cardiac clearance: in many centres it is standard practice for hip fracture patients to have a medical or cardiac assessment prior to surgery. This may include additional investigations such as an echocardiogram. Very little has been written on the value of this practice. Two recent studies have suggested the practice just resulted in delaying surgery with no demonstrable benefit, and may even increase morbidity.^{24,25} There is continued debate as to which medical conditions should be treated or corrected prior to surgery. A recent guideline²⁶ has listed those conditions that should be corrected (if possible) prior to surgery (Table 4). Most of these conditions listed in Table 4 should be amenable to fast correction, such that surgery is not delayed more than 24–48 hours at the most.

Beta blockers: some clinicians used to treat elderly patients before surgery with B blockers drugs to reduce the risk of an adverse cardiac event. It was not until a large randomized trial

Interventions that may reduce mortality and/or morbidity

Nerve blocks
Nutritional support
Pharmacological thromboembolic prophylaxis

Table 2

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