

Operative management of hip fractures: a review of the NICE guidelines

Introduction

Hip fractures are a major health concern in older age. Each year around 70 000 patients are admitted to hospital with hip fractures and within an ageing demographic this figure is set to rise (British Orthopaedic Association, 2007). It is estimated that by 2020 as many as 101 000 patients will be admitted to UK hospitals with a hip fracture (British Orthopaedic Association, 2007). This is a significant economic burden to the NHS with current estimated annual costs of around £2 billion (British Orthopaedic Association, 2007). Any new guidelines or changes in practice for such a condition may have considerable consequences.

This article looks at the National Institute for Health and Clinical Excellence (NICE) (2011) guidelines on the management of hip fractures in adults and considers the evidence behind them, their potential financial repercussions and any problems which may be encountered when implementing them.

The NICE guidelines issued in June 2011 were developed by a multidisciplinary guideline development group, which included orthopaedic surgeons, care of the elderly consultants, anaesthetists, nurse practitioners and physiotherapists. While the NICE guidelines encompass the total care of the patient from admission to discharge this article focuses on the guidelines relating to surgical aspects of hip fracture management, in particular areas that may represent a significant change in practice for orthopaedic departments across the country.

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Timing of surgery

Prompt surgical management is one of the cornerstones of the NICE guidelines on hip fracture management. NICE recommends that patients who sustain hip fractures should have surgery performed on the day of, or the day after admission. On humanitarian grounds alone NICE considers it unacceptable for a patient to spend more than one night in hospital without operation, as surgical fixation is an effective form of pain relief.

There is also evidence that delay in surgery confers an increased risk of morbidity and mortality and prolongs length of stay. Orosz et al (2004) performed a prospective cohort study of over 1000 patients admitted with hip fractures and found that patients who had surgery within 24 hours experienced less pain and a reduced length of stay (1.94 days). This study is the main body of evidence that NICE used in making guidelines advocating early surgery.

There is still some controversy about the cut-off point beyond which the advantages of early surgery are no longer conferred. Other evidence reviewed by NICE with regard to timing of surgery reflects this. One study failed to show any improvement in mortality 4 months post-surgery for cases done within 36 hours of admission (Al-Ani et al, 2008). It did demonstrate, however, that patients who had surgery within 36 hours had a reduced hospital stay and were significantly more likely to return to independent living at 4 months. A shortened hospital stay has obvious economic benefits, coupled with the potential to increase the chance of independent living and reduce the patient's experience of pain, so early surgery seems to be both ethically and economically sound.

In line with this guidance on early surgery, the Department of Health (2011) has issued a best practice tariff for hip fracture management, and surgery within 36 hours is one of the quality indicators that rewards a trust with an extra £885 if fulfilled along with other quality markers

such as falls assessment, admission protocol, orthogeriatric assessment, osteoporosis management and audit via the National Hip Fracture Database (Department of Health, 2011). These financial incentives are hoped to offset the costs of increased theatre time and dedicated trauma lists. NICE developed an economic model alongside these guidelines to investigate the costs of extra operating lists and reported that the initial increase in expenditure in the first year would become cost-effective by its second year. In a financially minded NHS it is hoped that the NICE guidelines will help to support orthopaedic surgeons to persuade trust boards to prioritize hip fracture surgery and allocate services appropriately.

The primary concern with early surgery is the possibility that patients will be rushed to theatre without having been properly optimized. The National Hip Fracture Database reports the average age of a person with hip fracture as 84 years for men and 83 years for women. Mortality is high with around 10% of people with a hip fracture dying within 1 month (Parker and Johansen, 2006). Death is frequently the result of associated comorbidities and indeed the fall that led to the fracture may be a red flag denoting underlying ill health.

If surgery for a patient with a hip fracture is delayed as a result of ill health the financial incentives are lost as soon as the 36-hour window is breached. Although the decision to operate ultimately lies with the consultant surgeon together with his/her anaesthetic colleagues the decision-making process has clear financial implications overhanging it.

Perhaps the most difficult obstacle to overcome is the need for flexibility. There is an ebb and flow to hip fracture admission rates that is familiar to all hospitals that receive trauma patients. Fracture incidence varies both on a seasonal basis with increased demand during the winter months (Bischoff-Ferrari et al, 2007) and also on a day-to-day basis. Clearly, hospitals need to develop a system that can

accommodate such variations. It is unlikely that any trust board would support a new system of trauma management that had a risk of theatres and theatre staff being underused during quieter periods. Developing a cost-effective, flexible and reliable system to accommodate early surgery is sure to be a challenge for some, if not all, hospitals.

Furthermore, NICE has recommended that consultants and senior staff should supervise trainees when they carry out surgery for hip fracture. This recommendation is based on non-randomized studies investigating the influence of surgical experience on re-operation rates. One prospective study of 600 patients showed a significantly higher re-operation rate at 6 months for those cases performed by unsupervised junior registrars compared to those performed by senior surgeons or with their supervision (Palm et al, 2007).

Although this research is by no means definitive the recommendation for increased seniority in hip fracture surgery may be well founded. Adherence to the European Working Time Directive has put particular strain on surgical training. With limited training opportunities available, implementing a well-supervised protocol for hip fracture surgery may not only improve the outcome for the patient but also for the surgeon being supervised. While this supervision may be costly, there is a conceivable economic incentive in its potential to reduce re-operation rates.

Postoperative weight bearing

NICE has stated that the aim of surgery for hip fracture should be to allow patients to fully weight bear (without restriction) in the immediate postoperative period. This advice came from the experience and opinion of the guideline development group who felt that long periods of restricted mobility impact heavily on patient independence, discharge destination and ultimately their long-term mobility. In the case of hemiarthroplasty weight bearing postoperatively is not usually limited, however, not all implants used in hip fracture surgery are designed to meet this guideline.

The authors' trust uses the Versa-Fx II Femoral Fixation System by Zimmer, which is a type of dynamic hip screw device. Their guidance for surgical tech-

nique recommends partial-weight bearing ambulation to begin on the second postoperative day (Zimmer, 2005). Similar systems from Biomet and DePuy, the Hiploc (Biomet Trauma, 2011) and TK2 (DePuy, 2005) respectively, come with guidance which specifically states that their products cannot be expected to withstand the unsupported stresses of full weight bearing. The NICE guidelines recommend the use of such extramedullary devices for trochanteric fractures above and including the lesser trochanter, but they also clearly stipulate that any surgery performed should allow patients to fully weight bear. To the authors' knowledge, none of the leading manufacturers for such orthopaedic implants recommend full weight bearing postoperatively.

Ultimately, the responsibility for weight-bearing status lies with the surgeon, but with such conflict between the manufacturers' and NICE's recommendations it is not such a straightforward decision-making process. Furthermore, many patients, particularly those with dementia, are unable to comply with partial or non-weight bearing mobilization and surgeons are faced with having to accept weight bearing with its risk of secondary fracture displacement over prolonged immobilization with its multiple deleterious risks.

Extracapsular fractures

The NICE guidelines on extracapsular fractures are not likely to represent a major change in practice for most orthopaedic departments, so are only touched on briefly here. As already mentioned, for trochanteric fractures above and including the lesser trochanter the use of an extramedullary device has been recommended. This is based on evidence from randomized controlled trials, which showed no difference in mortality, reoperation and mean mobility score with intramedullary implants compared to extramedullary implants (Hardy et al, 1998; Sadowski et al, 2002; Saudan et al, 2002; Utrilla et al, 2005). Furthermore, the extramedullary devices offer a cost saving over intramedullary nail devices.

The use of intramedullary nails is recommended for subtrochanteric fractures of the femur. This is based on low quality evidence from two randomized clinical trials, which demonstrated 150 fewer cases of non-union for every 1000 patients treated

with an intramedullary device (Ekstrom et al, 2007; Rahme and Harris, 2007). Non-union is an undesirable complication as it leads to further surgery incurring further costs and patient morbidity.

Also mentioned in the NICE guideline is the fact that subtrochanteric fractures may occur as a result of a pathological process. The guideline development group has suggested that there is an advantage to having a long intramedullary device in situ as it could provide mechanical protection in a potentially diseased bone.

The evidence supporting intramedullary implants is far from definitive and may not be sufficient to persuade orthopaedic departments to adopt these new guidelines. Certainly for some surgeons, their preference for a fixation method will be based on personal experience and this, in some cases, may pervade over the scientific evidence presented by NICE. Extramedullary devices may then be favoured in cases of borderline subtrochanteric fractures.

Displaced intracapsular hip fractures

The biggest area of change proposed by the NICE guidelines relates to the management of displaced intracapsular hip fractures. In the past, the vast majority of these injuries have been treated with a hemiarthroplasty. The choice of prosthesis depended in part on local accepted practice. Commonly less mobile patients have been treated with an uncemented Austin Moore type device and more able-bodied patients with a cemented implant. Less frequently, internal fixation or total hip replacements have been used for this injury.

The NICE guidelines have set clear criteria for the use of certain prostheses and recommended cessation of the use of others. Where replacement arthroplasty is being implemented NICE have recommended an anterior approach as they feel it confers a significant reduction in dislocation rates (Enocson et al, 2008). Many hip surgeons prefer the posterior approach and use it in elective work as it preserves the hip abductors and is easily extended should greater surgical access be required. With this in mind NICE have included a caveat stating that the posterior approach may well be as safe in preventing dislocation in those surgeons with a large experience of using it.

Internal fixation

NICE has recommended that all displaced intracapsular fractures be treated with some form of replacement arthroplasty. Historically, orthopaedic surgeons have, in certain circumstances, attempted to reduce the intracapsular fracture and internally fix it with cannulated hip screws. This offers the unique opportunity to salvage the native femoral head. This is a particularly attractive management option in younger, more active patients who are likely to outlive any replacement arthroplasty instituted. In addition, internal fixation is quicker, less invasive and may be associated with reduced early postoperative mortality (Lu-Yao et al, 1994). However, rates of operative revision up to 40% (Parker and Gurusamy, 2006) have made internal fixation in displaced fractures an unpopular choice. Such high rates of revision mean that any financial savings made by the initial procedure are likely to be lost when the patient returns for a repeat procedure, which could have been implemented in the first instance.

The need for revision is usually the result of non-union or avascular necrosis, secondary to disruption of the lateral epiphyseal branches of the circumflex artery, which supply the greater part of the femoral head. Undoubtedly, a key variable in achieving a successful outcome in individual cases will be down to operative technique and skills of the surgeon involved (Heetveld et al, 2009). While high rates of revision make it an unpopular management option it is possible that a certain sub-group of patients may do well from this procedure and any subsequent revision in this group of patients may not be detrimental to the overall functional status. Sadly, there is a lack of good quality evidence to elucidate exactly what criteria may be used to pick out who these potential patients might be.

Replacement arthroplasty

NICE has recommended that where hemiarthroplasty is to be used in displaced intracapsular hip fractures a proven cemented femoral stem design should be used in preference to an uncemented Austin Moore or Thompson stem. There is evidence that cemented hemiarthroplasties will lead to less pain and better mobility postopera-

tively (Parker et al, 2010). While this may be good quality evidence there are a few important factors that need to be taken into consideration when implementing a one-stem-fits-all policy.

Hip fracture surgery typically involves elderly, high-risk patients with multiple comorbidities. Orthopaedic surgeons are often faced with situations where patients at baseline are not good candidates for surgery. In high-risk patients an orthopaedic surgeon will want to perform an operation that will give the patient the most benefit but subject him/her to the least risk. The use of an Austin Moore implant is a quick procedure and avoids the potential risks associated with the use of cement. Not all patients with hip fractures were mobile before their injury. Some only transfer from bed to chair while others may be completely bed bound. It is hard to see how a cemented hemiarthroplasty will benefit such patients over and above an Austin Moore or equivalent. However, the NICE guidelines appear to make no exception for these cases.

Arguably, the biggest impact the NICE guidelines will have on current hip fracture management is the role of total hip replacement. NICE recommends that all patients with a displaced intracapsular neck of femur fracture, who were able to walk independently outside with no more than a stick, who are cognitively intact and well enough to tolerate the procedure, should be offered a total hip replacement. This signifies a potentially huge change in hip fracture management. Traditionally, the use of total hip replacement in cases of hip fracture has been low with some regions reporting as few as 2.3 total hip replacements per 100 000 diagnosed hip fractures (Ibrahim et al, 2010).

This new guideline, therefore, represents a significant change in practice for orthopaedic departments across the country. The proposed benefits for this include reduced pain at 1 year and an improved walking distance when compared to hemiarthroplasty (Skinner et al, 1989; Baker et al, 2006; Keating et al, 2006).

The implications for this are far reaching. Total hip replacement is a longer procedure than hemiarthroplasty with some papers showing 28% of total hip replacements running over 1.5 hours compared to 12% for hemiarthroplasty

(van den Bekerom et al, 2011). Not only does a prolonged procedure place greater physiological stress on the patient but also on hospitals trying to accommodate the extra theatre time. These hospitals will also have to provide sufficient staff and theatre equipment required to perform the extra procedures. While it is relatively easy to predict the requirements for a week's planned elective work, providing sufficient equipment for a fluctuating number of additional cases will be a challenge. Furthermore, theatres will need to be manned with staff who have experience in preparing and using the equipment safely.

A randomized controlled trial demonstrated that prolonged operating times were also associated with increased blood loss – 26% of patients undergoing total hip replacement sustained more than 500 ml of blood loss compared to 7% of those undergoing hemiarthroplasty (van den Bekerom et al, 2011). Postoperative anaemia and increased blood transfusions pose a risk to patients. Increased blood transfusions will also place extra stress on hospital blood banks and nursing staff who have to monitor patients closely while they are receiving their transfusion.

Performing a total hip replacement will require a higher level of surgical expertise. Senior supervision, already recommended by NICE, will need to be implemented to cover evenings and weekends if targets for time to surgery are to be met. With increasing subspecialization in some units, some senior consultants will not have performed a total hip replacement for many years if it is not part of their elective work. As such they may not be the most appropriate person to supervise a junior surgeon doing the procedure. Departments may have to find a way for their trauma lists to be covered by a lower limb consultant in order that the increased demand for total hip replacements can be met. Such supervision is a costly endeavour.

Furthermore, it is standard practice that most hip fractures treated with hemiarthroplasty are discharged without orthopaedic follow up. Patients who undergo total hip replacement will require an outpatient follow up protocol similar to that of elective total hip replacement cases. This again will contribute to increased consultant time and hospital costs.

Conclusions

The NICE guidelines serve to try and improve the outcomes for patients who sustain hip fractures. Many areas represent a significant change in practice and it will certainly take a while for these changes to filter down and become commonplace on the shop floor. Despite the difficulties inherent with change there is no doubt that the guidelines bring the management of these patients to the forefront of NHS care practices and highlight the multi-faceted nature of the care that they need.

In conjunction with the Department of Health tariff they offer consultant surgeons a unique opportunity to influence their trusts to prioritize their services and ensure that facilities are made available to them. The NICE guidelines also place an emphasis on dedicated trauma lists and senior supervision. While the principal reason for this is to ensure hip fractures are dealt with in a timely fashion it is hoped that it will also enhance the training opportunities for more junior orthopaedic surgeons.

The authors are not opposing this guidance, but merely highlighting some of the potential discrepancies between common current treatments and new recommendations. Some consequences may not be immediately obvious, but where changes in practice are applied to a population proportion that is expected to double by 2050, the knock-on effects and adaptations that might be necessary to fully implement this guidance may require major resource planning. **BJHM**

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KEY POINTS

- Hip fractures are a major health concern.
- National Institute for Health and Clinical Excellence (NICE) guidelines on hip fracture management highlight the multidisciplinary approach required to successfully manage these patients.
- Prompt surgery on dedicated trauma lists with senior supervision is the cornerstone of the NICE guidelines.
- The NICE guidelines allow no role for the Austin Moore hemiarthroplasty in intracapsular fracture neck of femurs.
- Provision of total hip replacements for able-bodied patients with fracture neck of femurs will require significant planning and resource allocation within most trusts.
- The NICE guidelines offer consultant surgeons an opportunity to influence their trusts to prioritize their services and ensure that facilities are made available to them.