

Anaesthesia for fractured neck of femur

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Abstract

Fracture of the femoral neck is a common injury in the elderly and many patients have significant comorbidities. Effective management requires a multidisciplinary approach including anaesthetists, geriatricians and orthopaedic surgeons. Strict adherence to clinical practice guidelines such as the American College of Cardiology and American Heart Association (ACC/AHA) may reduce unnecessary cardiac consultations. Although early surgery within 24–48 hours is beneficial, there may be medical conditions that need prior optimization. Both general and neuraxial anaesthesia can be used. Overall, there is no significant difference between them in terms of mortality and most complications including pneumonia and pulmonary embolism, although neuraxial anaesthesia is associated with reduced deep vein thrombosis. Pain management should begin preoperatively and a multimodal approach should be used. Peripheral nerve blocks can provide effective analgesia.

Keywords Analgesia; femoral neck fracture; fractured hip; fractured neck of femur; general anaesthesia; perioperative management; pre-operative assessment; regional anaesthesia

Royal College of Anaesthetists CPD Matrix: 3A08

Introduction

Femoral neck fractures are associated with aging and osteoporosis and can occur after relatively trivial trauma in elderly patients. Each year, 70,000 hip fractures occur in the United Kingdom (UK) and over 1.6 million people worldwide. The mean age is over 80 years and the incidence of fractured hip is increasing – in the UK it is expected to be 100,000 per year by 2033. Femoral neck fracture is associated with a 30-day post-operative mortality of 5–11%, and 1-year mortality of 12–36%. These rates have remained relatively constant over the years and continues to be a major cause of morbidity and loss of functional activity.

Optimal perioperative care emphasizes early optimization and early surgery, effective multimodal analgesia and the use of a

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Learning objectives

After reading this article, you should:

- be able to list four patient related postoperative pulmonary complications
- know the advantages of early hip fracture surgery
- know the strategies for pain control in patients with hip fracture surgery

multidisciplinary team. The multidisciplinary team should consist of the anaesthetist, orthopaedic surgeon, medical physician/geriatrician, physiotherapist and nursing staff. Good communication and discussion of patient management between team members is essential. The perioperative management of these patients is challenging. Current evidence suggests that early surgery is beneficial but sometimes medical optimization or further investigations are required before surgery can proceed safely. Thus, a balance needs to be made between optimization/investigations and avoiding unnecessary surgical delay. There is great variation in anaesthetic technique for hip fracture surgery, mainly because previous studies have not shown clear benefit with any technique.

Timing of surgery

Guidelines recommend that hip fracture surgery should be performed within 24–48 hours. Early surgery allows quicker mobilization and may reduce deconditioning, muscle wasting and complications such as pneumonia and skin breakdown (Box 1). A study of over 4000 patients found that 78% experienced surgical delay of ≥ 1 day, and 31% ≥ 2 days, and that delay of 2 days or more was associated with increased risk of complications.¹ Delays were most commonly due to organizational and medical reasons and only 4% were due to anaesthesia.

Early surgery is associated with better outcomes. The National Institute for Health and Care Excellence (NICE) benchmark is to perform hip fracture surgery within 36 hours or on post-admission day 0–1. Meeting the NICE time to fracture hip surgery benchmark was associated with reduced 30-day mortality, shorter length of hospital stay and reduced incidence of minor complications.¹ A study of over 26,000 patients undergoing surgery for fracture of the hip showed that surgery within 24 hours was associated with significantly reduced risk of respiratory complications including pneumonia and extended length of hospital stay.²

Surgical delay is often due to concurrent medical illness or severe comorbid conditions. Thus, the higher mortality demon-

Advantages of early hip surgery

- ↓ mortality
- ↓ length of hospital stay
- Early mobilization
- ↓ muscle loss
- ↓ pneumonia
- ↓ pressure sores

Box 1

strated from previous studies in patients with delayed surgery may also be because they are less healthy generally, and not a result of the delay itself. Hip fracture surgery should be performed within 24–48 hours for patients who are medically stable. In patients with unstable medical conditions, optimization is needed first.

Preoperative assessment

Most patients suffering from hip fracture are elderly. Anaesthesia in this population is complicated by issues such as cognitive impairment, limited physiological reserve, polypharmacy and multiple comorbidities. The most common comorbidities are cardiovascular disease, chronic obstructive pulmonary disease, cerebrovascular disease, diabetes mellitus and renal impairment. The purpose of preoperative assessment is to identify high-risk patients, optimize conditions that make surgery potentially life threatening, and to help formulate an anaesthetic plan.

Clinical assessment and general risk stratification

A thorough history and physical examination is essential. Often information from a witness/carer is important, especially in patients with cognitive impairment. It is also important to ask for symptoms suggesting acute cardiac or cerebral events that may have precipitated the injury. Assessment for other possible associated injuries especially head injuries should also be performed. Comorbidities are a predictor of mortality and rehabilitation potential. Various scoring systems are available to predict outcome, such as the Charlson comorbidity index, geriatrics index of comorbidity, cumulative illness rating scale and Nottingham hip fracture score. However, many of these systems are complicated and difficult to use in practice.

Cardiac assessment and preoperative echocardiography

Cardiac evaluation involves assessment for active cardiac disease, functional capacity of the patient, and clinical risk factors. The Revised Cardiac Risk Index (RCRI) is commonly used to predict cardiac risk in patients undergoing non-cardiac surgery. According to the American College of Cardiology and American Heart Association (ACC/AHA) guidelines, the RCRI predictors of cardiac risk include ischaemic heart disease, heart failure (prior/compensated), cerebrovascular disease, renal insufficiency, insulin-dependent diabetes mellitus, and intrathoracic, intra-abdominal or suprainguinal vascular surgery. Patients with two or more risk factors have elevated risk. Assessment of functional status is important for predicting perioperative and long-term cardiac outcomes. A patient with a functional capacity of four or more metabolic equivalents (METs) pre-injury (e.g. able to climb a flight of stairs, walking up a hill) is considered medically fit for hip fracture surgery and is unlikely to require preoperative cardiac intervention.

Most patients with hip fracture do not require cardiac consultation. Unnecessary cardiac consultations are common, result in overutilization and often result in unnecessary surgical delay. A retrospective review found that 71% of cardiac consultations did not follow the ACC/AHA guideline. Patients obtaining cardiac consultation had significantly longer hospital length of stay and longer time to surgery. Therefore, better compliance with ACC/AHA guidelines can reduce surgical delay and length of hospital

stay. Presence of active cardiac conditions requires cardiac assessment. These include unstable coronary syndromes (severe or unstable angina, recent myocardial infarction), decompensated heart failure, severe valvular diseases (severe aortic stenosis, symptomatic mitral stenosis) and significant arrhythmia. Patients with medical assist devices like pacemakers and automatic implantable cardioverter defibrillators also require cardiac consultation to evaluate battery life and mode adjustment if necessary. Also, cardiac evaluation may be needed when there is an unexplained cardiac symptom to ascertain a diagnosis. Finally, patients with poor functional capacity and presence of clinical risk factors may benefit from cardiac assessment to determine if anything can be done to improve it.

The need for echocardiography is controversial. Indications for echocardiography for non-cardiac surgery are for patients with dyspnoea of unknown origin and in patients with heart failure who have worsening dyspnoea or other change in clinical status. The anaesthetist needs to balance the benefit of thorough preoperative work up with the potential disadvantage of surgical delay. A retrospective review of 100 patients with hip fracture found that 34% of transthoracic echocardiograms were not performed in accordance to the ACC/AHA guidelines. In these patients, echocardiogram did not result in a change in anaesthesia or medical management. Instead, it may have resulted in unnecessary delay of surgery. Patients with cardiac murmur and previous echocardiography most likely do not require a repeat examination. However, management of patients presenting with a previously undiagnosed cardiac murmur is controversial. Echocardiogram needs to be decided on a case-by-case basis and is much more likely to be indicated if the patient with newly diagnosed murmur also has suspicious symptoms or signs.

Pulmonary assessment

Pulmonary evaluation is important because pulmonary complications are as common as cardiac. The anaesthetist is required to assess pulmonary risk, determine whether the patient can maintain adequate respiratory effort, and whether there is likely to be a need for postoperative ventilation (generally unlikely after hip surgery). Postoperative pulmonary complications (PPC) increase length of hospital stay, morbidity and mortality and affect at least 4% of patients after hip fracture surgery. PPCs include atelectasis, pneumonia, pulmonary thromboembolism, exacerbation of chronic lung disease, respiratory failure and acute respiratory distress syndrome (Box 2). Patient-related risk factors include poor general health (impaired sensorium and functional dependence, ASA class ≥ 2), age ≥ 60 years, smoking, lower respiratory tract infection, chronic obstructive pulmonary disease (COPD), obstructive sleep apnoea, congestive heart failure, low albumin and poorly controlled asthma. The presence of these risk factors may indicate the need for early anaesthetic consultation. Procedure related risk factors are emergency surgery, operation duration ≥ 3 hours, general anaesthesia and long acting neuromuscular blockade.

Spirometry, chest X-ray and arterial blood gas should not be ordered as routine investigations. It has been shown that only 0.1% of chest X-rays revealed unexpected abnormality that altered management and are only indicated when there are unexplained respiratory symptoms or clinical suspicion of lower respiratory tract infection. Preoperative spirometry has not been

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