Preoperative assessment of the orthopaedic patient

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Abstract

Patients undergoing orthopaedic surgery are quite a disparate group, ranging from the young and fit to the frail elderly. Careful pre-anaesthetic assessment and planning is necessary to identify and optimize comorbidities, and develop an individualized perioperative care plan to facilitate early rehabilitation.

Keywords Anticoagulation; assessment; echocardiogram; elderly; neck of femur; preoperative

Royal College of Anaesthetists CPD Matrix: 3A08

Learning objectives

After reading this article, you should be able to:

- assess the risks of orthopaedic surgery especially in the elderly population with hip fracture
- understand the perioperative anaesthetic considerations for orthopaedic surgeries
- understand the relative merits of different anaesthetic techniques

Introduction

Orthopaedic surgery varies from paediatric limb deformities, to sports-related injuries, trauma, joint replacement and fracture fixations. There is a wide range of patient demographics, in terms of age and comorbidities. Hip fractures are common in the elderly and remain a huge burden to healthcare. These patients often present with age-related illnesses, frailty, cognitive decline and polypharmacy. The National Institute for Health and Care Excellence (NICE) have developed guidelines on the management of hip fracture in adults (Box 1).

The preoperative assessment is dependent on the specific orthopaedic surgery and patient demographic. The general systemic and airway assessment is like other non-orthopaedic surgeries. Specialized surgeries e.g. limb deformities, trauma, spine surgeries are covered in other articles in this journal. Lower limb arthroplasties are common due to an ageing population and increasing obesity. Enhanced recovery programmes are now utilized to aim for early mobility, discharge and return to normal function.

Each patient should have a thorough history taken and physical examination, focusing on the different major systems and medications, but with the aim of not delaying surgery. The plan of anaesthesia and pain management depends on findings from clinical assessment.

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Cardiovascular risk assessment

Cardiac disease, particularly ischaemic and senescence are the most common causes of postoperative morbidity and mortality.[1] A detailed assessment of the patient's cardiac risk factors, functional status and exercise tolerance is vital. In the presence of cardiac risk factors and poor functional status, referral to a cardiologist may be useful for further investigation and optimization prior to operation. However, it is very important to consider whether a patient is likely to benefit from this as it may lead to significant delay in surgery.

Transthoracic echocardiogram (TTE) performed by anaesthetists can help to identify hypovolaemia, cardiac failure, heart valve abnormalities and pulmonary hypertension. This can affect the perioperative management of these patients, such as the need for vasopressors, fluid replacement and invasive monitoring. Focused TTE can be performed quickly in the clinic or at the bedside so as not to delay clinical management. Prospective, observational studies suggest that TTE results in a 50% reduction in 12-month mortality.[2]

The American College of Cardiology (ACC) and American Heart Association (AHA) have published a stepwise approach to perioperative cardiac assessment for coronary artery disease (Figure 1).[3] These take into account the urgency of surgery, the presence of acute coronary syndrome, cardiac risk factors and exercise tolerance of the patient.

Metabolic syndrome

Diabetes increases perioperative mortality rates by up to 50%.[4] This can be due to complications from poorly controlled diabetes, complex polypharmacy, increased perioperative infections, and associated hypo- and hyperglycaemia. The latest AAGBI guidelines summarize perioperative management of surgical patients with diabetes, such as preoperative assessment and optimization of blood glucose control, minimizing fasting times and safe use of the variable rate intravenous insulin infusion.[4]

Obese patients are prone to osteoarthritis and may also have concomitant diseases such as hypertension, ischaemic heart disease, diabetes mellitus and peripheral vascular disease. These patients are challenging. In 2015, the AAGBI published guidelines for managing obese patients undergoing surgery, including preparing for additional specialized equipment, recommending regional anaesthesia which maybe technically difficult, and ensuring a clear airway strategy.[5]

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NICE recommendations for preoperative assessment of patients with hip fracture

- Timing of surgery
  - Perform surgery on the day of, or the day after, admission
- Identify and treat correctable comorbidities immediately so that surgery is not delayed by:
  - Anaemia
  - Anticoagulation
  - Volume depletion
  - Electrolyte disturbance
  - Uncontrolled diabetes
  - Uncontrolled heart failure
  - Correctable cardiac arrhythmia or ischaemia
  - Acute chest infection
  - Exacerbation of chronic chest conditions
- Planning the theatre team
  - Schedule hip fracture surgery on a planned trauma list
- Multidisciplinary management

  From admission, offer patients a formal, acute orthogeriatric assessment including:
  - Rapid optimization of fitness for surgery
  - Early identification of individual goals for multidisciplinary rehabilitation to recover mobility and independence (pre-fracture status)
  - Continued, coordinated, orthogeriatric and multidisciplinary review
  - Liaison or integration with related services (mental health, falls prevention, bone health, primary care and social services)
  - Consider early supported discharge
- Analgesia
  - Assess the patient's pain regularly as part of routine nursing observations
  - Offer immediate analgesia, and ensure adequacy to allow for movement and examinations (e.g. external rotation of the leg)
  - Offer paracetamol every 6 hours preoperatively unless contraindicated
  - Offer additional opioids if paracetamol alone is not sufficient
  - Consider adding nerve blocks if paracetamol and opioids do not provide sufficient preoperative pain relief, or to limit opioid dose. Nerve blocks should be administered by trained personnel. Do not use nerve blocks as a substitute for early surgery
  - Non-steroidal anti-inflammatory drugs (NSAIDs) are not recommended
- Anaesthesia
  - Offer patients a choice of spinal or general anaesthesia after discussing the risks and benefits
  - Consider intraoperative nerve blocks for all patients undergoing surgery

Source: National Institute for Health and Care Excellence (NICE). Clinical guideline 124: hip fracture. The management of hip fracture updated May 2017

Box 1

Neurological

Postoperative delirium is common in the elderly undergoing orthopaedic surgeries and often causes delay in rehabilitation. The Confusion Assessment Method for ICU (CAM-ICU) is a quick and easy way to screen for delirium and can be used to monitor progress. The causes are multifactorial. Reversible causes should be addressed such as electrolyte disturbance, hypothermia, hypoxia, pain, infection and drugs. Regional anaesthesia and good analgesia reduce the risk of postoperative delirium in the immediate postoperative period. If general anaesthesia is used, studies have shown that avoiding excessive depth of anaesthesia with processed EEG can reduce postoperative cognitive impairment.[6]

Preoperative cognitive impairment and functional status due to dementia or other neurodegenerative disease should be carefully assessed and documented as baseline. Elderly patients should be assumed to have the mental capacity to make decisions about their treatment and, although this may be compromised in some, they should be fully informed of their treatment options. Multidisciplinary care can be beneficial with input from geriatricians, neurologists, physiotherapists and occupational therapists.

Rheumatoid arthritis

A multidisciplinary approach is required to care for patients with rheumatoid arthritis (RA) in the perioperative period, involving respiratory, cardiac, renal and haematological specialists. These patients are often on NSAIDs, steroids and disease-modifying anti-rheumatic drugs that pose specific challenges to the anaesthesia and surgery. Careful assessment of the airway is necessary as the cervical spine is affected in 50% of patients. The neck should remain in a neutral position, especially on transfer, turning and airway manipulation. Regional techniques maybe difficult but can be useful. Strict asepsis with invasive procedures is necessary as there is an increased risk of infection.

Pain assessment

Good pain management is crucial in orthopaedic surgeries in facilitating rehabilitation. Pain is often underdiagnosed in elderly patients, especially in the presence of cognitive impairment and may well be chronic before surgery.[7] There are different pain assessment tools (e.g. visual analogue scale) that can be used for more accurate assessment and temporal charting. A multimodal analgesic plan according to the WHO analgesic ladder is recommended. Regional anaesthesia is an option that can reduce opioid consumption and side effects. If using short-acting regional anaesthesia without an infusion (e.g. subarachnoid block), then it is imperative to have a preventive analgesic plan for when the block starts to recede or ensuing pain can be severe. There is also some concern with lower limb peripheral nerve block infusions that may affect motor function and proprioception, making mobilization difficult and increasing the risk of falls. Care should be taken when administering certain analgesics such as NSAIDS (renal function, gastrointestinal bleeding), opioids (respiratory depression, ataxia, confusion) and gabapentinoids (ataxia) in elderly patients. Drug doses may need to be adjusted due to age-related changes in pharmacokinetics and pharmacodynamics.

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