Management of surgical procedures common in men. Part 2: orthopedic procedures

Keywords

Lumbar laminectomy

Lumbar spinal fusion

Shoulder arthroplasty

Hip arthroplasty

Knee arthroplasty

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Abstract

Musculoskeletal disorders and injuries are common in men and often result in the need for surgical procedures. Orthopedic procedures rank in the top ten of the most common surgerical procedures performed in men. This article outlines the surgical and anesthetic implications and management of common orthopedic surgical procedures including: lumbar laminectomy, lumbar spinal fusion, shoulder arthroplasty, hip arthroplasty, and knee arthroplasty.

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Introduction

Musculoskeletal disorders and injuries are the indication for the majority of surgical procedures performed in men. According to National Healthcare Statistics for 2006, musculoskeletal complaints ranked second among all symptoms that presented to physicians in the USA [1]. Nearly a quarter of all Americans have some orthopedic disorder. The diagnosis and treatment of these disorders costs the healthcare system nearly $850 billion (7.7% of the gross domestic product) yearly [1]. Common orthopedic surgical procedures in men include: lumbar laminectomy, lumbar spinal fusion, shoulder arthroplasty, hip replacement and knee arthroplasty. The purpose of this review is to outline the current surgical techniques, anesthetic options, and peri-operative management of these procedures.

Spinal surgery

Lumbar spinal back pain was listed as the number one reason that patients visited a physician between 1998 and 2004 [1]. Conditions such as spinal stenosis, herniated discs, and spondylolisthesis are known to disrupt the normal anatomical integrity of the spine. Any condition that alters the normal protective anatomy of the spine can cause pressure on surrounding nerves. When pressure is applied to nerves the patient experiences pain. Usually, nonsurgical medical treatment is sought for relief of this back pain initially. When that treatment fails to provide adequate pain relief, surgical treatment is considered. Back pain that is unresolved by nonsurgical medical treatment is the leading indication for lumbar spine surgical intervention [1]. Removal of the insulting tissue or bone should relieve the pressure and associated pain.

Lumbar laminectomy

Lumbar laminectomy is the complete removal of the lamina [2]. A 1 inch vertical midline incision is made at the targeted level. Tissue layers are traversed down to the level of suspected disease and the area of concern is confirmed by visual inspection and radiography. Microscopic visualization aids the surgeon in the removal of bone and/or disc material. The wound layers are sutured closed when hemeostasis is established and a drain may be placed in the epidural space. The morbidity

and mortality rates are <5% and 0.5%, respectively [3]. Surgical time is estimated at 1–2 hours for a single level with an additional 0.5–1 hour for each additional level [2]. Depending on the extent of the laminectomy, the surgeon may also perform a spinal fusion to protect the integrity and stability of the spine. Abnormal movement of the spine applies pressure to spinal nerves resulting in the patient experiencing pain. Such pain can be reduced or alleviated when the unstable area is immobilized.

Lumbar spinal fusion

Lumbar spinal fusion results in the immobilization of segments of the lumbar spine and is the treatment for chronic lower back pain, segmental lumbar instability, spondylolisthesis, and instability for extensive laminectomy or facetectomy [2]. A 1-inch posterior midline incision is made at the targeted level. The unstable area of the spine that is believed to be contributing to pain is fused together with the aid of plates and screws. The movement of the unstable spine segment is reduced or isolated in an attempt to resolve the associated pain. A posterior approach is most commonly used; however, more complex cases might require a combined anterior and posterior approach with instrumentation. Surgical time is estimated at 3–4 hours for single levels and an additional 1 hour for each additional level [2]. The wound layers are sutured closed once hemeostasis is established and a drain may be placed in the epidural space. The morbidity and mortality rates for this procedure are 10–20% and 0–5%, respectively [2].

Anesthetic options

General anesthesia is indicated for these procedures. However, the technique used may need to be varied if motor evoked potentials (MEPs) are being recorded. MEPs monitor the integrity of the descending motor pathway during neurosurgical or orthopedic procedures. Volatile agents (sevoflurane, desflurane and isoflurane) are known to interfere with MEPs and are best avoided or used in low doses [3]. Total intravenous anesthesia (TIVA) with propofol is the most appropriate technique to complement the use of MEP monitoring [4]. However, different anesthetic combinations should also be considered (Table 1). If the surgical procedure necessitates the patient being in the prone position, the use of a wire reinforced endotracheal (ET) tube should be considered to prevent tube kinking and occlusion [2]. Patient positioning (prone), surgical time and the potential for postoperative neurological damage limit the use of regional anesthesia.

Preoperative management

Patients presenting for spinal surgery often have associated medical conditions involving the respiratory, cardiovascular, musculoskeletal, and gastrointestinal systems. Patients with low back pain are significantly more likely to smoke, be overweight or obese, drink heavily and be diagnosed with depression, anxiety, and insomnia [5]. A thorough airway examination should be conducted to identify a potentially difficult airway. Pre-operative assessment should also include a thorough neurological examination to include any history of bowel or bladder dysfunction. Patients taking medications such as non-steroidal anti-inflammatory drugs (NSAIDs) and acetylsalicylic acid (ASA) at home for pain should be instructed to stop taking them at least 1 week prior to surgery [2]. If patients have been medically managed using steroid therapy within 6 months, an intra-operative dose of steroids should be administered. Complete blood count (CBC), prothrombin time (PT), partial thromboblastin time (PTT), and international normal-

Table 1 Recommendations for anesthetic technique for MEPs

Compatible agents	Incompatible agents
Opioids	Volatile inhalation agents
Etomidate	Neuromuscular blockade with loss of > 2 twitches in the train of four
Ketamine	Nitrous oxide >50%
Low-dose propofol	Induction doses of thiopental

Source: Karlet [4] p. 331 – with permission pending.