Complications of Arthroscopic Shoulder Surgery

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Abstract

Popularity of shoulder arthroscopy has increased with developments in arthroscopic surgical instruments, implants, and techniques. While improved ability to reliably treat various shoulder pathologies arthroscopically has resulted in increased utilization of the arthroscope, complications of arthroscopic surgery are no less devastating than after open shoulder surgery. The surgeon must be aware of potential risks to minimize complications associated with arthroscopic shoulder surgery.

Keywords

Complications · Infection · Thromboembolism · Fluid extravasation · Nerve injury

4.1 Introduction

Orthopedic surgery has undergone a revolution in the past 30 years with emphasis on minimally invasive techniques, decreasing morbidity, and enhancing speed of recovery [1–3]. Shoulder arthroscopy has seen an increase in popularity with advances in arthroscopic instruments, implants, and surgical techniques. As with any surgical procedures, and while different from open surgery, adverse events may occur during shoulder arthroscopy. With expanding indications and increasing complexity of procedures being performed arthroscopically, serious complications can and do error. While recognizing that there are unique complications related to specific type of procedure, there are general complications that can occur during and after any arthroscopic shoulder surgeries.

4.2 Preoperative Complications

After induction of anesthesia, surgery starts with careful patient positioning. The surgeon must be aware of injury to neurovascular structures and communicate with the team to ensure adequate padding to avoid injury to bony prominences.

In the lateral decubitus position, the surgical arm is held in a traction device. It is important to use the least amount of weight necessary to distract the glenohumeral joint and work efficiently to prevent prolonged strain on the brachial plexus. Iatrogenic brachial plexus injury is further exacerbated with head that is bent towards the contralateral side and extended cervical spine.

Pressure-induced brachial plexus palsies have also been described on the nonoperative side. It is important to utilize axillary rolls to reduce risk of such injuries. Similarly, peroneal nerve palsies have been reported with lateral decubitus positioning of patients. Prior to draping, the surgical team must pay particular attention to the peroneal nerve which sits subcutaneously, adjacent to the fibular head.

Beach chair position predisposes patients to other possible complications. Head that is secured in a holder, under excessive and prolonged compression, can result in injury to the posterior auricular nerve (branch of the facial nerve) [1]. Compression of the eyes must be avoided and protected foam goggles can prevent iatrogenic corneal abrasion during surgery.

Particularly in the obese patient population, lateral femoral cutaneous nerve palsies have been described with the beach chair position. Using wide safety straps and foam padding under the pannus can potentially mitigate such problems [4].

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4.3 Intraoperative Complications

Cases of ischemic brain damage in patients undergoing shoulder surgery in the beach chair position have been described. Cerebral perfusion pressure decreases by approximately 15% in the sitting position in the non-anesthetized patients and the cardiac output is further compromised by vasodilating anesthetic agents. While increased mean arterial pressure results in increased bleeding and decreased arthroscopic visibility, the surgeon must work with the anesthesiologist to avoid hypotension and decreased cerebral perfusion pressure [2, 5]. It is the author's preference to utilize regional anesthesia and intravenous tranexamic acid during arthroscopic shoulder surgery to reduce requirement of inhalational anesthetic agents, improve arthroscopic visibility, and prevent potential catastrophic neurologic outcome [6].

While axillary nerve injury from portal creation has been described, overall, neurologic injuries during shoulder arthroscopy are rare. During capsulolabral repair, there is a relatively safe margin for arthroscopic suture placement between the capsule and axillary nerve, when the sutures are placed within 1 cm from the glenoid rim [7]. As more complex procedures are being performed arthroscopically, it is imperative that the surgeon has a detailed understanding of the patient's anatomy to minimize nerve injuries. During procedures such as arthroscopic Laterjet, axillary/suprascapular nerve releases, and comprehensive arthroscopic management of glenohumeral osteoarthritis, the arthroscopist must work cautiously, paying special attention to detail while using instruments adjacent to nervous structures.

Although rare, excessive extravasation is a potentially life-threatening complication. Patients may experience swelling of the chest, neck, face, and airway compromise. Patient-related risk factors include obesity, older age, and looser subcutaneous soft tissue which can facilitate fluid shifting to extra-capsular space. Moreover, arthroscopic procedures involving resection of the glenohumeral capsule and subacromial surgery may lead to fluid dissection into surrounding tissues. Limited surgeon experience which can lead to use of higher pump pressure, larger volume of irrigation fluid, and longer cases has been described as risk factor for swelling as well. The surgeon must be cognizant of these patient and surgical factors when operating to avoid potentially catastrophic complications [8]. Most cases of clinical edema resolve with observation alone. Prior to extubation, patients should be assessed and if there are signs of fluid extravasation, surgeon and the anesthesiologist must consider delayed extubation until the edema resolves. In severe cases, patients may require transfer to the intensive care unit with administration of diuretics and steroids.

4.4 Postoperative Complications

Overall risk of deep infection after arthroscopic shoulder surgery is low. Risks factors for infection mirror that of other orthopedic procedures such as diabetes, smoking, immunocompromise, prior injection of steroid, obesity, and vasculopathy. Most surgeons recommend the administration of perioperative antibiotics in all-arthroscopic rotator cuff repairs, stating that it significantly reduces the overall risk of infection. However, there are no prospective studies comparing infection in patients who had prophylactic antibiotics versus those who did not prior to shoulder arthroscopy. With small incisions, constant lavage of fluid, short operating times, and minimal hardware implantation, there does not seem to be conclusive detriment in withholding antibiotics—at least in the low-risk patients undergoing shoulder arthroscopy [2, 9].

Conversely, the rate of infection increases substantially, if an arthroscopic procedure is converted to an open procedure or also involves separate open portion of the case (i.e., subpectoral open biceps tenodesis, arthroscopic assisted tendon transfers) [1, 10]. Repeating the surgical site preparation and changing gloves can reduce bacterial loads to minimize the risk of postoperative infection. Additionally, avoiding direct contact between implants and graft with the patient's skin by applying clean towels/drapes, such as during superior capsular reconstruction, can further reduce potential contamination.

Venothromboembolic (VTE) events are rare following shoulder arthroscopy [2, 11]. As such, additional pharmacologic prophylaxis is not routinely prescribed even in patients with risk factors (increased age, smoker, obesity, hypercoagulability) for thromboembolism. Antithrombotic prophylaxis and aspirin have not shown clinically significant reduction in deep vein thrombosis or pulmonary embolism in low-risk patients who are undergoing arthroscopic rotator cuff repair. Prevention of VTE disease is sufficiently managed through the use of mechanical prophylaxis during surgery and with early mobilization postoperatively. However, if VTE is diagnosed after shoulder arthroscopy, medical consultation with internist/hematologist is necessary to determine type and duration of anticoagulation therapy. While most VTE events do not necessarily result in any residual sequalae of the shoulder, development of adhesive capsulitis and delayed recovery have been reported as well.

4.5 Summary

In summary, complications can and do occur during shoulder arthroscopy. Such complications are not less severe or less devastating compared to open procedures. With broadening

indications and increasing complexity of procedures being performed arthroscopically, the surgeon must have detailed knowledge of associated risks to be able to prevent, recognize, and manage complications.

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