

Resurfacing Hemiarthroplasty in Patients with Shoulder Surgery

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Abstract

Shoulder surgery is associated with significant postoperative pain, but mobilization and physiotherapy often begin on the first postoperative day. Therefore, excellent postoperative analgesia is essential to provide a good functional recovery. A multimodal approach is required to achieve this. Analgesic options include: conventional oral and parenteral analgesia, inter-scalene analgesia or intra-articular analgesia with or without continuous infusion, or supra-scapular nerve block combined with local anaesthetic wound infiltration.

Keywords: Interscalene catheters; Shoulder arthroplasty; Adult rheumatoid; Bone-sparing; Corticosteroid injections; Upper limb

Introduction

Paracetamol should always regularly be prescribed as part of a multimodal approach; this can be started intra-operatively as a parenteral preparation is now available. Non-steroidal anti-inflammatory drugs are relatively contraindicated in the first 24h after surgery due to the increased risk of bleeding associated with this group of drugs [1]. However, they can be considered after this period if there is no other contraindication to their use. A strong opioid should be prescribed for the postoperative period, patient-controlled analgesia using morphine is entirely appropriate when regional techniques are not used. A useful alternative is oral oxycodone commenced on the first postoperative day [2]. A single-shot interscalene block is associated with shorter anaesthetic and surgical time, decreased blood loss, shorter stay in the recovery room, decreased postoperative opioid requirements and faster discharge from hospital. An interscalene block with bupivacaine provides analgesia for 15 h. Rescue analgesia, usually a strong opioid, must be available when the block regresses; as this is likely to occur overnight, a straightforward i.m. injection of opioid at this stage is appropriate.

Methodology

Perineural inter-scalene brachial plexus catheters with local anaesthetic infusions are becoming increasingly popular in the management of postoperative pain after shoulder surgery. Not only do they prolong postoperative analgesia, they are opioid-sparing and may reduce the unwanted side effects associated with these drugs [3]. Patients can be fully ambulant while using the simple elastomeric balloon pumps. The most commonly used local anaesthetic agents for infusion are levobupivacaine and ropivacaine, infused at low concentrations to avoid prolonged motor block. An additional patient controlled component may be useful to increase efficacy further and improve patient satisfaction, although this requires a more sophisticated infusion pump. Until recently, patients were required to stay in hospital for the duration of the infusion; however, recent work from specialist centres has shown that patients may be safely discharged from hospital with the catheters in situ, connected to simple, disposable elastomeric or electronic pumps. This requires excellent and easily accessible support after discharge [4]. Intra-articular injection with bupivacaine and morphine at the end of surgery provides useful pain control and reduces morphine consumption in the first 24 h after major shoulder surgery as shown in (Figure 1). A standard epidural kit can be used by the surgeon to insert a catheter into the sub-acromial bursa at the end of the procedure. A continuous postoperative intra-articular infusion of local anaesthetic can then be used to provide analgesia of

the joint, particularly after arthroscopic surgery [5]. However, analgesia can be disappointing compared with other techniques and dilution of local anaesthetic may be a significant factor in the reduced efficacy. The technique may be more effective if prilocaine and epinephrine are injected into the sub-acromial bursa before operation and then maintained after operation with a ropivacaine infusion. Supra-scapular nerve block can be a useful local analgesic supplement where interscalene block is either not technically possible or contraindicated [6]. The technique only blocks a proportion of the afferent input from the shoulder joint and is therefore substantially inferior to the interscalene block. In addition, it will not provide any cutaneous analgesia; therefore, it is usually combined with local anaesthetic infiltration of the incision site. The nerve is easily blocked, usually with the patient in the sitting position, with needle insertion site 1 cm above the mid-point of the scapular spine, at an angle perpendicular to the skin [7]. It is best performed with a peripheral nerve stimulator that will elicit contraction of muscles in the scapular area. The nerve is blocked with 10 ml of



Figure 1: Pain control and reducing morphine consumption.

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local anaesthetic solution and a catheter for continuous postoperative infusion can also be inserted if required. Whichever option is chosen, regional anaesthesia techniques can significantly reduce postoperative pain, which is often severe and limits early rehabilitation. They reduce opioid requirements, increase patient satisfaction and has the potential to improve functional outcome [8]. Inter-scalene block, particularly when continued as an infusion, is superior to other regional techniques, and i.v. PCA, and should be considered the technique of choice for the large majority of patients having shoulder surgery. In 1984 we reported on patients undergoing total shoulder arthroplasty with the Neer prosthesis between December 1975 and December 1979. In 1997 we reported on longer-term results of total shoulder arthroplasty with the Neer prosthesis in patients undergoing surgery between December 1975 and December 1980. For the purposes of this study, we re-reviewed a group of patients undergoing shoulder arthroplasty between 1975 and 1980 whose surgical treatment included the anteromedial approach to the shoulder as a routine part of arthroplasty and who were available for ongoing follow-up.

Discussion

The study proceeded after institutional review board approval. Quite strikingly, in this patient group, a stronger anterior deltoid postoperatively was significantly associated with less postoperative pain, greater postoperative active elevation, greater postoperative internal rotation, increased function of the limb for all 10 activities assessed, and an improved overall result rating. Certainly maintaining, if not increasing, postoperative deltoid strength is associated with favorable outcome parameters for total shoulder arthroplasty as shown in (Figure 2). Currently, the extended delto-pectoral approach is used for shoulder arthroplasty and seems to offer a great advantage in protecting the anterior portion of the deltoid muscle [9]. We do, though, continue occasionally to use the antero-medial approach. We surveyed a second more contemporary patient group including those undergoing shoulder arthroplasty between 1990 and 1994. In summary, there seem to be three major reasons for use of the anteromedial approach for shoulder arthroplasty. The first is for old trauma or revision shoulder arthroplasty in shoulders having had extensive previous surgery and having tight, stiff, and somewhat frail soft tissues associated with underlying bone deformity requiring correction [10]. The second is for protection of a very frail anterior deltoid that will not withstand retraction or for a patient with severe osteopenia of the humeral shaft to protect against iatrogenic fracture; these conditions most commonly occur in patients in rheumatoid arthritis. The third reason is for enhanced access to repairs of postero-superior rotator cuff tears done in conjunction with shoulder arthroplasty. We believe that these three factors will continue to be reasonable conditions in which to consider the antero-medial



Figure 2: Associated outcome parameters for total shoulder.

approach [11]. It seems impossible to deny the importance of the anterior deltoid in shoulder arthroplasty. Certainly, the extended delto-pectoral approach with preservation of the deltoid origin and the majority of the deltoid insertion is a positive step toward maintaining or enhancing postoperative deltoid function. In those unusual circumstances in which added exposure is needed, the antero-medial approach with careful attention to incision of the deltoid, careful repair of the origin, and appropriate postoperative rehabilitation can be used to accomplish the goal of maintaining anterior deltoid function and enhancing the success of shoulder arthroplasty. Arthroplasty options include stemmed or resurfacing hemi-arthroplasty or total shoulder arthroplasty. In the adult rheumatoid literature, arthroplasty results in significant pain relief regardless of prosthesis choice, and some series have included very small numbers of patients with JIA [12]. However, only 2 articles and 1 abstract have been published that are devoted to the outcome in patients with JIA, and all used stemmed humeral prostheses as part of a hemi-arthroplasty or total shoulder arthroplasty procedure. Surface replacement of the humeral head represents a bone-sparing alternative for these young patients. This study reports the outcome of resurfacing hemi-arthroplasty in a cohort of patients with JIA affecting the gleno-humeral joint. We retrospectively reviewed data gathered through routine clinical interaction with patients who underwent RHA of the gleno-humeral joint because of JIA at our institution. Patients were identified through an arthroplasty database [13]. Patients undergoing surgery for any other indication were excluded, as were patients in whom surgery had been performed less than 5 years earlier. Patients were referred to the senior author from a specialist rheumatology department after exhaustive medical management, including disease-modifying anti-rheumatic medication, physical therapy, and intra-articular corticosteroid injections. The indications for surgery were pain and loss of function with evidence of joint destruction on plain radiographs in patients whom nonsurgical management had not adequately controlled symptoms [14]. No patient had undergone a prior surgical procedure for their operated-on shoulder. At the time of the latest followup, patients had undergone a median of 4 primary and revision arthroplasties of other major joints in their lifetime, but only 1 patient had undergone ipsilateral upper limb arthroplasty. The same patient had also undergone a contralateral stemmed shoulder hemiarthroplasty, before the current study period, and contralateral total elbow replacement [15].

Copeland surface resurfacing hemiarthroplasty is a safe and effective intervention that significantly improves pain, range of motion, and function in the midterm for patients with end-stage arthritis of the shoulder due to JIA.

Conclusion

The outcome is at least equivalent to that of stemmed hemiarthroplasty, with the added benefits of bone conservation, easier revision, and mitigation of peri-prosthetic fracture. Surgeons and patients should be prepared for the particular technical difficulty and poorer outcome associated with significant humeral head erosion.

Acknowledgement

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Conflict of Interest

None

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