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Original article

Recovery after shoulder arthroscopy: Inpatient versus outpatient management

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ABSTRACT

Introduction: Shoulder arthroscopy is particularly suited to outpatient surgery, thanks to advances in anesthetic and analgesic techniques. The main goal of this study was to compare postoperative recovery after shoulder arthroscopy between outpatient and inpatient management.
Hypothesis: There is no difference in functional recovery between inpatient and outpatient management.
Materials and method: A single-center, single-operator prospective study was conducted. Both groups received patient-controlled analgesia via an interscalene catheter. The inclusion criterion was shoulder arthroscopy for rotator cuff tendinopathy. The choice between inpatient and outpatient management was left to the patient. The study endpoint was postoperative recovery assessed on QOR-15 at days 1, 2, 3, 4 and 7 and on Quick-DASH at 6 weeks.
Results: Forty-nine patients were included, divided into 2 groups. The outpatient (OP) and inpatient (IP) groups were comparable. Reconstructive surgery accounted for 54% of cases in OP versus 62% in IP. There was no significant difference in recovery in the first postoperative days (QOR-15) or at 6 weeks (Quick-DASH) ($p > 0.05$). Pain on visual analog scale (VAS) was significantly greater in OP after discharge home.
Discussion: No significant difference in postoperative recovery was observed between groups. Nevertheless, pain management and patient information for outpatients need improving.
Level of evidence: II, comparative study.

1. Introduction

Day surgery is on the rise: it reduces structural costs and nosocomial infection risk, and enables patients to return quickly to their normal environment, without reducing the quality of care [1].

The difficulty lies in managing pain [2] and the side effects of anesthetic and analgesic drugs [3]. Pain may lead to early re-consultation and readmission, increasing health-care costs [4].

Multimodal anesthesia techniques have been developed to improve postoperative analgesia [5–8], associating general and locoregional anesthesia and different analgesic classes. The aim is to reduce resort to opioids and anesthetic drugs, so as to reduce side effects [9].

In shoulder surgery, interscalene block [5,10–12] is often preferred to intra-articular [13,14] or subacromial injection [15,16].

Continuous interscalene block has proven superiority over a single injection, especially in terms of rebound at the end of local anesthetic action, with lower toxicity [12,17,18]. Interscalene catheter-controlled analgesia enables patients to regulate pain and achieve rapid recovery, without major complications [6,19,20].

Shoulder arthroscopy is a frequent and safe procedure [21] for numerous pathologies [22], and is suited to day-surgery [6,23], thanks to progress in pain management [2].

It reduces the rate of infection, limits surgical approaches and promotes rapid postoperative recovery.

Success depends on establishing a clinical pathway, requiring perfect coordination between anesthesiologist and surgeon, to inform and educate the patient, who thus becomes an actor in his or her treatment [24] thanks to rapid postoperative recovery [25,26].

A single-center, single-operator prospective study was conducted in February and March 2015. The main objective was to compare postoperative recovery after shoulder arthroscopy between outpatient and inpatient admission.

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The two groups were compared for pain on visual analog scale (VAS), complications rates and satisfaction.

The study hypothesis was that there is no difference in functional recovery between inpatient and outpatient management.

2. Material and methods

During a 2-month period, all patients receiving shoulder arthroscopy for tendinopathy of torn, untorn or calcified rotator cuff were included.

They received oral information on the study.

Two groups were distinguished: outpatients (OP) and inpatients (IP).

Distribution between the groups depended on the patient's choice and the feasibility of day-surgery.

Inclusion criteria comprised: shoulder arthroscopy for rotator cuff tendinopathy, age $\geq$ 18 years, and informed consent.

Exclusion criteria comprised: history of complex regional pain syndrome or of surgery in the affected shoulder.

Outpatients had to meet the eligibility criteria for day-surgery: understanding the protocol, adherence, accompanying person, residence < 1 hour from center, and American Society of Anesthesiologists (ASA) score $\leq$ 2.

Outpatients were required to come under the "home-hospitalization" (*Hospitalisation à Domicile* [HAD]) scheme required by the national health insurance system and the Order of Nurses, so as to be included in a health-care network. At the anesthesiology consultation, a prescription for discharge home was drawn up for step 1, 2 and 3 analgesics: systematic paracetamol and tramadol, and short-acting opioids on demand, without anti-inflammatory drugs.

Both groups had the same protocol of general anesthesia and patient-controlled analgesia via an interscalene catheter fitted for a few days. The type of surgical procedure was assumed not to affect the degree of pain.

Before surgery, the anesthetist fitted the perineural catheter under ultrasound control and surgical asepsis.

The puncture point was protected by an adhesive film (Fig. 1).

The ambIT^{TM} pump (GAMIDA, Eaubonne, France) was connected up to the catheter, with a baseline flowrate of 2–5 mL/h ropivacaine 2 mg/mL.

The catheter did not hinder antisepsis, draping or arthroscopy.

A dose of ketoprofen was administered intraoperatively.

On awakening, regular pain monitoring on VAS was performed. Analgesia was based on 3–5 mL boli in the pump, step 1 and 2 analgesics (tramadol) and opioids on demand.

Surveillance of locoregional anesthesia side effects tracked any sensory or motor impairment, dyspnea, dysphonia or Horner syndrome.

Baseline pump flowrate was adapted according to pain level and side effects.

Discharge was authorized by the surgeon and anesthesiologist if Chung score criteria were met [27]. Whatever the type of surgery, the patient was given a local anesthesia prescription of 2.5% ropivacaine for the ambIT pump, a self-rehabilitation schedule, explained by the physiotherapist, and an arm-to-body immobilization sling. Inpatients received the same rehabilitation protocol, with daily physiotherapy visits.

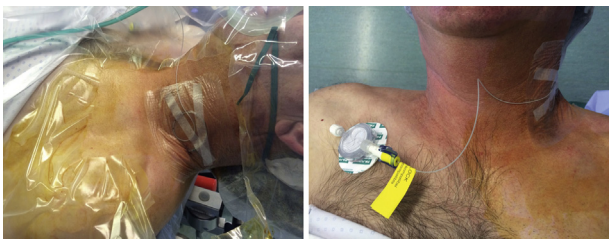

Fig. 1. Fitting interscalene catheter.

After discharge home, the HAD home-hospital service provided at least 4 days' care. The baseline pump flow was stopped on day 3 and the catheter was withdrawn on day 4.

The HAD staff assessed pain, and checked absence of complications relating to the catheter (displacement, side effects) and surgery site.

Inpatients received a second dose of non-steroidal anti-inflammatory drugs (NSAIDs) the first postoperative evening. Surveillance and the rest of the analgesia and rehabilitation protocol were similar to those in the outpatient group.

Scheduled hospital stay was 2 days, with catheter withdrawal at discharge.

Postoperative recovery was assessed preoperatively and on days 1, 2, 3, 4 and 7, on the QOR-15 questionnaire [28], the short form of the QOR-40 [29] self-administered questionnaire on quality of recovery after anesthesia and surgery. At 6 weeks, the surgeon administered the Quick-DASH and satisfaction score.

Pain was assessed by the surgeon based on the VAS, opioid intake and any emergency consultation within 6 weeks.

Satisfaction was graded 0–10 on VAS by the patient.

Complications and side effects were inventoried in the two groups.

Statistical analysis used R software (R Core Team, 2014).

Alpha risk was set at 5%.

Normal distribution was checked on Shapiro–Wilk test.

Normally distributed variables were analyzed on Student test; otherwise, the non-parametric Mann–Whitney–Wilcoxon and Fisher exact tests were used.

3. Results

The continuous series comprised 49 patients: 28 OP and 21 IP. The two groups were statistically comparable, except for surgical indications for calcification ($p = 0.03$), and showed normal distribution (Table 1).

There was no significant intergroup difference in mean QOR-15 score (Fig. 2, Table 2), or in Quick-DASH at 6 weeks (Fig. 3).

Table 1
Series characteristics.

	Inpatients	Outpatients	Intergroup differences
Number of patients	21	28	
Mean age	57 years (43–51)	53 years (34–71)	$p = 0.16$
Gender	52.38% female 47.62% male	50% female 50% male	$p = 1$
BMI	26.99	28.77	$p = 0.42$
ASA score	57.14% ASA1	78.57% ASA1	$p = 0.13$
	33.33% ASA2	21.43% ASA2	$p = 0.32$
	9.52% ASA3	0% ASA3	$p = 0.19$
Dominant side involvement	71.43%	61.54%	$p = 0.55$
Types of surgery			
Cuff repair	11 (52%)	14 (50%)	$p = 1$
Cuff repair + acromion + acromioclavicular reconstruction	2 (10%)	1 (4%)	$p = 0.57$
Acromion + acromioclavicular reconstruction	4 (19%)	3 (11%)	$p = 0.44$
Isolated acromion reconstruction	4 (19%)	4 (14%)	$p = 0.71$
Calcification	0 (–)	6 (21%)	$p = 0.03$

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