Orthopaedics & Traumatology: Surgery & Research xxx (xxxx) xxx

Contents lists available at ScienceDirect

Orthopaedics & Traumatology: Surgery & Research

journal homepage: www.elsevier.com

Original article

Outpatient shoulder prostheses: Feasibility, acceptance and safety

Caroline Cointat [a], Marc Olivier Gauci [a], Michel Azar [a], Laurie Tran [c], Christophe Trojani [a,b], Pascal Boileau [a,*]

[a] *Unité de recherche clinique Côte d'Azur (UR2CA), service de chirurgie orthopédique et chirurgie du sport, institut universitaire locomoteur et du sport (iULS), CHU de Nice, hôpital Pasteur 2, 30, voie Romaine, 06001 Nice, France*
[b] *Groupe Kantys, institut de chirurgie réparatrice locomoteur et du sport (ICR), 7, avenue Durante, 06000 Nice, France*
[c] *Service d'anesthésie-réanimation, institut Arnault-Tzanck, 171, rue du Commandant Gaston-Cahuzac, 06700 Saint-Laurent-du-Var, France*

ARTICLE INFO

Article history:
Received 4 April 2020
Accepted 26 October 2020
Available online xxx

Keywords:
Shoulder arthroplasty
Anatomic shoulder arthroplasty
Reverse shoulder arthroplasty
Outpatient surgery

ABSTRACT

Introduction: Outpatient surgery in France is defined by the national authority for health (HAS) as a scheduled surgery enabling same-day discharge without any increased risk to the patient. With the advent of enhanced recovery after surgery, outpatient lower limb arthroplasty has become a common procedure. However, only 1.1% of knee arthroplasties in France were performed on an outpatient basis in 2017.
Objectives: 1) assess early morbidity and mortality after outpatient shoulder arthroplasties to validate eligibility and safety criteria; and 2) assess patient acceptance of outpatient surgery.
Methods: A single-center study with the following inclusion criteria: primary shoulder arthroplasty, American Society of Anesthesiology (ASA) score I or II, no cognitive impairment, and no coronary artery or thromboembolic diseases. Analgesia was provided by bupivacaine via a peripheral nerve catheter in the first 72 hours followed by oral analgesics. Patients were discharged if the post-anesthetic discharge scoring system (PADSS) was > 9/10 and the visual analog scale (VAS) was < 5/10. Postoperative telephone interviews were carried out on D1, D2 and D3 to assess pain with the numerical rating scale and to collect data on their analgesic consumption. All patients were seen by an independent observer at one and six months for a clinical and radiologic follow-up and at 90 days during a consultation with the senior surgeon. The primary endpoint was the 90-day morbidity and mortality rate (readmissions, rehospitalizations, and minor and major complications). A satisfaction questionnaire was collected at one and six months.
Results: Thirty-six patients were offered an outpatient shoulder arthroplasty between February 2016 and February 2018: 12 (33%) refused with no valid reasons and 24 patients agreed to the procedure (seven hemiarthroplasties, nine anatomic shoulder arthroplasties and eight reverse shoulder arthroplasties). The mean age at surgery was 70 years (55–82), mean body mass index (BMI) was 26 (21–32) and 14 patients were ASA II (66%). Three patients (12%) refused same-day discharge despite a PADSS score > 9/10 and adequate pain management. Two patients (8%) were not discharged home on the same day as the surgery for medical reasons (one for pain and one for high blood pressure). No readmissions or complications were reported for the 19 outpatient arthroplasties. None of the outpatients used opioids. All patients were satisfied with their functional outcome, 84% were satisfied with the outpatient management and 17% felt they were insufficiently monitored and regretted that they were not hospitalized.
Conclusions: 1) outpatient shoulder arthroplasty can be safely proposed to selected patients with low comorbidities, regardless of their age and type of implant; 2) the acceptance rate for outpatient shoulder arthroplasty remained low among our patient population. These results should incite us to better educate patients about outpatient surgery.
Level of evidence: IV; retrospective study.

* Corresponding author.
E-mail address: pr.boileau@icr-nice.com (P. Boileau).

https://doi.org/10.1016/j.otsr.2021.102913
1877-0568/

1. Introduction

Outpatient surgery in France is defined by the national authority for health (HAS) as a scheduled procedure performed under technical conditions requiring the safety of an operating room and anesthesia, followed by postoperative monitoring enabling same-day discharge, without any increased risk to the patient. Outpatient surgery is associated with earlier patient rehabilitation. It is part of the enhanced recovery after surgery pathway [1], also known as fast-track surgery [2], with a multimodal pain management that enables a faster functional recovery.

Many studies have demonstrated the feasibility, safety and cost savings associated with outpatient knee [3–5] and hip [6] arthroplasties in an appropriately selected population. In France, only 1.1% of knee arthroplasties were performed on an outpatient basis in 2017 [7]. In the United States, outpatient arthroplasties are common procedures with good published results. However, American and French economic systems are different and their definition of "outpatient surgery" vary [8–13]. Although well documented for knee and hip arthroplasties [5,14,15], the literature on outpatient shoulder arthroplasties remains poor. European studies mainly focus on anatomic arthroplasty registries with no clinical follow-up or patient satisfaction assessment, even though it is now well established that shoulder arthroplasty (regardless of the type of prosthesis) is a common, standardized procedure [16] with few complications [17] and shorter hospitalizations [18]. A few recent studies, mainly focusing on anatomic shoulder arthroplasty registries, have shown the advantages of outpatient shoulder arthroplasties in terms of safety, feasibility [8–13,19] and socioeconomic benefits [20].

According to a HAS report, the rate of orthopedic surgery performed in France on an outpatient basis was 38% in 2015. Over 6000 shoulder arthroplasties were performed in France in 2017 and 3594 of these were coded level 1 according to the national diagnosis-related group system, i.e. patients with few comorbidities. This means that half of the shoulder arthroplasties in France could have possibly been performed on an outpatient basis. Even though surgeons are being encouraged to offer outpatient shoulder arthroplasties, conditions still need to be defined and we need to see whether patients are willing to accept this type of procedure.

The main purpose of this study was to assess the feasibility and safety of outpatient shoulder arthroplasties, regardless of their type (anatomic, reverse or hemiarthroplasties), by analyzing early morbidity and mortality (within the first 90 days) in selected patients. The secondary objectives were to assess pain management and satisfaction in patients who underwent an outpatient procedure. We hypothesized that any type of outpatient shoulder arthroplasty could be performed safely in selected patients, ASA I or II, regardless of their age, and that patients would readily accept this procedure.

2. Materials and methods

2.1. Study protocol

This was a retrospective single-center clinical study with prospective data collection. Outpatient eligibility criteria for shoulder arthroplasties were defined in close collaboration between the anesthesiology and surgical teams at our center, based on the French Society of Anesthesia and Intensive Care Medicine (SFAR) 2009 updated criteria.

We included all patients who were operated on by a senior surgeon specialized in the shoulder, for a primary arthroplasty (anatomic, reverse or partial), with an ASA score of I or II, and a preoperative hemoglobin level greater than 12 g/dL. We excluded patients who had shoulder revisions, coronary artery disease, obstructive pulmonary disease, cognitive impairment or a history of thromboembolic events. We also excluded patients who lived alone at home and did not have someone to stay with them during the first postoperative night or who lived 100 km or more from the nearest hospital. We did not set a limit on body mass index (BMI) or age; regarding the patient's physiological age (ASA score) rather than their actual age.

2.2. Outpatient education

Every stage of the pathway was explained to the patient three times, by the surgeon, the anesthesiologist and the trained nursing care coordinator. This nurse was also in charge of giving the patient and the accompanying person an outpatient passport, i.e. the signed written explanatory documents. Patients watched an animated video on a tablet computer that explained what a typical day entailed and how to put on the shoulder sling. A nurse specialized in the management of postoperative perineural catheters was also scheduled.

2.3. Endpoints

The primary endpoint was the 90-day morbidity and mortality rate which was assessed by identifying all readmissions, rehospitalizations, complications, and emergency medical consultations. The secondary endpoints were patient acceptance rate of outpatient surgery and patient satisfaction rate assessed by a questionnaire that was completed either during the consultation at one and six months or by phone.

2.4. Surgical and postoperative protocols

All procedures were performed by the senior surgeon (PB) via the deltopectoral approach in the beach chair position. These procedures involved anatomic, reverse or hemiarthroplasties. No surgical drains were used. Patients were immobilized in a neutral rotation sling for one month postoperatively. Self-rehabilitation with pendulum exercises was started once the perineural catheter was extracted, and rehabilitation with a physiotherapist when the sling was removed. A physiotherapist met with patients before they were discharged to teach them pendular exercises and show them how to put on the sling on their own.

2.5. Anesthetic and analgesic protocols

The procedure was performed under general and locoregional anesthesia with 0.2% bupivacaine administered through an interscalene catheter that was placed under ultrasound guidance. After the first initial block, patients used the catheter to self-administer boluses as needed. Patients were discharged home after a visit from the surgeon and the anesthesiologist, if Chung's post-anesthetic discharge scoring system (PADSS) [21,22] was greater than nine and if pain was adequately controlled with a visual analog scale (VAS) of < 5/10. Prescriptions for paracetamol, ibuprofen 400 mg, tramadol hydrochloride 50 mg and nefopam 20 mg were given to patients who had no contraindications. Patients were also given a prescription for morphine (oxycodone hydrochloride 5 mg) in case the pain was not relieved. In the presence of contraindications, an equivalent analgesic dose was prescribed where possible. Once discharged home, specifically trained nurses checked the perineural catheter twice a day and was finally removed on D3.

2.6. Data collection

The data regarding readmissions, length of hospitalizations and operating times were obtained with the Clinicom® (V2019)

Table 1
Epidemiological characteristics of the 24 patients who underwent outpatient shoulder arthroplasties.

Patients	$n = 24$
Age at the time of surgery (years)	70 (55–82)
Male	13/24 (54%)
Smokers	1 (4%)
Diabetes	3 (12.5%)
BMI (kg/m^2)	26 (21–32)
ASA score	
ASA I	8 (34%)
ASA II	16 (66%)
Types of shoulder prostheses	24
Hemiarthroplasty	7 (30%)
Anatomic total shoulder arthroplasty	9 (37%)
Reverse total shoulder arthroplasty	8 (33%)
Operating time	62 min (50 to 75)
Average length of outpatient stay	9 hrs

software and clinical data with the Ortho+® (V17) software. Telephone interviews were conducted during the first three postoperative days to assess patient pain (numerical rating scale) and analgesic consumption (tramadol, morphine and the number of bupivacaine boluses). Patients were also asked to self-report in a daily pain diary. A patient satisfaction survey was carried out regarding the procedure and outpatient management one month after surgery. Patients were seen one month after the procedure for a clinical and radiographic examination by the physics and rehabilitation physician, at three months for a consultation with the senior surgeon and at six months by an independent examiner (CC).

2.7. Statistical analysis

The intra- and postoperative variables were determined using GraphPad Prism® software (version 7.00, La Jolla, California, USA). The categorical data were expressed as percentages and the standard deviation was obtained from the confidence intervals. A $p < 05$ was considered significant.

3. Results

3.1. Population

Over a two-year period (between 02/2016 and 02/2018), 24 patients with low comorbidities (ASA I or II) were scheduled for an outpatient shoulder arthroplasty. Different types of prostheses were evenly distributed across this study population: nine anatomic, eight reverse and seven hemiarthroplasties. The average length of stay for an outpatient procedure was nine hours, with patients admitted to the outpatient unit between 6 and 6:30 a.m. and discharged the same day at around 3 p.m. The epidemiological characteristics of our cohort are summarized in Table 1.

3.2. Outpatient protocol failures

Of the 24 included patients, 19 arthroplasties were finally performed on an outpatient basis (Table 2). Five patients failed same-day discharge and remained overnight: three patients medically fit for discharge (PADSS score > 9/10) refused to leave on the same day because of asthenia, with no medical or social reasons for a prolonged stay, and a mean age of 75 years (82–69). Two patients were not discharged for medical reasons: a 66-year-old male patient who underwent a hemiarthroplasty had inadequate pain management (nonfunctioning catheter during the immediate postoperative period) and a 72-year-old female patient, who underwent a reverse arthroplasty, had hard-to-control

Table 2
Outpatient protocol failures.

Outpatient management failures/operated patients	$n = 24$
Discharge contraindicated for medical reasons Poorly controlled pain = 1 HBP = 1	2/24 (8%)
Rehospitalization within 90 days postoperatively for medical reasons	0
Postoperative discharge refusal/Patient medically fit for discharge	3/24 (12.5%)

postoperative hypertension. None of the patients were rehospitalized, for medical or surgical reasons, within 90 days of discharge.

3.3. Refusal of outpatient surgery

We initially offered outpatient surgery to 36 patients during this period and 12 of them (33%) refused the outpatient pathway from the start, out of personal convenience, with no medical or social reasons, and were therefore excluded from the study. The main reason for refusing was “fear of pain.”

3.4. Complications and revisions

There were no rehospitalizations, revisions, reoperations or emergency room visits within 90 days of discharge. No major complications were reported among the 19 outpatient arthroplasties.

3.5. Results according to the type of prosthesis

No significant differences in early morbidity and mortality were found between the different types of arthroplasties. Out of the five outpatient failures there were two anatomic arthroplasties, two reverse arthroplasties and one hemiarthroplasty.

3.6. Postoperative pain management

Patients were relieved with a perineural catheter and none of them required oral morphine. There was a significant decrease in bolus intake of bupivacaine and a decrease in tramadol consumption during the first three postoperative days (Fig. 1).

3.7. Patient satisfaction

Every patient who underwent an outpatient shoulder arthroplasty was satisfied with the surgery at one and six months, and the satisfaction rate with the outpatient management was 84% (satisfied or very satisfied). However, only 75% of these patients recommended outpatient surgery. The two main reasons why they were not recommending this procedure were pain and apprehension of discharge.

4. Discussion

Based on our findings we concluded that: 1) outpatient shoulder arthroplasties can be performed safely in selected patients, regardless of their age and the type of implant (anatomic, reverse, total or hemiarthroplasties); and 2) this type of surgical management remains poorly accepted by French patients, with a refusal rate of 33% for first-line procedure in our study.

Our first hypothesis was verified: outpatient shoulder arthroplasties can be performed on a selected population, with no increased risk to the patients. There were no readmissions, major complications or reoperations reported in our cohort of 24 selected

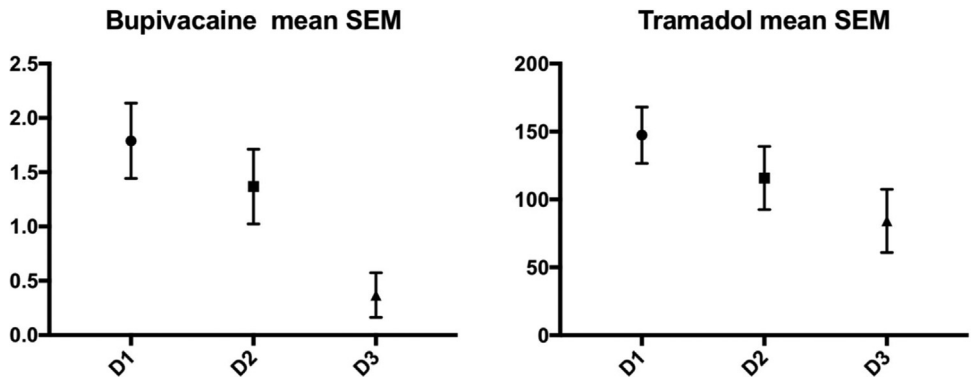

Fig. 1. Intake of bupivacaine boluses and tramadol during the first three postoperative days. For bupivacaine (1.8 ± 0.4 bolus D1 vs. 0.4 ± 0.2 bolus D3, $p = .0339$ and 1.4 ± 0.3 bolus D2 vs. 0.4 ± 0.2 bolus D3 $p = 0009$). For tramadol (140 ± 20 mg D1 vs. 84 ± 20 mg D3 $p = 1482$).

patients. There were no cases of early mortality 90 days after outpatient shoulder arthroplasty and only one case of morbidity (hematoma). Only two patients had to remain hospitalized for medical reasons: one for poorly controlled postoperative pain and the other for hypertensive crisis. Our eligibility criteria were therefore verified: outpatient shoulder arthroplasties can be safely offered to a homogeneous group of patients, with or without low comorbidities (ASA I or II). In the end, 84% of patients were satisfied with the outpatient management and they were all satisfied with the functional outcome of the shoulder six months after surgery. Our findings supported the data found in the literature: outpatient shoulder arthroplasty can be considered a reliable and safe procedure in selected patients [8,11,12,23,24]. Brolin et al. reported a 90-day complication rate of around 10%, which was higher than our series, and comparable between the 30 outpatients and 30 inpatients [13].

4.1. Selection criteria

Our selection criteria were consistent with recently published studies [10]. Unlike some American registry-based studies [13,17,19,25,26], we did not select our patients according to their age or BMI. An age limit of 70 years is found in the literature [10]. However, one third of the patients (9/24) in our series were 75 and older, and our oldest patient was 82 years old. Our main eligibility criterion was the ASA score, which reflects the rate of comorbidities and, in a way, the physiological age of patients rather than their actual age.

4.2. The different types of prostheses

Unlike previous studies, which were mainly registry-based and focused on anatomic prostheses [11,12,20,23,24], all the patients in our series underwent a clinical follow-up and the type of prosthesis was not a deciding factor for selection: we performed anatomic, reverse, total and hemiarthroplasties on an outpatient basis. The rate of complications was similar for all types of prostheses and while most studies have demonstrated the feasibility of performing outpatient anatomic shoulder arthroplasties, very few have assessed reverse arthroplasties [27–29] and none have studied hemiarthroplasties. Our study showed that outpatient management could be offered even in the context of a reverse prosthesis and hemiarthroplasty.

4.3. Acceptance of outpatient surgery and the different healthcare systems

Our second hypothesis was not verified: in France, patient acceptance of outpatient surgery remains low. A third of eligible patients (12/36) refused this type of surgical management preferring a conventional hospitalization. In our series, three of the 24 patients who underwent an outpatient procedure (12.5%) were "anxious about going home the same day as the surgery and being in pain" and therefore refused to be discharged and were hospitalized overnight.

The fear of spending the first postoperative night without medical assistance is the main reason why patients refuse this type of procedure; hence, the need for good preoperative education and preparation. Outpatient surgery is more accepted in the United States because it is associated with cost savings for the patient. Our series reported an 84% satisfaction rate for outpatient management. During this period, 124 patients who underwent shoulder arthroplasties in our center could have been eligible for an outpatient management according to our criteria, which would have been a source of savings. Our findings showed that the current French social security healthcare system does not encourage patients to seek outpatient management. This should compel us to develop outpatient education and improve their preparation (patients as partners) to increase their acceptance of this type of surgical management, particularly through consultations with physiotherapists, rehabilitation doctors and trained nursing care coordinator, and through patient testimonies. These findings also raised the issue of a lack of a standard definition of outpatient surgery, which differs depending on the country. Whereas in the United States, outpatient surgery is considered a full-day hospitalization (24 hours), in France it is limited to a half-day (12 hours). Patient acceptance rate would likely be higher in France if outpatient surgery were defined as a 24-hour hospitalization (one night). Patients would probably more readily accept a procedure that was performed in the afternoon with one night of observation and a discharge the next morning.

4.4. Analgesic protocol

It has been demonstrated that perineural catheters [30] and interscalene blocks [31,32] offer effective pain management following outpatient shoulder arthroplasties. However, some centers do not use locoregional anesthesia [9] or a simple interscalene block, to avoid rebound pain when the catheter is removed. The perineural catheter, although initially anxiety-provoking, is rapidly accepted by patients who appreciate the pain relief it provides 12 hours after surgery. We chose to first administer bupivacaine via a perineural catheter followed by step 1 and 2 oral analgesics in anticipation of rebound pain when the catheter is removed. Only one patient in our study was hospitalized overnight for pain management. There is little information on analgesia in the literature because most of the studies are registry-based. An interscalene block of bupivacaine is the most common [28].

4.5. Study limitations

This study had a number of limitations: short follow-up (D90 and six months), small sample size, and no control group. Nevertheless, it is the first French study assessing the feasibility, acceptance and safety of outpatient shoulder arthroplasties within the French healthcare system. Age and the type of shoulder prosthesis (anatomic, reverse, total or hemiarthroplasties) were not used as selection criteria in our study.

5. Conclusion

Outpatient shoulder arthroplasties can be safely offered to selected patients, with or without minor comorbidities. Age and type of prostheses (anatomic, reverse, total or hemiarthroplasties) are not limiting factors for outpatient management. However, our study showed that a significant number of patients are still reluctant to be treated on an outpatient basis. These results should encourage us to develop outpatient education and preparation.

Disclosure of interest

M. O. Gauci: consultant at Wright Medical.
P. Boileau: consultant, royalties, Wright Medical.
The authors C. Cointat, Michel Azar, L. Tran and C. Trojani declare that they have no competing interest.

Funding

No funding for this study.

Contribution

C. Cointat wrote the article, performed patient follow-ups, and collected and analyzed data.
M. O. Gauci revised the article.
Michel Azar revised the article.
L. Tran developed the anesthesia protocol.
C. Trojani coordinated the study and edited the article.
P. Boileau performed the surgical procedures, established the study protocol, wrote and revised the article.s

References

[1] Faujour V, Slim K, Corond P. The future, in France, of enhanced recovery after surgery seen from the economical perspective. Presse Med Paris Fr 2015;44:e23–31.
[2] Nanavati AJ, Prabhakar S. Fast-track surgery: toward comprehensive perioperative care. Anesth Essays Res 2014;8:127–33.
[3] Hoorntje A, Koenraadt KLM, Boevé MG, van Geenen RCI. Outpatient unicompartmental knee arthroplasty: who is afraid of outpatient surgery? Knee Surg Sports Traumatol Arthrosc 2017;25:759–66.
[4] Berger RA, Kusuma SK, Sanders SA, Thill ES, Sporer SM. The feasibility and perioperative complications of outpatient knee arthroplasty. Clin Orthop 2009;467:1443–9.
[5] Pollock M, Somerville L, Firth A, Lanting B. Outpatient total hip arthroplasty, total knee arthroplasty, and unicompartmental knee arthroplasty: a systematic review of the literature. JBJS Rev 2016:4, http://dx.doi.org/10.2106/JBJS.RVW.16.00002.
[6] Kelly MP, Calkins TE, Culvern C, Kogan M, Della Valle CJ. Inpatient versus outpatient hip and knee arthroplasty: which has higher patient satisfaction? J Arthroplasty 2018;33:3402–6.
[7] Cassard X, Garnault V, Corin B, Claverie D, Murgier J. Outpatient total knee arthroplasty: readmission and complication rates on day 30 in 61 patients. Orthop Traumatol Surg Res OTSR 2018;104:967–70.
[8] Charles MD, Cvetanovich G, Sumner-Parilla S, Nicholson GP, Verma N, Romeo AA. Outpatient shoulder arthroplasty: outcomes, complications, and readmissions in 2 outpatient settings. J Shoulder Elbow Surg 2019;28:S118–23.
[9] Bean BA, Connor PM, Schiffern SC, Hamid N. Outpatient shoulder arthroplasty at an ambulatory surgery center using a multimodal pain management approach. J Am Acad Orthop Surg Glob Res Rev 2018;2:e064.
[10] Fournier MN, Brolin TJ, Azar FM, Stephens R, Throckmorton TW. Identifying appropriate candidates for ambulatory outpatient shoulder arthroplasty: validation of a patient selection algorithm. J Shoulder Elbow Surg 2019;28:65–70.
[11] Leroux TS, Zuke WA, Saltzman BM, Go B, Verma NN, Romeo AA, et al. Safety and patient satisfaction of outpatient shoulder arthroplasty. JSES Open Access 2018;2:13–7.
[12] Leroux TS, Basques BA, Frank RM, Griffin JW, Nicholson GP, Cole BJ, et al. Outpatient total shoulder arthroplasty: a population-based study comparing adverse event and readmission rates to inpatient total shoulder arthroplasty. J Shoulder Elbow Surg 2016;25:1780–6.
[13] Brolin TJ, Mulligan RP, Azar FM, Throckmorton TW. Neer Award 2016: outpatient total shoulder arthroplasty in an ambulatory surgery center is a safe alternative to inpatient total shoulder arthroplasty in a hospital: a matched cohort study. J Shoulder Elbow Surg 2017;26:204–8.
[14] Tran L, Barthelemy M, Boileau P, Raucoules-Aime M, Carles M, Trojani C. Sciatic nerve block or not for outpatient total knee arthroplasty? Study protocol for a randomized controlled trial. Trials 2019;20:30.
[15] Ruiz N, Buisson X, Filippi G, Roulet M, Robert H, Orthopedics and Traumatology Society of Western France (SOO). Ambulatory unicompartmental knee arthroplasty: short outcome of 50 first cases. Orthop Traumatol Surg Res OTSR 2018;104:961–6.
[16] Day JS, Lau E, Ong KL, Williams GR, Ramsey ML, Kurtz SM. Prevalence and projections of total shoulder and elbow arthroplasty in the United States to 2015. J Shoulder Elbow Surg 2010;19:1115–20.
[17] Griffin JW, Hadeed MM, Novicoff WM, Browne JA, Brockmeier SF. Patient age is a factor in early outcomes after shoulder arthroplasty. J Shoulder Elbow Surg 2014;23:1867–71.
[18] Dunn JC, Lanzi J, Kusnezov N, Bader J, Waterman BR, Belmont PJ. Predictors of length of stay after elective total shoulder arthroplasty in the United States. J Shoulder Elbow Surg 2015;24:754–9.
[19] Brolin TJ, Throckmorton TW. Outpatient shoulder arthroplasty. Orthop Clin North Am 2018;49:73–9.
[20] Steinhaus ME, Shim SS, Lamba N, Makhni EC, Kadiyala RK. Outpatient total shoulder arthroplasty: a cost-identification analysis. J Orthop 2018;15:581–5.
[21] Chung F. Discharge criteria – a new trend. Can J Anaesth J Can Anesth 1995;42:1056–8.
[22] Massa H, Hubert S, Carles M, Raucoules-Aimé M. Anesthésie du patient ambulatoire. EMC n.d. 2010.
[23] Basques BA, Erickson BJ, Leroux T, Griffin JW, Frank RM, Verma NN, et al. Comparative outcomes of outpatient and inpatient total shoulder arthroplasty: an analysis of the Medicare dataset. Bone Jt J 2017;99–B:934–8.
[24] Brolin TJ, Cox RM, Zmistowski BM, Namdari S, Williams GR, Abboud JA. Surgeons' experience and perceived barriers with outpatient shoulder arthroplasty. J Shoulder Elbow Surg 2018;27:S82–7.
[25] Menendez ME, Baker DK, Fryberger CT, Ponce BA. Predictors of extended length of stay after elective shoulder arthroplasty. J Shoulder Elbow Surg 2015;24:1527–33.
[26] Arshi A, Leong NL, Wang C, Buser Z, Wang JC, Vezeridis PS, et al. Relative complications and trends of outpatient total shoulder arthroplasty. Orthopedics 2018;41:e400–9.
[27] Gregory JM, Wetzig AM, Wayne CD, Bailey L, Warth RJ. Quantification of patient-level costs in outpatient total shoulder arthroplasty. J Shoulder Elbow Surg 2019;28:1066–73.
[28] Tansey RJ, Almustafa M, Hammerbeck H, Patil P, Rashid A, George Malal JJ. Reverse shoulder replacement: a day-case procedure. JSES Int 2020;4:397–9, http://dx.doi.org/10.1016/j.jseint.2020.01.001.
[29] Antonacci CL, Cu BJ, Erickson BJ, Vazquez O, Alberta FG. Complications and readmissions after reverse and anatomic total shoulder arthroplasty with same-day discharge. J Am Acad Orthop Surg 2020, http://dx.doi.org/10.5435/JAAOS-D-20-00245.
[30] Gallay SH, Lobo JJA, Baker J, Smith K, Patel K. Development of a regional model of care for ambulatory total shoulder arthroplasty: a pilot study. Clin Orthop 2008;466:563–72.
[31] Shah A, Nielsen KC, Braga L, Pietrobon R, Klein SM, Steele SM. Interscalene brachial plexus block for outpatient shoulder arthroplasty: postoperative analgesia, patient satisfaction and complications. Indian J Orthop 2007;41:230–6.
[32] Ilfeld BM, Wright TW, Enneking FK, Mace JA, Shuster JJ, Spadoni EH, et al. Total shoulder arthroplasty as an outpatient procedure using ambulatory perineural local anesthetic infusion: a pilot feasibility study. Anesth Analg 2005;101:1319–22.