Ambulatory Open Shoulder Surgery

By Raymond A. Sachs, MD
Jennifer H. Smith, BS

Introduction: During 1995, a coordinated orthopedic/anesthesia protocol was used on 100 consecutive patients having ambulatory open shoulder surgery. These patients had either Bankart repair, open acromioplasty, or rotator cuff repair. Ages ranged from 15 to 92 years. Anesthesia technique included induction with propofol (Diprivan), and minimization of intraoperative narcotics. Patients were injected with 60 mg ketorolac tromethamine (Toradol) 15 to 30 minutes before the conclusion of surgery, and wound edges were injected with 10 to 20 ml of 1% Marcaine with epinephrine at closure. Strong oral pain medication, usually including Percocet, was provided to each patient on discharge. Data were collected during the recovery room stay, and a nurse called each patient 3-12 months postoperatively.

Results: Ninety-seven percent of patients were satisfied with care from admission to discharge. Ninety-seven percent were satisfied with pain management during the hospital stay. Eighty-four percent were satisfied with pain medication for home use. Only 3% called their physician or the emergency department during the first 48 hours after surgery, but in no case was readmission necessary. Seventy-nine percent of patients would "do it this way again."

Conclusion: Ambulatory open shoulder surgery can be performed successfully and with high patient satisfaction, regardless of patient age and type of surgery. Currently, with the exception of arthroplasty, we perform all elective open shoulder surgery on an outpatient basis.

"Prior to 1994, all open shoulder surgery at this institution was performed on an inpatient basis."

"Ambulatory surgery which can only be accomplished by the extensive use of home care or rehabilitative facilities is often not a triumph and merely results in cost shifting."

Introduction

Before 1994, all open shoulder surgery at this institution was performed on an inpatient basis. At that time, typical anesthesia consisted of sodium pentothal for induction, Forane for maintenance of anesthesia, and fentanyl for pain control throughout the procedure. Morphine, Dilaudid, or Demerol were used in the early postoperative period for pain control. We noted that patients often took a long time to regain alertness and that they often complained of severe pain. A retrospective study of our own rotator cuff repairs showed that the average hospital stay was 2 days and that 76% of patients suffered postoperative nausea, while 36% had urinary retention.

During 1994, in a joint effort with the anesthesia department, we attempted to create a protocol that would decrease all of the above side effects and allow us to perform open shoulder surgery on an outpatient basis. We identified the long half-life of sodium pentothal and the sedative effects of opiate drugs as the possible culprits for our patients' lack of alertness. We also recognized the known side effects of opiate drugs as the probable cause of the nausea, vomiting, and urinary retention.

Materials and Methods

Rotator cuff repair, Bankart reconstruction, and open acromioplasty are the three most common open shoulder procedures performed at our institution. In 1995, 100 consecutive patients had one of these three procedures performed on an ambulatory basis. These patients were not selected, nor were they eliminated on the basis of age, social issues, or medical condition. The ages of our patients ranged from 15 to 92 years. The mean age was 50 years.

All surgical procedures were performed using a combined orthopedic/anesthesia protocol with the following features:

- All patients had a general anesthetic delivered by endotracheal tube. Induction was with propofol (Diprivan) instead of Pentothal to facilitate quicker recovery from anesthesia. Propofol has a half-life of only 10 to 15 minutes compared with 8 hours for Pentothal.
- The anesthesiologist minimized the intraoperative use of fentanyl and other narcotics. All patients were injected with 60 mg of ketorolac tromethamine (Toradol) 15 to 30 minutes before the conclusion of surgery, and all wound edges were injected with 10 to 20 ml of Marcaine with epinephrine.
- All patients were discharged with a sling. However, patients who had acromioplasty, with or without rotator cuff repair, were instructed to perform pulley exercises for 1 minute every hour to prevent stiffness.

No patient went home with a Foley catheter, and no home services or rehabilitation facilities were used. Ambulatory surgery which can only be accomplished by extensive use of home care or rehabilitative facilities is often not a triumph and merely results in cost shifting. An effective outpatient protocol should not necessitate such manipulation.

RAYMOND A. SACHS, MD, has been a staff orthopedic surgeon for the Southern California Permanente Medical Group for 15 years. He is an Assistant Clinical Professor of Orthopedics at UCSD as well as shoulder mentor for the San Diego Sports Medicine Fellowship. not pictured JENNIFER H. SMITH, BS, a graduate of UCLA, is now in her third year of medical school at Washington University in St. Louis. She has a strong interest in orthopedic surgery, and will begin her residency in July, 1999.

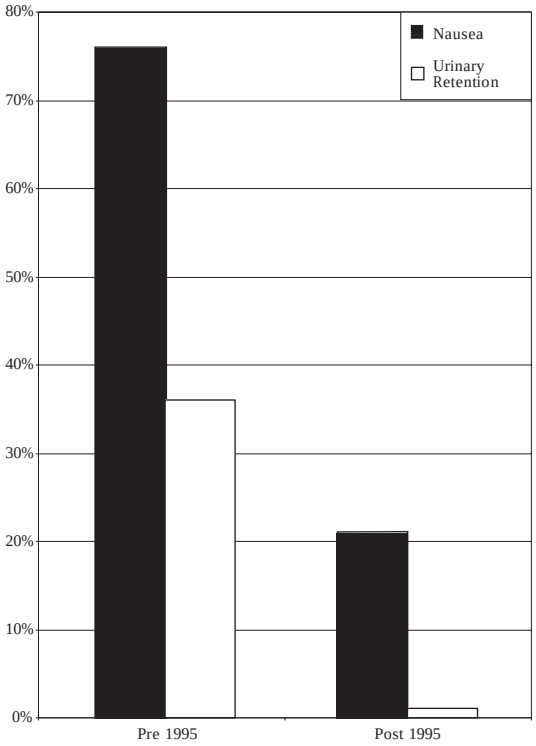

Figure 1. Incidence of postoperative nausea and urinary retention in patients undergoing open rotator cuff repairs.

Data were collected on these patients during the recovery room stay, and further follow-up data were collected by one nurse who called the patients 3 to 12 months postoperatively. Patients were questioned about nausea, vomiting, catheterization, and any other problems which warranted a trip to the emergency department or a phone call to their physician. They were asked to evaluate the quality and effectiveness of their pain control regimen. Finally, they were asked to rate their degree of satisfaction with all aspects of care.

Results

Open Bankart Repair

Twenty-six patients had Bankart repair. Their ages ranged from 15 to 50 years with a mean age of 24 years. Thirty-six percent of patients experienced nausea. None had urinary retention. One patient called the hospital from home. This patient was seen in the emergency department and admitted with a wound infection. Ninety-two percent of patients were satisfied with the management of their pain while in the recovery area, and 96% were satisfied with the pain medication prescribed for home use (typically acetaminophen and codeine/synthetic codeine combinations). Ninety-two percent were satisfied with their care from admission to discharge, and given the choice of inpatient or outpatient procedure, 85% said they would "do it this way again." Of the four patients who said that they would not have the surgery done again on an ambulatory basis, only one expressed any displeasure with their management. The other three preferred an overnight stay for social reasons such as the inconvenience of a long drive home or living alone.

Open Acromioplasty

Eleven patients had open acromioplasty. Their ages ranged from 30 to 69 years with a mean age of 49 years. Twenty-seven percent of patients experienced nausea. None had urinary retention. One patient called the hospital because of a high level of pain. No patients were seen in the emergency department or admitted to the hospital. Ninety-one percent of patients were satisfied with the management of their pain in the recovery area, and 91% were satisfied with their pain medicine for home use. Ninety-one percent were satisfied with their care from admission to discharge, and 73% said they would do it this way again. Of the three who said they would not do the procedure again on an ambulatory basis, only one had any complaints with the protocol. Two preferred to stay the night for social reasons.

Rotator Cuff Repair

Sixty-three patients had rotator cuff repair. Their ages ranged from 42 to 92 years with a mean age of 61 years. Thirteen percent experienced nausea, and one had urinary retention which required a call and a visit to the emergency department for catheterization. No patients in this group were admitted to the hospital. All patients were satisfied with their pain management in the recovery period. Eighty-seven percent were satisfied with the

Table 1. Incidence of postoperative problems in patients undergoing ambulatory open shoulder surgeries

	Bankart	Acromioplasty	Rotator Cuff	Total
Nausea	36%	27%	13%	21%
Urinary Retention	0%	0%	0%	1%
Called for Help	4%	9%	2%	3%
Went to the E.R.	4%	0%	2%	2%
Admitted	4%	0%	0%	1%

pain medicine prescribed for home usage. (Percocet was commonly used during the first 48 hours, followed by acetaminophen/codeine combinations.) Ninety-five percent were satisfied with their care from admission to discharge. Seventy-eight percent said that they would do it this way again. Nine of the 14 who preferred an overnight stay had social reasons only for this preference.

"Total time from admission to discharge averaged 8 hours. There were no significant differences between types of surgical procedures."

Age

There were no significant differences in complications or in any measure of satisfaction when patients were grouped according to age.

Type of Surgical Procedure

There were no significant differences in complications or in any measure of satisfaction when patients were grouped according to pathology or type of surgical procedure.

Time of Hospitalization

Total time from admission to discharge averaged 8 hours. There were no significant differences between types of surgical procedures.

Discussion

Open shoulder surgery is typically performed in an inpatient setting due to the perceived need to control postoperative pain with parental narcotics as well as to manage significant levels of postoperative nausea and urinary retention. We postulated that nausea and urinary retention were due to the administration of intraoperative narcotics and that the need for both intraoperative and postoperative parenteral narcotics could be minimized by use of intraoperative Toradol and wound injection with a long-acting local anesthetic such as Marcaine with epinephrine.

"The low incidence of postoperative problems enabled us to perform open shoulder surgery on an ambulatory basis with a high level of safety and without the necessity of cost shifting to expensive home care."

Our own experience prior to 1994 in rotator cuff surgery had shown high levels of nausea and urinary retention and significant pain requiring 24 to 48 hours of parenteral narcotics. Simple adjustments in a combined orthopedic/anesthesia protocol allowed us to sharply diminish the incidence of these common side effects (Fig 1). We recognize that it is impossible to separate our protocol into its component parts for purpose of analysis. We present this protocol as one unified approach that has worked for us, acknowledging that there may be other protocols that could work as well or better.

Overall, in our group of 100 patients, only 21% experienced nausea, and only one patient had urinary retention. Only 3% of patients had problems of a magnitude that required a call to their doctor, a nurse, or to the emergency department. Only 2% visited the emergency department, and only 1% required admission (Table 1). As a whole, 97% were satisfied with the management of their pain while in the recovery area, and 90% were satisfied with their medication for home use. Ninety-three percent were satisfied with their care from admission to discharge, and 79% said that they would have their procedure done again in the same way (Table 2). Two thirds of patients who preferred an inpatient procedure did so for social reasons only.

Conclusions

The combined orthopedic/anesthesia protocol was successful in sharply reducing postoperative problems with pain, nausea, and urinary retention.

The low incidence of postoperative problems enabled us to perform open shoulder surgery on an ambulatory basis with a high level of safety and without the necessity of shifting cost to expensive home care.

The low incidence of postoperative problems and the high degree of patient satisfaction were not affected by the type of open shoulder procedure nor by patient age. ❖

References
1. Burns JW, Aitken HA, Bullingham RE, et al. Double-blind comparison of the morphine sparing effect of continuous and

Table 2. Incidence of overall satisfaction in patients undergoing ambulatory open shoulder surgeries

	Bankart	Acromioplasty	Rotator Cuff	Total
Postoperative pain control	92%	91%	100%	97%
Home pain medications	96%	91%	87%	90%
Total care in hospital	92%	91%	95%	93%
Would do it the same way	85%	73%	78%	79%

intermittent i.m. administration of ketorolac. *Br J. Anaesth.* 1991;67:235-238
2. Kenny GN, McArdle CS, Aitken HH. Parenteral ketorolac: opiate-sparing effect and lack of cardiorespiratory depression in the perioperative patient. *Pharmacotherapy* 1990;10:127S-131S.
3. Liu J, Ding Y, White PF, et al. Effects of ketorolac on postoperative analgesia and ventilatory function after laparoscopic cholecystectomy. *Anesth. Analg.* 1993;76:1061-1066.
4. O'Hara DA, Fragen RJ, Kinzer M. Ketorolac tromethamine as compared with morphine sulfate for treatment of postoperative pain. *Clin. Pharmacol. Ther.* 1987;41:556-561.
5. Peirce RJ, Fragen RJ, Pemberton DM. Intravenous ketorolac tromethamine versus morphine sulfate in the treatment of immediate postoperative pain. *Pharmacotherapy* 1990;10:111S-115S.
6. Rice AS, Lloyd J, Miller CG, et al. A double-blind study of the speed of onset of analgesia following intramuscular administration of ketorolac tromethamine in comparison to intramuscular morphine and placebo. *Anaesthesia* 1991;46:541-544.
7. Smith I, Shively RA, White PF. Effects of ketorolac and bupivacaine on recovery after outpatient arthroscopy. *Anesth. Analg.* 1992;75:208-212.
8. Stanski DR, Cherry C, Bradley R, et al. Efficacy and safety of single doses of intramuscular ketorolac tromethamine compared with meperidine for postoperative pain. *Pharmacotherapy* 1990;10:40S-44S.
9. Wong HY, Carpenter RL, Kopacz DJ, et al. A randomized, double-blind evaluation of ketorolac tromethamine for postoperative analgesia in ambulatory surgery patients. *Anesthesiology* 1993;78:6-14.

Stages to Truth

"Every truth passes through three stages before it is recognized. In the first, it is ridiculed, in the second it is opposed, in the third it is regarded as self-evident."

Arthur Schopenhauer