Thirty percent of patients have moderate to severe pain 24 hr after ambulatory surgery: a survey of 5,703 patients

[Trente pour cent des patients ont des douleurs modérées à sévères, 24 h après la chirurgie ambulatoire : une enquête auprès de 5 703 patients]

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Purpose: Postoperative pain is the commonest reason for delayed discharge and unanticipated hospital admission after ambulatory surgery. We investigated the severity of pain at 24 hr postoperatively and determined the most painful procedures. The need for further medical advice and clarity of postoperative analgesia instructions were also studied.

Methods: Five thousand seven hundred and three ambulatory surgical patients were telephoned 24 hr postoperatively. Patients graded their pain using the ten-point self-assessing verbal scale (0 = no pain, 10 = worst pain). Data were analyzed in two groups, those with moderate to severe pain (pain score 4–10) and those with no or mild pain (0–3).

Results: Thirty percent of patients (1,495/5,703) had moderate to severe pain. Microdiscectomy, laparoscopic cholecystectomy, shoulder surgery, elbow/hand surgery, ankle surgery, inguinal hernia repair, and knee surgery were identified as the procedures causing most pain at 24 hr. 13.2% of patients needed medical advice by telephone, 1.4% made an unplanned visit to a doctor while the rate of readmission to the hospital was 0.08%. Ninety-eight percent found postoperative instruction sheets and advice helpful. Eighty-eight percent of patients indicated that analgesic instructions were absolutely clear.

Conclusion: This study has identified the more painful common ambulatory surgical procedures which will allow take home analgesia to be tailored according to individual procedures. Further improvement in analgesic instructions may help in better pain management of ambulatory surgery patients.

Objectif : *La douleur postopératoire cause la plupart des départs retardés de l'hôpital ou des admissions non prévues après la chirurgie ambulatoire. Nous avons vérifié la sévérité de la douleur, 24 h après l'opération, et déterminé les interventions les plus douloureuses. La nécessité d'avis médical supplémentaire et la clarté des directives sur l'analgésie postopératoire ont aussi été notées.*

Méthode : *Nous avons téléphoné à 5 703 patients de chirurgie ambulatoire 24 h après l'opération. Les patients ont coté leur douleur selon une échelle verbale d'auto-évaluation en dix points (0 = aucune douleur, 10 = douleur très intense). Les données ont été classées en deux groupes : douleur modérée à sévère (score de 4–10) et douleur absente ou légère (0–3).*

Résultats : *Trente pour cent des patients (1 495/5 703) ont éprouvé des douleurs modérées à sévères. La microdiscectomie, la cholécystectomie laparoscopique, l'opération de l'épaule, du coude/de la main, de la cheville, la réparation d'une hernie inguinale et l'opération du genou causaient le plus de douleurs à 24 h. Nous avons noté que 13,2 % des patients ont eu besoin d'avis médical au téléphone, 1,4 % d'une visite médicale imprévue et 0,08 % d'une réadmission hospitalière. Les feuilles de directives postopératoires et les conseils ont été utiles pour 98 % des patients. Les directives sur l'analgésie ont été absolument claires pour 88 % des patients.*

Conclusion : *La présente étude a désigné les opérations chirurgicales ambulatoires courantes les plus douloureuses qui devront comporter une analgésie postopératoire à domicile adaptée aux besoins individuels. L'amélioration du traitement de la douleur postopératoire pourrait passer par des directives analgésiques plus claires.*

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THE rate of ambulatory surgery has increased steadily over the last decade. Ambulatory surgery now accounts for up to 70% of all elective surgical procedures in some countries.[1] Ambulatory surgery has gained wide patient acceptance and its cost effectiveness is widely proven.[2] With new, minimally invasive surgical techniques gaining acceptance, great potential exists for this field to further expand. One of the main criteria for a surgical procedure to be performed on an ambulatory surgery basis is minimal postoperative pain that can be controlled with oral analgesics.[3] Contrary to the common belief that ambulatory surgery is followed only by minor pain, studies have shown that pain is the commonest reason for delayed discharge,[4] the commonest reason for contacting the family doctor[5] and the main reason for unanticipated hospital admission.[6,7]

Inadequate management of postoperative pain causes unnecessary suffering and discomfort and leads to several pathophysiological changes. Pain is associated with increased cardiac work and vascular resistance, which can lead to ischemic cardiac events.[8–10] This is particularly relevant as there is an increasing number of elderly patients undergoing ambulatory surgery procedures.[11] Pain after discharge also has economic implications, e.g., increasing the demand on community health services and delaying the return to daily activities including employment.

We previously studied the severity of pain in 3,729 patients after ambulatory surgery.[12] Twenty-six percent had moderate to severe pain 24 hr after ambulatory surgery. Multimodal analgesia was instituted with naproxen 500 mg given to general surgery, orthopedic and gynecology patients as a premedication unless contraindicated. Regional anesthesia or local infiltration was used where appropriate. Written instructions regarding management of pain after ambulatory surgery were given to patients.

This is a follow-up study to investigate the presence and severity of pain after ambulatory surgery with these new measures and to identify which are the more painful surgical procedures. A secondary goal was to examine the ability of patients to manage at home, the clarity of analgesic and postoperative instructions and the overall patient satisfaction with the ambulatory surgical unit (ASU).

Methods

Approval of the Institutional Ethics Committee was obtained, and 12,085 consecutive ambulatory surgical patients were studied prospectively over a 17-month period at the ASU of the Toronto Western Hospital. Written informed consent was not required by the Ethics Committee for this study, as it is routine practice in our institution to call patients 24 hr postoperatively. Verbal consent to the telephone interview was obtained from each patient before the surgery.

All orthopedic, gynecology and general surgery patients received naproxen 500 mg *po* a half hour to one hour before surgery unless contraindicated. Local anesthetic and regional blocks were used when appropriate.

Standardized postoperative care was given to the patients. Pulse rate, blood pressure, pulse oximetry, level of consciousness, respiratory rate and temperature were assessed. For treatment of moderate to severe postoperative pain, *iv* fentanyl 25 μg, was titrated until the patient was comfortable. For mild postoperative pain, acetaminophen or acetaminophen with codeine 30 mg *po* was used. Nausea/vomiting was treated with 25 to 50 mg dimenhydrinate *iv* or granisetron 1 mg *iv*. Patients were discharged from the postanesthesia care unit to the ASU when their Aldrete scores were 9 or more. Patients received verbal information and printed instructions regarding pain management before discharge home (Appendix I, available as Additional Material at cja-jca.org).

Telephone interviews were conducted 24 hr after the surgery; unsuccessful calls were retried 48 and 72 hr after the surgery. Nurses were trained with telephone interview techniques and a standardized questionnaire was used (Appendix II, available as Additional Material at cja-jca.org). Patients were not interviewed if they had refused to give consent to the telephone interview before the surgery, if they could not communicate in English, or if they could not be reached after 72 hr. Patients were asked to grade their pain using a ten-point self-assessing verbal scale (0 = none, 10 = worst) and were asked whether they had taken any medication for the pain. Patients were also asked if they experienced any problems after the surgery, specifically, nausea/vomiting, bleeding, sore throat, fever, bowel and voiding problems. Follow-up telephone advice was given to patients who needed it. Unplanned phone calls to a physician, visits to a physician, emergency visits and hospital readmissions were recorded.

Patients were also asked for a "yes" or "no" answer: 1) if they had received enough information to take care of themselves after the surgery; 2) if the instruction sheet they received at the ASU was helpful; 3) if the instructions about the schedule of taking pain medications were clear; and 4) if the instructions about how to change the amount and timing of pain medication, if needed, were clear.

At the end of the telephone interview, patients were asked about their satisfaction with the ASU staff and the care they received at the ASU.

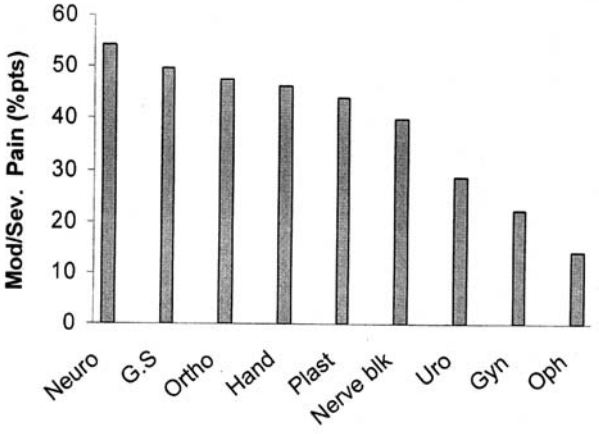

FIGURE 1 Percentage of patients with moderate to severe pain (4 to 10 on the ten-point self-assessing verbal scale) assessed 24 hr postoperatively in different types of surgery. Neuro = neurosurgery (n = 140); G.S = general surgery (n = 441); Ortho = orthopedic surgery (n = 1,005); Hand = hand surgery (n = 443); Plas = plastic surgery (n = 59); Nerve blk = nerve block (n = 98); Uro = urology (n = 109); Gyn = gynecological surgery (n = 409); Oph = ophthalmology (n = 2,396).

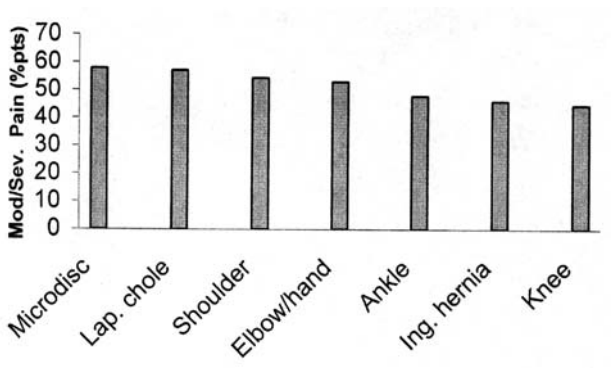

FIGURE 2 Seven most painful surgeries in the ambulatory surgery unit. Microdisc = lumbar microdiscectomy (n = 95); Lap. chole = laparoscopic cholecystectomy (n = 205); Shoulder = shoulder arthroscopy (n = 184); Elbow/hand = orthopedic elbow and hand surgery (n = 17); Ankle = ankle surgery (n = 48); Ing. hernia = inguinal hernia repair (n = 152); and Knee = knee arthroscopy (n = 703).

All data were stored in a computerized database and descriptive statistical analysis was done using Microsoft® Excel 2000. Data were sorted into nine main groups according to the type of surgery: orthopedic surgery; urology; general surgery; ophthalmology; neurosurgery; gynecology; plastic surgery; hand surgery and nerve block. Each type of surgery was further subdivided according to the procedure.

Data were analyzed by dividing patients into those with moderate pain (score 4–6) to severe pain (score 7–10) on the self-assessing verbal scale, and those with no or mild pain (0–3). Data of patients with moderate to severe pain were further analyzed according to several parameters including: type of surgery and procedure; complications following surgery; ability to manage at home; need for follow-up telephone advice; calling a medical doctor on the phone; unplanned visits to a medical doctor; visits to emergency units of a hospital; and hospital readmissions.

Results

Twelve thousand eighty-five patients underwent ambulatory surgery during the study period at the Toronto Western Hospital. Eight thousand eight hundred and sixty patients (73%) agreed to receive a follow-up call at home. Out of these calls only 5,073 (57.3%) were successful. The majority of the successful calls (72.1%) were made on the first 24 hr after surgery.

Less than 30% of the patients (1,495/5,073) had moderate to severe pain. Patients who underwent neurosurgery had a significantly higher incidence of moderate to severe pain following surgery (54.3%, 76/140), followed by general surgery (49.9%, 220/441), and orthopedic surgery patients (47.4%, 476/1,005; Figure 1). Patients who underwent ophthalmic surgery constituted the least number of patients complaining of moderate to severe pain (14%, 332/2,369; Figure 1).

The seven procedures with the highest incidence of moderate to severe pain 24 hr postoperatively are shown in Figure 2. Lumbar disc surgery was the most painful surgery with 57.9% of patients complaining of moderate/severe pain, followed by laparoscopic cholecystectomy (57.1%) and shoulder surgery (54.3%), while cataract phaco emulsification was the least painful (6.8%). The incidence of pain according to specific surgical procedures is presented in Appendix III (available as Additional Material at cja-jca.org).

Two percent of the patients who answered the questionnaire (104/5,073) had nausea and/or vomiting, 1% (59/5,073) of the patients had bleeding, and less than 1% had sore throat (43/5,073), swelling (43/5,073), dizziness (42/5,073), bowel problems (37/5,073), fever (23/5,075), or voiding problems (17/5,073).

TABLE Clarity of instructions for pain medications in patients with moderate/severe pain (n = 1,495)

Instructions for taking pain medication	*Number*	*Percentage*
Clear instructions	1,315	88
Somewhat clear instructions	134	9
Unclear or forgot instructions	17	1
Did not receive instructions	29	2
Instructions regarding changing the amount and timing of pain medication		
Clear instructions	1,286	86
Somewhat clear instructions	134	9
Unclear or forgot instructions	28	2
Did not receive instructions	47	3

Eighty-seven percent of the patients with moderate to severe pain (1,295/1,495) indicated that they were able to manage pain at home, while 13% (200/1,495) felt that they were not prepared to manage pain at home. The main reasons that affected the patients' ability to manage pain at home were: patients reported prescriptions were not properly explained to them; patients waited too long before taking their pain medication; patients did not fill the prescription; and patients were afraid to take the pain medication, thinking that it was addictive.

9.8% (499/5,073) of the patients required medical advice from the calling nurse due to various problems following surgery. Most of the advice given was about pain management, prescription counseling, dressing change and calling a physician. The majority were general surgery patients (22%, 97/441), plastic surgery (22%, 13/59) and orthopedic patients (16%, 164/1,005).

3.4% of the patients (170/5,073) called a physician, mainly for pain, abdominal distention, bleeding, and nausea and vomiting. Microdiscectomy was associated with the highest rate of calling a physician because of severe pain (8.4%, 8/95), followed by shoulder arthroscopy (5.4%, 10/184), hand surgery (4.7%, 21/443), laparoscopic cholecystectomy (4.9%, 10/205), and inguinal hernia (3.3%, 5/152; Figure 3).

0.7% (38/5,073) of the patients had to make an unplanned visit to a physician. 0.7% (36/5,073) had to go to the emergency unit of a hospital; 0.26% (13/5,073) due to pain. There were only four cases of hospital readmission (0.08%, 4/5,073); only one (0.02%, 1/5,073) was due to pain (after laparoscopic cholecystectomy).

A majority of patients (98.2%, 4,984/5,073) indicated that they received enough information to take care of themselves after the surgery, and that the instruction sheet was helpful. Over 99% of the patients indicated that the surgery staff listened and answered their questions.

In patients with moderate to severe pain, the clarity of the instructions of taking pain medication and the clarity of the instruction on how to change the amount and timing of pain medication if the current schedule did not relieve the pain is shown in the Table.

Patient satisfaction of the care received at the ASU was excellent 78.1% (3,965/5,073), good 21.2% (1,074/5,073), fair 0.5% (26/5,073), and poor 0.2% (8/5,073).

Discussion

Poor pain control can counteract many of the beneficial effects of ambulatory surgery and leads to the development of chronic pain.[13] In this study we interviewed a large cohort of patients (5,703) who had undergone various types of surgery. Overall, 55% of patients had some degree of pain at home with 21% having moderate pain (pain score 4–6) and 10% experiencing severe pain (pain score 7–10). About 12% of patients with moderate to severe pain reported not receiving adequate instructions for taking pain medications. Also, 14% of these patients reported receiving inadequate information to adjust their analgesic regimen. Almost 10% patients required medical advice from the calling nurse due to various problems following surgery.

Rawal and co-workers[14] asked patients to describe pain as mild, moderate or severe and reported similar pain profiles at 24 hr in 1,035 patients. Beauregard[15] and colleagues reported a 40% incidence of moderate to severe pain in a group of 89 patients who had undergone knee arthroscopy and gynecological laparoscopy. The incidence of severe pain was not specified. In the UK, McHugh and co-workers[16] found the incidence of severe pain to be 21% 48 hr post ambulatory surgery in 99 patients.

We previously conducted telephone interviews with 3,729 patients; 5.3% indicated severe pain, 20.8% moderate pain, 34.2% mild pain and 25% no pain 24 hr after ambulatory surgery[12] while 14.7% of patients were not able to specify their pain level. Since that study, we instituted multimodal analgesia with preoperative naproxen, regional anesthesia and local infiltration where appropriate. We also gave written instructions regarding pain management to these patients. In spite of these measures, there is a twofold increase in the incidence of severe pain in the current study. This may be due to

changes in surgical procedures being performed as ambulatory cases e.g., laparoscopic cholecystectomy and lumbar microdiscectomy were not ambulatory procedures previously at our hospital.

We singled out the seven most painful procedures, in descending order of pain intensity, lumbar microdiscectomy, laparoscopic cholecystectomy, shoulder, elbow/hand, ankle, inguinal hernia repair and knee surgery. All of these procedures have a 45% or higher incidence of moderate or severe pain. Rawal and colleagues[14] cited inguinal hernia, orthopedic surgery and hand surgery as the most painful procedures but did not further analyze the orthopedic data. Previous studies[14–16] have only looked at pain in specific groups of patients; our study provides a more comprehensive documentation of pain evolution in a large number of patients who have undergone common ambulatory surgery procedures. This should allow anesthesiologists to tailor postoperative analgesia to the surgical procedure.

Despite almost one third of patients having moderate or severe pain, there was only one patient who was readmitted to the hospital due to poor pain control. In the literature, pain continues to be one of the most frequent causes of unanticipated admission and readmission to the hospital in ambulatory surgery with an incidence ranging from 1 to 3%.[17,18] Coley and colleagues[7] showed that surgeries that involved bones and joints were the most common procedures associated with unanticipated admissions due to pain, followed by pancreatic bilary, ear nose, and throat and vascular surgery. Variations in readmission rates between surgical institutes may be a result of several factors and is difficult to compare due to different caseloads. Our admission rate is low despite a 30% incidence of significant pain, perhaps because there is the availability of 24-hr telephone support and patients have the option to increase their analgesic medication. Almost 10% of patients contacted required advice about pain control as well as other matters.

Most patients were happy with postoperative instructions regarding after-care and analgesia. Both verbal and written instructions are important in increasing compliance with postoperative instructions. Ten percent of patients with moderate to severe pain felt they did not receive absolutely clear instructions for taking pain medication and 2% stated they did not receive any instructions. Patients are given the option to change their analgesic regimen to augment pain relief. Fourteen percent of patients with significant pain were unclear about increasing their medications. These are important indicators that better and clearer instructions need to be given to patients.

Instructions and the labelling of medications should be simple and unambiguous. Hanchak and coworkers[19] compared patients' understanding of medication dosing instructions in terms of daily frequency to instructions specifying hourly intervals. There was a high incidence of misinterpretation of the dosing frequency with prescriptions written in hourly intervals (e.g., q 6 hr) compared to instructions stating daily frequency (e.g., qid). Written information must be clear and easily comprehended to be of value. According to the 1991 Canadian census data, 30% of the adult population in Canada is functionally illiterate.[20] Low literacy disproportionately affects ethnic minorities.[21] Take home information should be written in a way that makes it possible for patients who read at a sixth- to eight-grade level to understand.

Overall patient satisfaction with the care they received at our ASU was excellent or good in 98% of cases. Patient satisfaction is a complex issue and is not just related to how well pain is controlled.[22] Patients seem to be accepting of pain as part of their postoperative course. In the UK a survey revealed that almost 50% of patients would tolerate some degree of pain after major surgery rather than complain.[23] On the other hand, patients ranked pain in the top three of most undesirable outcomes after ambulatory surgery.[24,25] Ninety-nine percent of patients were satisfied that the ASU staff listened and answered their questions, which is important to patients and may explain high satisfaction rates despite a 30% incidence of moderate or severe pain. Other studies have also shown a high overall satisfaction rating despite a high incidence of pain.[14,16] McHugh[16] and colleagues found that 48% of ambulatory patients contacted the ambulatory surgery ward for advice; in that study 12% of patients were not provided with written or verbal instructions.

We have shown that over 30% of patients have pain scores of 4 or more after discharge from the ASU and evaluated the type of surgery as a predictor of pain severity. Many institutions like our own provide good analgesia to allow the patient to leave the hospital comfortable but, once the patient is at home, little is known about pain control. Currently, there are no protocols or guidelines for the prescription of home analgesia. Patients are sent home with a standardized prescription of acetaminophen with codeine, irrespective of the type of surgery. Lopez and colleagues[26] investigated a clinical guide for the treatment of postoperative pain. Take home medication was modified according to type and invasiveness of surgery. Two thousand seven hundred and eighty-three patients were allocated to receive different analgesic regimens according to Chung's prediction of painful procedures.[12] This strategy resulted in

86% of patients having a visual analogue score < 3 when telephoned 24 hr postoperatively. Therefore new protocols or guidelines for the prescription of take-home analgesia need to be developed.

A limitation of this study was the large number of patients that we could not contact: 6,382 could not be contacted out of 12,085 patients, either because they had refused to give consent to the telephone survey, they could not communicate in English or they could not be reached by telephone within 72 hr.

In conclusion, a significant number of patients have moderate or severe pain after ambulatory surgery. The most painful procedures have been identified and postdischarge analgesia should be tailored accordingly. We have identified the need to improve further on the provision of easily comprehended analgesic instructions. Pain management after ambulatory surgery provides a unique challenge as more invasive procedures are being performed on an outpatient basis. New protocols or guidelines for the prescription of take-home analgesia need to be developed.

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