

## A 3-day postoperative study related to pain, nausea, vomiting and tiredness in patients scheduled for day surgery

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### Abstract

Day surgery is increasingly used and to be able to evaluate and improve the work of ambulatory surgery, outcome and follow-up studies are a necessity. We decided, therefore, to study 100 consecutive patients scheduled for day surgery. A questionnaire, dealing with pre- and postoperative anxiety, stress and expectations, pain (rest and movement), tiredness, nausea, vomiting and consumption of analgesic, was filled in by the patients during 3 days at home. Visual analogue scales were used to rate these parameters, except for consumption of tablets. Patients experienced more anxiety before than after surgery and they anticipated the postoperative period to be more painful than actually experienced. Local anaesthesia procedures were expected to be more painful preoperatively than spinal and general anaesthesia, when asked before surgery. Pain intensity reached its maximum 12 h after surgery and pain intensity was significantly higher for 'pain at movement' as compared to 'pain at rest'. Twenty-two patients considered the postoperative pain to be worse than anticipated and nine patients found the analgesics available ineffective. Seven patients expressed an opinion of a hospital stay the first postoperative night to have been preferable. Nausea, vomiting and tiredness were no major concern. Paracetamol and dextropropoxyphene were used as analgesic treatment at home and it is obvious that more potent analgesics should be administered the first postoperative day. Copyright © 1996 Elsevier Science B.V.

*Keywords:* Day surgery; General anaesthesia; Local anaesthesia; Nausea; Pain; Spinal anaesthesia; Tiredness

### 1. Introduction

Day surgery is an increasing part of surgical services. Some advantages of day surgery are, in theory, decreased cost for society, reduction of waiting lists and a quicker return to home for the patient. To accomplish a successful day surgery, among other things a correct selection of patients must be done, skilful and dedicated staff and experienced surgeons and anaesthesiologists must be engaged. A safe return home is a result of well balanced anaesthesia and well performed surgery. Of utmost importance is a stringent and determined way to treat nausea and pain

postoperatively. An evaluation of the reaction of each patient for pain and nausea at the unit is an instrument for how to carry out effective pain relief. This treatment of pain at the unit is the platform for a continued successful pain relief management at home.

It is of crucial importance to give the patients an effective program for their pain relief at home, to be able to provide adequate analgesia. During the first 2–3 days at home an aggressive treatment should be performed. However, few data exist describing postoperative pain as well as nausea and tiredness during the first days in patients subjected to day surgery. The present study was designed to gain such data and of equal importance is to continue to collect such data to be able to change management.

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## 2. Materials and methods

We asked 100 consecutive patients scheduled for day surgery (Table 1), if they were willing to participate in a study, to evaluate how they managed during the 3 first days at home. All patients asked volunteered. The questionnaire was divided into three parts; the first part dealt with pre- and postoperative anxiety, stress, relief and expectations in the hospital. The second part involved parameters such as pain at rest, pain at movement, nausea and tiredness and amount of analgesics taken at home. The patient recorded these parameters, at 8 a.m., 12 p.m. and 8 p.m., 3 times per day during 3 days. All questions were constructed using the VAS (visual analogue scale), a 10 cm horizontal line equipped with the words telling the extremes, such as 'no pain' and 'worst pain ever', at left and right hand ends of the line, respectively. The third part consisted of questions concerning experiences of surgery, pain, effectiveness of analgesics, satisfaction of treatment by staff of the unit and if they were willing to be subjected to surgery again on an ambulatory basis. A nurse made a telephone-call to every patient on the third postoperative day to enquire how the patient managed at home. General anaesthesia consisted of propofol as anaesthetic agent and alfentanil as analgesic agent, lidocaine with 7.5% glucose was used for spinal anaesthesia and lidocaine 1–2% or prilocaine 0.5% was used for local anaesthesia.

### 2.1. Statistical methods

Data were analysed using Pearson product-moment correlation (Pearson), Student's *t*-test (*t*-test),  $\chi^2$ -test, Kruskal-Wallis ANOVA by ranks (Krus-W), Friedmans ANOVA (Friedman) or parametric ANOVA/MANOVA including Scheffé post-hoc test when appropriate. A *P*-value less than 0.05 was considered significant.

Table 1  
Demographic data

Number of patients	100
Age (median and range)	38.5 years (16–76)
Sex (M:F)	63:37
Type of surgery	
<b>Orthopedic</b>	
Knee	59
<b>General surgery</b>	
Inguinal hernia	19
Varicose veins	4
<b>Plastic surgery</b>	
Breast	4
Other <sup>a</sup>	14

<sup>a</sup>Cutaneous and subcutaneous surgery.

Table 2  
Type of premedication given to patients

Type of premedication	Number of patients
<b>Analgesics</b>	
Diclofenac	55
Ketorolac	14
Paracetamol	31
<b>Antiemetics</b>	
Metoclopramide	11
Number of patients not receiving premedication	0

## 3. Results

### 3.1. Patients

The demographic data from the 100 patients studied is shown in Table 1. The majority of cases (59/100) involved knee surgery (all arthroscopically, mainly surgical procedures (51/59) such as meniscal resection; only 8/59 were diagnostic) and hernia repair (19/100).

### 3.2. Premedication and type of anesthesia used

All patients received premedication using NSAID's, Table 2. Some (11/100) received metoclopramide due to a history of nausea and emesis related to earlier anaesthesia and surgery. The anaesthetic techniques used were spinal and local anaesthesia with or without sedation using midazolam, or general anaesthesia, Table 3.

### 3.3. Psychological assessments

All patients rated anxiety before and following anaesthesia/surgery, Fig. 1. The patients were significantly more anxious before versus following surgery revealed by the significant shift in the factors tension, stress and calm ( $P < 0.05$ ; *t*-test). The patients, furthermore, rated anticipated discomfort and pain in relation to the surgical procedure, also including a postoperative question if the procedure was more painful/uncomfortable than expected, Fig. 2. The patients expected the procedure to be associated with significantly more pain and discomfort than actually experienced, as rated in the PACU following surgery ( $\chi^2$  33.2–66.4, d.f. 2,  $P < 0.05$ ; Friedman). This view as expressed by the patients did not change when confronted with the same questions 3 days postoperatively, i.e. the pain and discomfort experienced during surgery, as reported in the PACU was still valid. Interestingly, the patients subjected to knee surgery, using local anaesthesia and sedation, already before anaesthesia/surgery anticipated the procedure to

Table 3

Number of patients subjected to various types of anaesthesia with respect to main surgical procedure

Type of surgery	Type of anaesthesia		General anaesthesia
	Local anaesthesia	Spinal anaesthesia	
Orthopedic surgery ( <i>n</i> = 59)	24	2	33
General surgery ( <i>n</i> = 23)	4	17	2
Plastic surgery ( <i>n</i> = 18)	0	5	13
Total number	28	24	48

be significantly more painful and uncomfortable than the patients to receive spinal or general anaesthesia ( $\chi^2$  9.83–11.80,  $P < 0.001$ ; Krus-W). This was also found following surgery at the PACU and 3 days later.

### 3.4. Postoperative pain intensity and consumption of analgesics

All patients rated pain intensity both at rest and during active movement for 3 days postoperatively, Fig. 3A–B. Pain intensity at rest and at movement changed significantly over time ( $F_{(10,861)} = 5.59–9.28$ ,  $P < 0.001$ ; MANOVA) reaching a maximum at 12 h postoperatively. Pain intensity was significantly higher at movement as compared to rest except at 12 h postoperatively ( $F_{(1,861)} = 573.44$ ,  $P < 0.0001$ ; 2-way ANOVA and Scheffé post-hoc test). If considering the total postoperative period, the total sum of pain scores at movement (mean  $\pm$  S.D.,  $314.7 \pm 214.0$ ) were significantly higher as compared to values at rest ( $165.7 \pm 149.2$ ) ( $t$ -value 12.75,  $P < 0.0001$ ), and with a significant correlation between the two ( $r = 0.87$ ,  $P < 0.001$ ; Pearson). The total sum of pain scores at rest or during movement, for the 3 day postoperative period, did not differ significantly between patients if analysed with regard to anaesthetic technique used (local, spinal or general

anaesthesia) or main surgical procedure (orthopedic, general surgery or plastic surgery).

Postoperatively at the hospital, mainly paracetamol, dextropropoxyphene and ketobemidone were used as analgesic treatment, with the latter being omitted for treatment at home, Table 4. The number of patients needing analgesics postoperatively increased significantly following discharge, 36/100 not needing analgesics at hospital compared to 20/100 at home during the 3 days postoperative period ( $\chi^2$  6.35,  $P < 0.02$ ).

At 3 days postoperatively the patients gave some overall comments on pain and analgesics. Twenty-two patients reported postoperative pain intensity to have been more intense than expected, but only nine found the analgesics available to them to be ineffective. No patient contacted the hospital for additional analgesic therapy. Seven of the patients expressed a desire of having the opportunity to stay at the hospital during the first postoperative night.

### 3.5. Postoperative nausea

Generally, nausea was of no major concern following surgery, Fig. 4. There was no significant change over time and the values for all patients were very low. The four female patients subjected to breast reconstructive

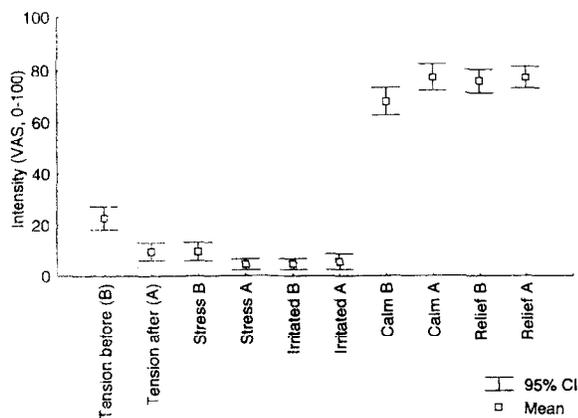


Fig. 1. The degree of state anxiety in patients subjected to surgery. Relief B = 'do you think that you will feel relief postoperatively that surgery was at last performed?', Relief A = 'do you feel relieved that surgery has been done?' Mean values with 95% confidence interval represented by whiskers.

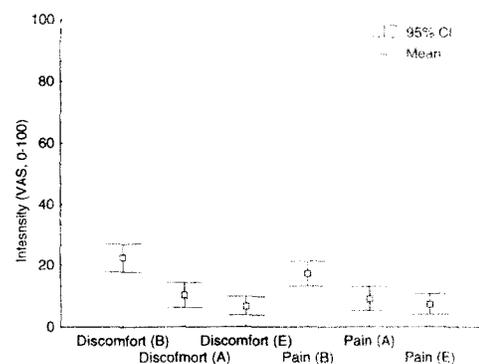


Fig. 2. Anticipated and experienced discomfort and pain with regard to the surgical procedure. (B) = anticipated discomfort/pain, (A) = actually experienced discomfort/pain and (E) = discomfort/pain during surgery as reported on active questioning 3 days postoperatively. Mean values with 95% confidence interval represented by whiskers.

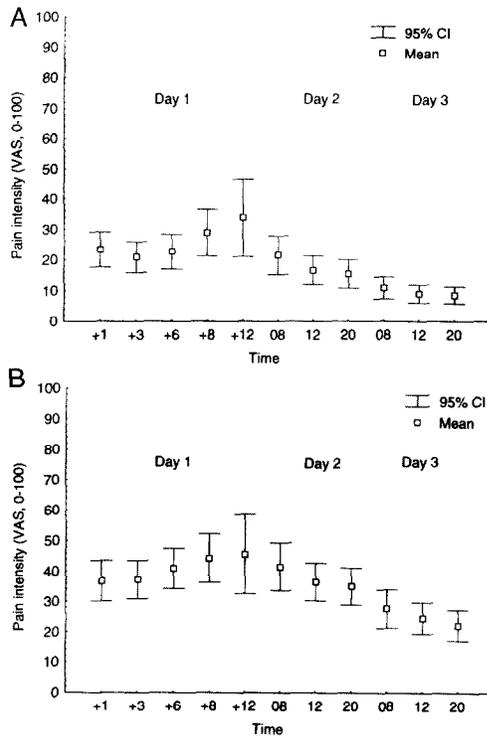


Fig. 3. A and B. Pain intensity at rest (A) and during active movement (B) during the first 3 postoperative days. Measurements during day 1 given as hours postoperatively (1–12 h), and during days 2 and 3 at 8 a.m., 12 a.m. and 8 p.m. Mean values with 95% confidence interval represented by whiskers.

surgery reported more intense nausea than the others (11.2; 2.6–19.8 respectively 3.2; 2.6–3.8, mean VAS; with  $\pm 95\%$  C.I.). Three quarters of the breast patients received metoclopramide due to nausea.

Table 4  
Type of analgesics given to patients for treatment postoperatively at hospital and at home

Type of analgesics	Number of patients	
	At hospital	At home
<b>NSAID's</b>		
Diclofenac	1	7
Ketorolac	6	—
Paracetamol	44	73
<b>Opioids</b>		
Codeine	0	1
Dextropropoxyphene	50	73
Ketobemidone	26	—
Alfentanil	1	—
Patients not receiving analgesics post-operatively	36	20

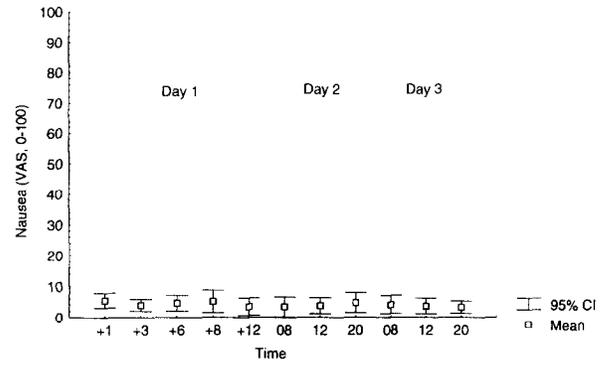


Fig. 4. Nausea during the postoperative period. No patient reported vomiting. Measurements during day 1 given as hours postoperatively (1–12 h), and during days 2 and 3 at 8 a.m., 12 a.m. and 8 p.m. Mean values with 95% confidence interval represented by whiskers.

### 3.6. Postoperative tiredness

Intensity ratings changed significantly over time ( $F_{(1,10)} = 10.65$ ,  $P < 0.0001$ ; 2-way ANOVA), increased during the first 12 h and then declined over time, Fig. 5. No major differences were detected between patients exposed to various surgical or anaesthetical procedures.

## 4. Discussion

Successful day surgery should always include an effective management of pain and nausea 2–3 days postoperatively at home. It is interesting to note that patients anticipate discomfort and pain to be more serious than actually experienced. One reason for this attitude is probably bad personal experience or bad experience of surgery told by friends and relatives. Patients subjected to arthroscopy or surgery under local anaesthesia anticipated the procedure to be more painful and discomforting than patients having general anaesthesia or spinal block, indicating that a very care-

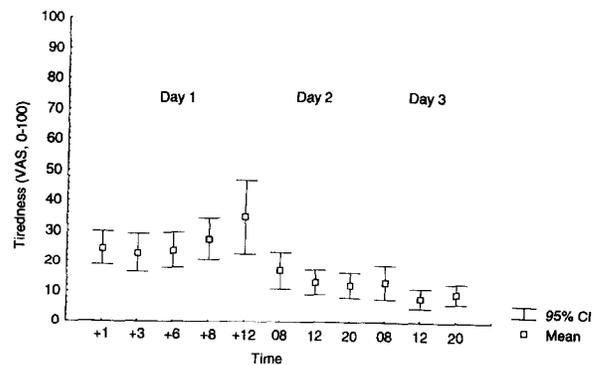


Fig. 5. Degree of tiredness reported postoperatively. Measurements during day 1 given as hours postoperatively (1–12 h), and during days 2 and 3 at 8 a.m., 12 a.m. and 8 p.m. Mean values with 95% confidence interval represented by whiskers.

ful selection of patients is necessary. These patients need a very thorough and informative presentation, preoperatively.

Not surprisingly, movement caused more pain than rest in our study. Of great interest is, how we shall be able to combat pain at movement. We are probably not able to reduce pain completely at movement, but our results show a peak of pain 12 h postoperatively. Paracetamol and dextropropoxyphene were used for the first 24 h of the postoperative period and it is obvious that this regime is not sufficient. Nine patients in our study reported analgesics available to be ineffective. Twenty-two patients experienced pain to be more severe than anticipated. Baker et al. proposed that when severe pain was expected more potent analgesics should be prescribed, such as methadone [1]. Oberle et al. reported that about 30% of the patients undergoing arthroscopy had severe pain the first postoperative day. In patients undergoing tubar ligation, 60% scored 4 or more on a 5 point scale during the immediate postoperative period. In the same study 5–15% of the patients were in severe pain the third postoperative day [2].

This panorama of pain described is of great concern, many of the patients of our study were in no pain at the unit and consequently developed pain at home. The standard or goal of our hospital for pain management is that pain >3–4 on VAS (0–10) should not be experienced by the patient. This standard is achieved in the hospital but not at home. Different types of analgesics, wound infiltration with local anaesthetics, local anaesthetics without, or in combination with, opioids administered into joints are different ways to manage pain postoperatively. Careful evaluation of the patient, type of surgery and consumption of analgesics in the hospital will give you an idea of how the postoperative period at home will be for the patient and a suitable program of pain management should be instituted. More potent analgesics seem to be warranted during the first postoperative day.

Postoperative nausea and vomiting are of major concern. Even though management is successful in the hospital, the crucial moment often comes when the patient ambulates and many patients do have problems with nausea and vomiting for several days at home [3,4]. Nausea is very complex and a specific management is hard to obtain. There are several centres in the brain involved, the emetic centre, chemoreceptor trigger zone and the vestibular portion of the 8th cranial nerve. Receptors for serotonin, dopamine, muscarine and histamine take part in this system [5]. We did not find nausea and vomiting a major problem, but some procedures are correlated to a higher incidence of nausea and vomiting. Among our patients, four female patients had breast surgery and all

of them experienced nausea at home for all 3 days. These groups of patients having surgery of high risk for nausea and vomiting should be treated pre- and peroperatively with antiemetic drugs. A careful history has to be taken and if a risk for nausea and vomiting is revealed adequate measures must be taken [6]. We used metoclopramide and/or droperidol during the period of this study [6,7], now we also use ondansetron, depending on the severity of the situation [8,9].

Tiredness was rated as rather severe during the first 12 h postoperatively. Oberle et al. reported that a sizeable percentage of patients were severely bothered by fatigue for several days [2]. We did not notice among our patients such a severe tiredness for 2–3 days. Information about what will happen is of course essential, since patients do not expect to be tired for such a long period, which is important among other things from a medico-legal point of view, such as in driving a car.

Seven patients indicated a desire to stay overnight at the hospital, which might suggest that these patients had such a terrible postoperative period at home and expressed the view of a possibly better postoperative care at the hospital. Some patients do have a hard postoperative period at home which necessitates a change in postoperative management. More potent analgesics must be available to the patients and a more continuous use of drugs for the first days must be emphasized. Roberts et al. [10] stated that potential discomfort and recovery should not be underestimated. Possible rest and assistance at home are important factors and should be considered before scheduling a patient for day surgery [10]. We have according to our results changed our therapeutical measures for our patients at home. When moderate to severe pain is expected; ketobemidone/paracetamol shall be used the first postoperative day and dextropropoxyphene/paracetamol for the two following days. We will study whether such a regime results in improved analgesia at home.

Peripherally administered opioids is an elegant way to approach the problem of postoperative pain management when adequate, but more experience and research are warranted [11,12]. We have studied pethidine compared to prilocaine, both given locally, in the knee joint and found both less pain and consumption of analgesics postoperatively with pethidine [13]. In orthopedic patients such a model of peripherally administered opioids probably would be a step forward in producing good pain relief with few side effects.

A necessity is to continuously make quality controls and outcome studies and accordingly be able to change therapy and management of the day-care unit to improve the care and the satisfaction of the patient.

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