

# The pain of haemorrhoidectomy: a prospective study

R.I. Limb <sup>a,\*</sup>, G.E. Rudkin <sup>b</sup>, A.J. Luck <sup>c</sup>, L. Hunt <sup>d</sup>, P.J. Hewett <sup>c</sup>

<sup>a</sup> Department of Anaesthesia, The Queen Elizabeth Hospital, 28 Woodville Road, Woodville South, SA 5011, Australia

<sup>b</sup> School of Medicine, Flinders University of South Australia, Australia

<sup>c</sup> Division of Surgery, The Queen Elizabeth Hospital, 28 Woodville Road, Woodville South, SA 5011, Australia

<sup>d</sup> Leicester General Hospital, Leicester, UK

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## Abstract

The efficacy of a multimodal analgesic approach for ligation excision haemorrhoidectomy was evaluated in a prospective series of 62 patients. Opioid was given as intravenous fentanyl intra-operatively, as part of a standardised general anaesthetic technique, followed by post-operative parenteral fentanyl or oral oxycodone as required. Pre-emptive local anaesthesia was provided via ischiorectal fossae and haemorrhoid pedicle infiltration. The non-steroidal anti-inflammatory drug indomethacin was administered rectally at the end of surgery and regularly orally for 5 post-operative days. A wide range of pain scores was recorded post-operatively but all mean scores were between 2 and 3. Pain was highest at the time of the first bowel action but this was successfully managed in the patient's home. Patient satisfaction with their pain management was achieved in 95% of patients. We conclude that the multimodal analgesia technique combined with pre-operative patient education leads to successful pain control following haemorrhoidectomy. © 2000 Elsevier Science B.V. All rights reserved.

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## 1. Introduction

Ligation excision haemorrhoidectomy has a reputation of producing severe pain. It is the most commonly performed operation for prolapsing haemorrhoids. Traditionally patients have remained in hospital until the first post-operative bowel action, a time when parenteral opioids may be administered.

Recent trends towards earlier hospital discharge have led to a re-evaluation of post-haemorrhoidectomy analgesia and the introduction of innovative analgesic options. These include the use of a subcutaneous morphine pump [1], transdermal fentanyl [2] and intrasphincteric ketorolac administration [3]. Regimens such as these have allowed haemorrhoidectomy to be performed as day surgery. However, many of these analgesic options are expensive and require sophisticated equipments. A more suitable alternative may be to use a post-operative pain management plan using a multimodal analgesic technique using commonly available

medications and delivery systems [4]. This concept was incorporated into a day case haemorrhoidectomy project conducted at our hospital [5].

The aim of the study was to prospectively evaluate pain and analgesic requirements after haemorrhoidectomy using a multimodal analgesic technique.

## 2. Methods

Patients scheduled for haemorrhoidectomy between February 1996 and December 1997 were considered for this prospective series. Exclusion criteria were an American Society of Anaesthesiologists (ASA) Grade 4 or 5, chronic renal failure, coagulopathy, symptoms of bladder outlet obstruction, intolerance of non-steroidal anti-inflammatory drugs (NSAIDs) or inadequate social support following surgery.

In the outpatient department, an investigator discussed the study with the patient and obtained informed consent. Patients were given written information describing the management plan and advised that their pain would be well controlled post-op-

\* Corresponding author. Tel.: +61-8-82226000; fax: +61-8-82227065.

eratively. Interpreter services were provided to those patients who were from a non-English speaking background.

Pre-operatively, patients were allowed clear fluids orally until 3 h before surgery. On admission, patients were given a sodium citrate/sodium lauryl sulfoacetate/sorbitol (Microlax™) enema. All procedures were performed in the morning by a surgeon experienced in the technique. Patients were unpremedicated and underwent a standardized spontaneously breathing general anaesthetic using a laryngeal mask airway. Propofol induction was supplemented with intravenous fentanyl. Intravenous fluids were avoided unless a specific indication existed. A 100-mg indomethacin suppository was administered to the patients at the end of the procedure.

A standard ligation excision haemorrhoidectomy was performed with the patients in the lithotomy position. Before surgery the surgeon performed an inferior haemorrhoidal nerve block. The local anaesthetic solution used was a combination of 20 ml of 0.5% plain bupivacaine, 10 ml of 1% plain lignocaine and 10 ml of

normal saline to make a total volume of 40 ml. An injection of 5–10 ml was made into the ischiorectal fossa at 16:00 and 22:00 h. A 40-mm, 21 gauge needle was introduced to its full depth and moved upwards and downwards in a fan shaped manner. Before the haemorrhoidal pedicles were grasped, a small amount of local anaesthetic was injected into the point of contact. After making the skin bridges, the haemorrhoid was injected liberally with the anaesthetic solution. Following completion of the procedure, the remainder of the local anaesthetic solution was injected into the wounds.

Patient recovery to home discharge was a three-stage process (Fig. 1).

Patients initially recovered in a dedicated day surgery two-stage recovery area. They were then transferred to a step down unit (stage 3) when the day surgery discharge criteria [6] were met. Once in this unit, patients were encouraged to be self-caring, ambulant and to commence a normal diet. Patients were reassessed by nursing staff at no later than 18:00 h. If the patient had voided urine and pain and nausea were well controlled, they were discharged home to the care of a responsible adult. If these criteria were not met, overnight admission was arranged.

At home, the patients were instructed to take oral indomethacin (25 mg tds) and stool softener (Sorbitol™ 15 ml bd). They had available to them paracetamol, dextropropoxyphene/paracetamol and oxycodone (Fig. 1). Patients were encouraged to take warm salt baths at least twice daily. Any bowel or urinary complications were documented. A registered nurse visited each patient daily until at least the time of the first bowel action.

Pain scores were recorded using a Visual Analogue Scale (VAS Scale 1–10). (1 represented no pain and 10 worst pain imaginable). These were documented at 30, 120 and 240 min post-operatively, daily for the first 5 days, at the time of the first bowel action and on review by the surgeon on the tenth post-operative day.

Post-operative nausea and vomiting (PONV) was also scored according to a VAS score [7]. Intravenous antiemesis prophylaxis, ondansetron 4 mg was given at induction. Patients requiring further treatment received metoclopramide 10 mg intravenously, intramuscularly or orally depending on the recovery phase or orally at home.

On day 30 post-operatively, patients were asked to complete a questionnaire with an independent assessor relating to satisfaction with their post-operative pain management.

### 2.1. Statistical analysis

Repeated measure analyses for pain scores, nausea scores, analgesia used and antiemetic used were con-

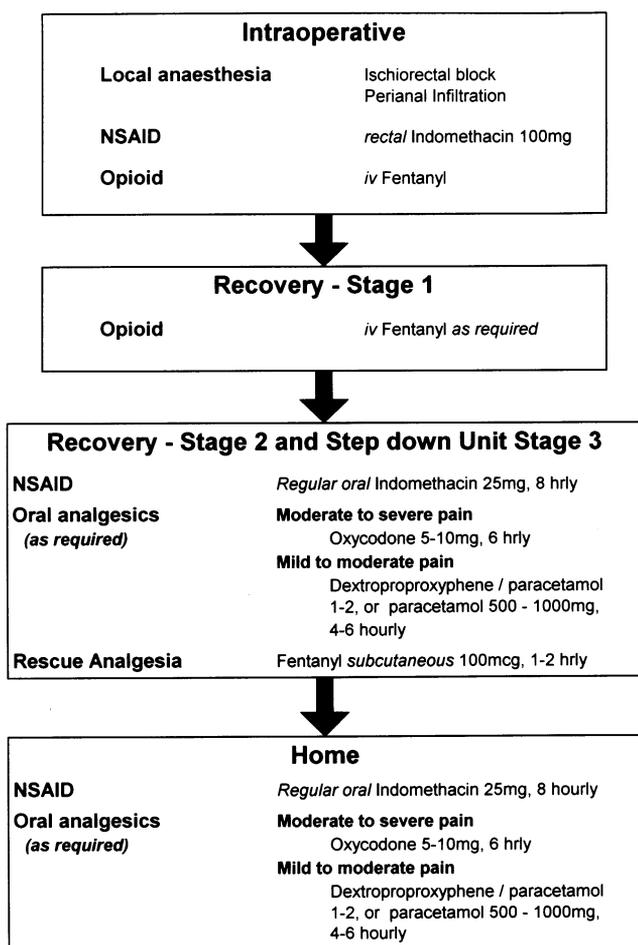


Fig. 1. Phases of patient care with corresponding multimodal analgesic plan.

Table 1  
VAS pain scores<sup>a</sup>

Time	Number	Mean	Lower	Upper	Range
30 min	62	2.29	1.87	2.81	1–10
2 h	62	2.52	2.13	2.97	1–8
4 h	62	2.45	2.11	2.85	1–6
Day 1	62	2.58	2.20	3.03	1–8
Day 2	62	2.94	2.61	3.31	1–7
Day 3	62	2.82	2.51	3.17	1–7
Day 4	62	2.5	2.17	2.88	1–7
Day 5	62	2.19	1.81	2.65	1–8
Day 10	42	2.70	2.22	3.30	1–8
First bowel action	62	4.81	4.22	5.47	1–10

<sup>a</sup> Lower, upper = lower and upper bound for a 95% confidence about the mean.

ducted using generalised estimating equations [8], the data being normalised by a log transformation.

Categorical analyses were conducted for patient satisfaction and nausea and antiemetic use, using the  $\chi^2$ -test.

Non-parametric analyses were conducted for patient satisfaction and pain at the first bowel action using the Wilcoxon rank sum test.

### 3. Results

In this series 62 patients (42 males and 20 females) underwent ligation excision haemorrhoidectomy. The median age was 43 years (range 25–78) and the median weight was 75 kg (range 41–110). There were 34 ASA grade 1 patients, 26 ASA grade 2 and 2 ASA grade 3. Forty-one patients underwent three complex haemorrhoidectomies, 15 had two complexes excised and the remaining six required one complex haemorrhoidectomy. The median dose of intra-operative fentanyl was 100  $\mu$ g (range 50–250). Fifty-eight patients received no intra-operative intravenous fluid, two received less than 100 ml and two more than 500 ml.

A wide range of pain scores (Table 1) was seen at all times post-operatively.

Mean pain scores were between 2 and 3 throughout. Analysis of the data showed higher pain levels on day 2 and 3 than in the first 24 h post-operatively (30 min post-operatively c.f. day 2 ( $P < 0.02$ ) and day 3 ( $P < 0.05$ ); 4 h post-operatively c.f. day 2 ( $P < 0.04$ ). Pain on day 3 was worse than day 5 ( $P < 0.02$ ). There was a trend of higher pain scores on day 10 but this was not statistically significant. A similar pattern was seen on analysis of the proportion of patients reporting pain scores greater than 2, seen in Fig. 2, with peaks at day 2, 10 and at the first bowel action.

Analgesic requirements are shown in Table 2. Intravenous fentanyl was given to eight patients (13%) in the first 30 min post-operatively but no patient required it

subsequently. The majority of patients required no analgesia in the first 24 h post-operatively. Oxycodone requirements were higher on the second, third and fourth post-operative days ( $P < 0.05$ ), than at other times. Simple analgesic use was constant throughout the post-operative period.

Median time to the first bowel action was 2 days (range 1–7). The mean pain score at this time was 4.8 (range 1–10), higher than at any other time ( $P < 0.0001$ ). Pain scores with the first bowel action were not related to the day of the first bowel action ( $P > 0.15$ ). Patients (53%) took oxycodone at this time and more oxycodone was used when the bowel action was later in the post-operative period ( $P < 0.04$ ). One patient, who was non-compliant with aperient medication, did not open his bowels until the seventh post-operative day. He had severe pain requiring parenteral opioid analgesia and hospital admission.

The mean nausea scores and antiemetic use are shown in Table 3.

Nausea scores were low. On the second and third post-operative days those patients with higher nausea scores experienced more pain ( $P < 0.002$ ) and took more oxycodone ( $P < 0.03$ ). Only four (6%) patients

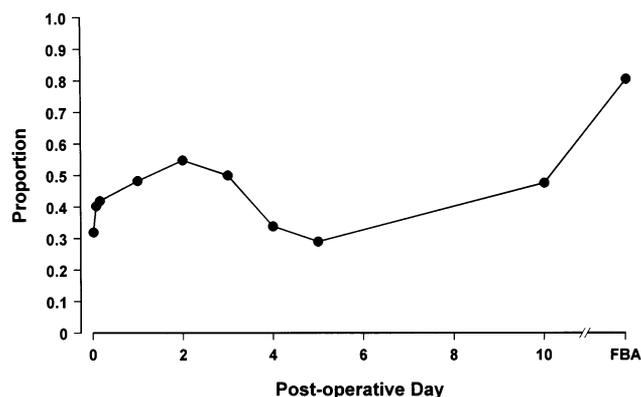


Fig. 2. Proportion of patients with pain scores > 2. FBA = first bowel action.

Table 2  
Analgesic use

Time	Number	Fentanyl	Oxycodone	Simple	None
30 min	62	8	3	1	50
2 h	62	0	15	6	41
4 h	62	0	4	11	47
Day 1	62	0	11	11	40
Day 2	62	0	30	13	19
Day 3	62	0	35	18	9
Day 4	62	0	28	18	16
Day 5	62	0	14	17	31
Day 10	42	0	14	11	17
First bowel action	62	0	33	13	16

Table 3  
VAS nausea scores and antiemetic use<sup>a</sup>

Time	Number	Mean nausea score	Lower	Upper	Parenteral metoclopramide	Oral metoclopramide	None
30 min	62	1.29	0.98	1.7	4	0	58
2 h	62	1.44	1.16	1.79	6	2	54
4 h	62	1.32	1.1	1.59	1	3	58
Day 1	62	1.35	1.07	1.72	0	5	57
Day 2	62	1.8	1.36	2.42	0	15	47
Day 3	62	1.42	1.13	1.8	0	10	52
Day 4	62	1.19	1.01	1.42	0	7	55
Day 5	62	1.16	1.01	1.34	0	4	58
Day 10	42	1.21	0.88	1.82	n/a	n/a	n/a

<sup>a</sup> n/a, Not available; lower, upper = lower and upper bound for a 95% confidence about the mean.

required parenteral metoclopramide post-operatively. This was not related to the administration of post-operative fentanyl. Antiemetic use was related to pain on day 2 ( $P < 0.03$ ) and 4 ( $P < 0.007$ ) but was not related to analgesic intake.

There was no relationship between pain and patient age or sex, whether they were from non-English speaking background or the number of haemorrhoidal complexes excised.

Seven of these patients required unanticipated overnight admissions for the following reasons:

1. pain, anxiety, pharmacy delay
2. pain, sweating
3. PONV, delayed voiding
4. PONV, delayed voiding
5. PONV
6. delayed voiding
7. nausea, language barrier

All patients were interviewed on day 30 post-operatively and patient satisfaction with their pain control is shown in Fig. 3.

Fifty-nine (95%) of the patients were satisfied with the post-operative pain management regimen. This level of satisfaction was not statistically related to the pain scores at the time of the first bowel action ( $P > 0.9$ ) or to nausea scores ( $P > 0.07$ ).

#### 4. Discussion

Recovery from surgical haemorrhoidectomy may be very painful particularly at the time of the first post-operative bowel action. In this series, a wide variation in post-operative pain was seen. In general, however, pain was well controlled using a multimodal analgesic approach. Few patients required fentanyl in the recovery room and only one subsequently needed parenteral opioid. Sixty-one of the 62 patients (99%) required

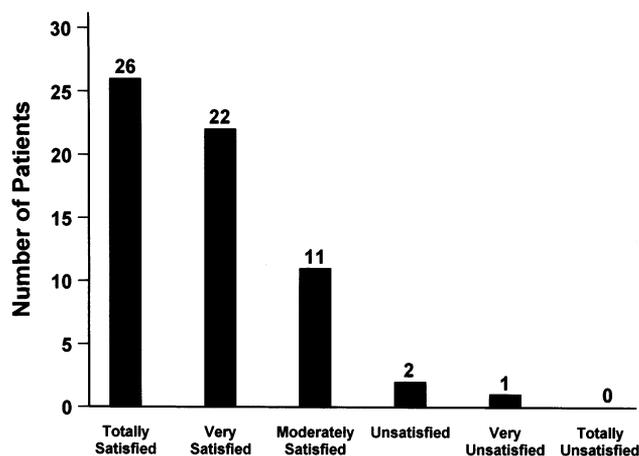


Fig. 3. Patient satisfaction with pain management.

neither parenteral analgesia, nor inpatient management at the time of the first bowel action.

Multi-model analgesic regimens, (the combination of two or more drugs and/or delivery systems to improve analgesia and minimise side effects) have shown benefit after surgery [9]. In particular the benefits of combining non-steroidal anti-inflammatory drugs, local anaesthesia and opioids are well-recognised [10]. Few have described such an approach for post-haemorrhoidectomy pain [11]. The success of the pain management approach on this series is reflected in the low mean pain scores and the high level of patient satisfaction.

Pain levels recorded on the second post-operative day were higher than that seen in the first 24 h. This may be due to the early analgesic effect of the pre-emptive local anaesthetic block. Pre-emptive analgesia is thought to inhibit peripheral nociceptive responses and prevent altered central that amplifies post-operative pain [12]. Infiltration of local anaesthesia for haemorrhoidectomy is controversial. Marsh et al. [13] found that bupivacaine confers no advantage but Morisaki et al. [14] showed that wound infiltration with lignocaine prolongs analgesia following haemorrhoidectomy. Caudal injection of bupivacaine has been shown to be superior to local injection, with patients experiencing significantly less pain 6 h after haemorrhoidectomy [15]. However, not all patients are suitable for caudal analgesia. Failure rates of 5–10% and delayed ambulation have been reported [15]. Spinal anaesthesia has been associated with a higher incidence of urinary retention compared with local infiltration [16]. In an effort to optimise patient advantages of early pain control in this series, we infiltrated local anaesthesia not only into the wounds but also into the ischiorectal fossae. The local anaesthetic thus interrupts the inferior haemorrhoidal nerve and the perineal branch of the fourth sacral nerve on each side. It should provide paralysis of the external sphincter and decreased sensation in the anal canal. The addition of this block would appear to confer specific advantages following haemorrhoidectomy, as our patients had low initial pain scores and analgesic requirements. This needs to be confirmed by further studies.

Increased pain after the fifth day was unexpected. It may be that infection plays a role in post-haemorrhoidectomy pain. Carapeti et al. [17], in a well-designed randomised placebo controlled trial, found metronidazole-reduced pain on day 5–7 after haemorrhoidectomy.

Opioid administration in the outpatient setting may increase post-operative nausea and vomiting. By adopting a multimodal approach to pain management and using prophylactic antiemetics, we anticipated that we would minimise opioid use and avoid this problem. Only 6% of patients required antiemetics in the recovery room, a considerably lower rate than that expected

from the literature [18]. Nausea scores, although not antiemetic use correlated with oxycodone usage. Nausea scores did not correlate with patient satisfaction regarding pain management.

Pre-operative patient education, focussing on pain management strategies can reduce the pain and distress of surgery [19]. Our positive approach to patients pre-operatively was meant to make patients felt confident that their pain would be well controlled. Hospital-based home nursing organisations are perceived as a valuable service with high patient and carer satisfaction as well as providing continuity of care [20]. We believe this involvement was important for the success of our project.

In summary, a wide variation in the level of pain after haemorrhoidectomy has been seen in this series. The pain of haemorrhoidectomy can be well controlled by a combination of adequate pre-operative education, pre-emptive analgesia and a multimodal post-operative analgesic regimen utilising standard medications and delivery systems.

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