

Original Article

Comparison of Fistulectomies Conducted under Intravenous General Anesthesia or Heavy Sedation with Midazolam and Meperidine

Tzung-Ju Lu
Chia-Cheng Lee
Cheng-Wen Hsiao
Tsai-Yu Lee
Chang-Chieh Wu
Shu-Wen Jao

Division of Colon and Rectal Surgery,
Department of Surgery, Tri-Service General
Hospital, National Defense Medical Center,
Taipei, Taiwan

Key Words

Fistulectomy;
Heavy sedation;
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Introduction. Anesthesia and postoperative pain are the main concerns of patients scheduled to undergo fistulectomies. Although several types of anesthesia are used for this procedure, opinions as to the simplest and most effective type are controversial. We compared the effects of heavy sedation and intravenous general anesthesia to clarify this issue.

Methods. We retrospectively studied medical records of patients who were diagnosed with an anal fistula and underwent surgical treatment at our institute. Patients were given intravenous general anesthesia or heavy sedation during surgery. Outcomes were patient characteristics, medication dose, postoperative pain score, and complications.

Results. Two hundred patients were enrolled in the study: 91 received intravenous general anesthesia (group 1) and 109 patients received heavy sedation (group 2). A further 10 patients were excluded because of incomplete admission data. There were no significant differences between groups 1 and 2 in age, ASA classification, body weight, or duration of hospital stay. However, the duration of surgery was longer in group 1 than in group 2 (51.03 ± 18.745 minutes vs. 38.37 ± 13.581 minutes, $p < 0.01$). The postoperative meperidine dose was greater for group 1 than for group 2 (82.58 ± 79.808 mg vs. 31.65 ± 50.305 mg, $p < 0.01$). Postoperative pain score was higher for group 1. None of the patients developed major surgical or anesthetic complications, including respiratory complications.

Conclusion. Both anesthetic methods were safe and effective and did not differ in the incidence of postoperative complications. However, patients who received heavy sedation experienced less postoperative pain and required less medication, which simplifies hospital treatment and reduces occupancy of the post-anesthesia care unit with an associated reduction in costs.

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Anal fistulae are common worldwide. The prevalence of anal fistulae is 0.0086% and males are

more susceptible than females.¹ Surgery is the main treatment for fistulae. Fistulectomies are preferred in

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Correspondence to: Dr. Shu-Wen Jao, Division of Colon and Rectal Surgery, Tri-Service General Hospital, No. 325, Sec. 2, Chenggong Rd., Neihu District, Taipei City 114, Taiwan. Tel: +886-2-8792-7223; Fax: +886-2-2754-7566; E-mail: ndmcnalien@gmail.com

our hospital even though they take longer to heal. However, patients who undergo this procedure experience postoperative pain similar to those who experience hemorrhoidectomy pain. Postoperative pain is an important factor for patients considering this operation. Many attempts have been made to limit postoperative pain and the cost of the procedure. Local anesthesia is regarded as simple, safe, and cost effective for anorectal surgery. However, patients have complained that local anesthesia is insufficient and that they experience considerable pain in the perianal region. There are several methods for decreasing pain during and after surgery. Heavy sedation, which was first used for eye surgery in 1961,² is a simple method of limiting pain during surgery. The aim of our study is to determine whether heavy sedation and intravenous anesthesia differ in terms of medication required, postoperative pain, and complications after anal fistulectomy.

Methods

After obtaining institutional review board approval from the Tri-Service General Hospital in Taiwan, we retrospectively studied the medical records of 210 consecutive patients who underwent a fistulectomy for a fistula-in-ano between September 2006 and December 2009 at our institute. We reviewed demographics, anesthetic methods, surgical findings, pain score after the operation, and complications. Patients who underwent a fistulectomy under intravenous general anesthesia with perianal infiltration of anesthetic were classified as group 1, and patients who underwent a fistulectomy under heavy sedation with perianal infiltration of anesthetic were classified as group 2. All patients received sodium phosphate per os on the day before the operation and a phosphate enema in the morning of surgery. The operations were performed with the patients in the prone jackknife position. Heavy sedation was induced by a nurse and consisted of intramuscular injections of Demerol (meperidine, 1 mg/kg) and midazolam (4 mg) approximately 30 minutes before the operation. Patients who received heavy sedation were not required to fast for more than 8 hours before the operation. The blood pressure and oxygen saturation of pa-

tients who received heavy sedation were monitored during the operation. After the operation was completed, the patients were sent back to an ordinary ward without entering the postanesthesia care unit (PACU). Intravenous general anesthesia was induced by an anesthesiologist. Patients who received intravenous general anesthesia were required to fast for at least 8 hours before the operation and for 4 hours after the operation. The anesthetic procedure included monitoring of vital signs, oxygen supplementation using a mask, and administration of anesthetic drugs. Fentanyl (2 ml of a 50 µg/ml solution), midazolam (2-5 ml of a 1 mg/ml solution), and propofol (8-10 ml of a 10 mg/ml solution) were administered during intravenous general anesthesia. The patients remained in the PACU for 30 minutes after surgery. Perianal anesthetic infiltration was performed for both groups using 60 ml of a solution consisting of 30 ml of a 0.5% bupivacaine solution, 15 ml of a 2% xylocaine solution, 15 ml distilled water and 0.4 ml of a 1:1000 epinephrine solution. Patients who underwent intravenous anesthesia received the perianal infiltration of anesthetic after they lost consciousness. Administration of intravenous medication was terminated when the perianal infiltration had been completed.

All patients were given clindamycin (300 mg intravenously) before the operation and oral metronidazole (500 mg three times daily for 5 days) after the operation. All fistulectomies, in which the excision site was left open, were conducted by the same surgical team. After the operation, a small piece of hemostatic gauze (Kaltostat, Bristol-Myers Squibb, Convatec Medical, Taiwan) was packed into the anal canal and removed the next morning. An oral analgesic agent (flurbiprofen; 100 mg twice daily) was prescribed for all patients after the operation. If the patient still experienced severe pain, an intramuscular injection of meperidine (Demerol, 50 mg q6h prn) was prescribed. Patients were instructed to complete a subjective pain survey using a visual analogue scale ranging from 0 (no pain) to 10 (the worst pain) after the operation and at 8-hour intervals thereafter. The duration of surgery, the duration of hospital stay, and early complications (urinary retention, postoperative bleeding, fecal urgency, and urinary tract infection) were recorded.

The data were entered into a computerized database and analyzed using SPSS software 16.0 (SPSS Inc., Chicago, IL, USA). Independent Student's *t* test, Chi-square tests was used to evaluate any differences between groups; $p < 0.05$ was taken as statistically significant.

Results

Two hundred ten patients were included in this study. Ten patients were excluded because of missing data. Ninety-one patients underwent a fistulectomy under intravenous general anesthesia with perianal anesthetic infiltration (group 1). One hundred nine patients underwent a fistulectomy under heavy sedation with perianal anesthetic infiltration (group 2). There were no significant differences between groups 1 and 2 in age (mean age 39.74 ± 10.863 years vs. 39.93 ± 14.313 years, $p = 0.915$), body weight, body height, and ASA grade (group 1, 83 cases of ASA I and 8 cases of ASA II; group 2, 98 cases of ASA I and 11 cases of ASA II; $p = 0.755$; Table 1).

Surgical results are shown in Table 2. The duration of surgery was longer for patients who received intravenous anesthesia than those who received heavy

sedation (51.03 ± 18.745 minutes vs. 38.37 ± 13.581 minutes, $p < 0.01$). Three patients in group 1 developed surgical complications (two had postoperative bleeding and one had acute urine retention). In group 2, two patients developed complications; one had postoperative bleeding and one had acute urine retention. There were no complications associated with anesthesia during or after the operation. The fistulectomy in the prone jackknife position was well tolerated by all patients.

Postoperative pain score was recorded every 8 hours (Fig. 1). The average pain score for group 1 was higher than that for group 2 until 40 hours after the operation. Patients who received intravenous general anesthesia required more meperidine postoperatively than the heavy sedation group (82.58 ± 79.808 mg vs. 31.65 ± 50.305 mg, $p < 0.01$). The average duration of hospital stay was 3.16 days for both groups. No patients were readmitted for postoperative complications within a month of surgery (Table 3).

Discussion

Surgery of the anorectal region requires adequate anesthesia because this area has an abundant nerve

Table 1. Patients profile

Patients profile			
	Group 1	Group 2	<i>p</i> value
Number	91	109	
Gender (M/F)	75/16	103/6	0.007
Age (yr)	39.74 ± 10.863	39.93 ± 14.313	0.915
Body Height (cm)	168.37 ± 7.724	168.49 ± 6.666	0.912
Body weight (Kg)	69.57 ± 12.149	70.06 ± 11.247	0.766
ASA grade I/II	83/8	98/11	0.755
Complex/Simple fistula	10/81	9/100	0.982

Group 1: Fistulectomy under the intravenous general anesthesia.

Group 2: Fistulectomy under the heavy sedation.

Table 2. Surgical result

Surgical Result			
	Group 1	Group 2	
Operation time (min)	51.03 ± 18.745	38.37 ± 13.581	$p < 0.01$
Complication	3	2	$p = 0.255$
Bleeding	2	1	$p = 0.229$
Acute urine retention	1	1	$p = 0.449$

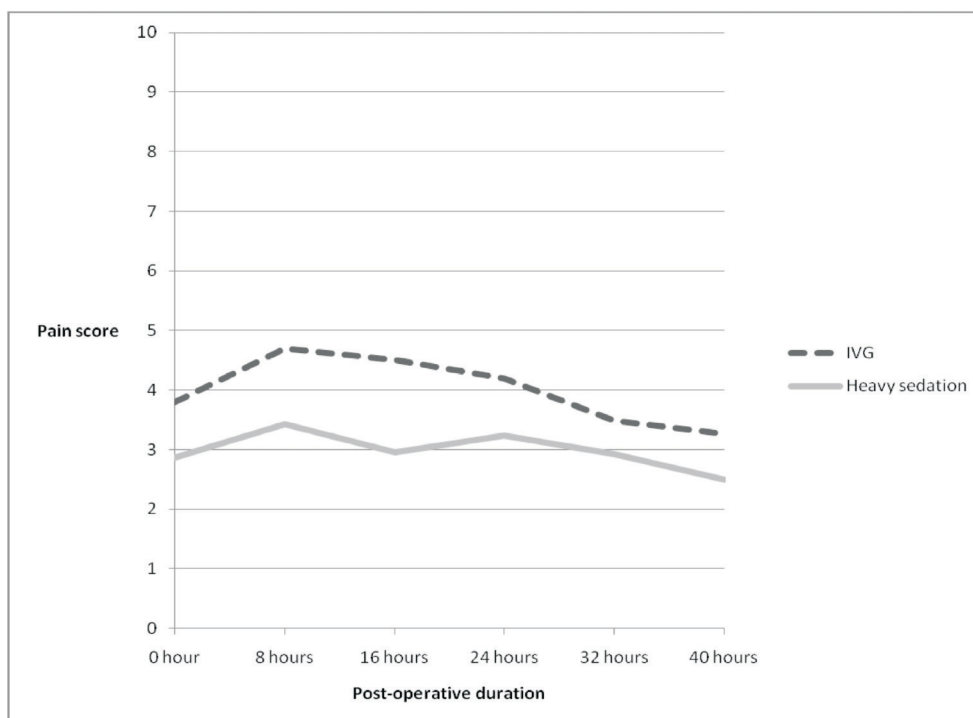


Fig. 1. Post-operative pain score.

Table 3. Post-operative pain control and hospital course

Post-operative Pain Control and Hospital Course			
	Group 1	Group 2	
Meperidine dose (mg)	82.58 ± 79.808	31.65 ± 50.305	<i>p</i> < 0.01
Hospital stay (day)	3.16 ± 1.186	3.16 ± 1.140	<i>p</i> = 0.957
Re-admission	0	0	-

supply. Many kinds of anesthesia have been used to limit pain during this procedure. Local anesthesia is simple and is considered safe for anorectal surgery.³ However, pain during the local infiltration of anesthetic and a sensation of dilatation of the anus and rectum are major problems for patients. Various methods have been developed to limit pain, including local anesthesia combined with intravenous anesthesia,⁴⁻⁶ a modified needle,⁷ injection above the dental line with anoscopy,⁸ and a posterior perineal block with local anesthetic.⁹ The intravenous general anesthesia procedure for anorectal surgery was first published in 1948.⁴ Although this is a simple method, the patient's respiratory condition should be monitored during deep anesthesia because of the prone position of the patient. A recent study¹⁰ showed that intravenous general anesthesia with local anesthesia is safe and

cost-effective. However, according to this study, patients with severe respiratory disease or morbid obesity are not suitable for intravenous general anesthesia in the prone position.

Heavy sedation was first used in 1961 for ocular surgery.² Midazolam and meperidine are often used for this purpose now. Midazolam is benzodiazepine and has potent anxiolytic, amnestic, hypnotic, anti-convulsant, skeletal muscle relaxant, and sedative properties. Its duration of action is about 30 minutes and its onset is 1-3 minutes. A combination of midazolam and meperidine increases sedation and analgesia. Short-term procedures such as colonoscopy and hemorrhoidectomy are suitable for this kind of anesthesia. Unlike intravenous general anesthesia, heavy sedation does not have to be administered by an anesthesiologist. This method is cheap in terms of anesthetic

drug and PACU costs.¹¹

In our experience, fistulectomies conducted using perianal local infiltration and either intravenous general anesthesia or heavy sedation is safe and effective. However, the duration of surgery was longer for patients who received intravenous general anesthesia than for those who received heavy sedation. During the operation, inadequate intravenous anesthesia caused the patients to move when the anus was dilated. As a result, time was wasted maintaining the prone position of the patient. Although deeper intravenous anesthesia would resolve this problem, more time would be required to monitor the patient's respiratory condition. Patients who received heavy sedation did not completely lose consciousness during surgery. We used midazolam and meperidine to reduce the discomfort of infiltration and to erase their memory of the procedure. All patients who received heavy sedation were calm during the operation and the sensation of anal dilatation was well tolerated.

Pain was more severe after intravenous general anesthesia than after heavy sedation. Consequently, the requirement for postoperative meperidine was lower in the heavy sedation group than in the general anesthesia group. In our opinion, heavy sedation enables patients to adapt gradually to pain in the anal region, whereas patients who undergo general anesthesia are suddenly exposed to anal pain when the effect of the anesthetic wears off. In both groups, urinary complications occurred before the anal wound packing was removed but resolved after the packing was removed and bethanechol chloride or meperidine injections were prescribed. Postoperative bleeding occurred in 2 cases in group 1, and 1 case in group 2. Although postoperative bleeding was rare in both groups, we consider that improved toleration of pain during and after the operation would help the surgeon to monitor bleeding when completing procedure and help to maintain compression of the wound after the operation. Mean hospital stay did not differ between the groups because there were no major complications and pain score for both groups was less than 4 before discharge. Although we did not analyze cost differences between the groups, it is clear that complex anesthesia is associated with the cost of PACU care and additional postoperative medication.

Conclusion

Although some patients hesitate at the prospect of heavy sedation, our study revealed that fistulectomy was well tolerated by patients who received heavy sedation or intravenous anesthesia with local infiltration. Furthermore, heavy sedation caused less postoperative pain than intravenous general anesthesia. Heavy sedation also reduced the operation time, time spent preparing for anesthesia, and demands on the PACU staff without causing respiratory complications. However, our study did not include ASA class III or IV patients, who would not benefit from general anesthesia. We also lacked elderly patients and patients with morbid obesity. The criteria for heavy sedation need to be established by a larger study.

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原 著

朦朧麻醉與靜脈全身麻醉對肛門瘻管手術的比較

呂宗儒 蕭正文 李家政 李才宇 吳昌杰 饒樹文

國防醫學院 三軍總醫院 外科部 大腸直腸外科

目的 肛門瘻管手術的術中與術後的疼痛是患者考量接受手術的一個重點，也是醫療品質與花費的議題。因此，我們比較目前常用的靜脈全身麻醉與朦朧麻醉的麻醉方式，希望了解其效果。

方法 我們藉由一個回溯性的研究來探討不同麻醉方式對於手術、疼痛、與併發症之影響。有一組病患族群接受使用靜脈麻醉之瘻管切除術，而另外一組病人接受使用朦朧麻醉之瘻管切除手術。分析預後的因子包括手術時間、疼痛指數、住院天數、及併發症。

結果 200 位有單純或複雜性肛門瘻管之病患接受瘻管切除手術，其中 91 例接受靜脈全身麻醉，另外 109 個病患接受朦朧麻醉。靜脈麻醉組與朦朧麻醉組病患關於年齡、身高體重、複雜性瘻管比例並無統計學的差異。兩組病人手術時間以靜脈麻醉較長 (51.44 minutes vs. 39.94 minutes)，術後止痛藥使用以靜脈麻醉組較多 (82.58 mg vs. 31.65 mg)。關於住院天數、手術併發症則無統計學顯著性差異。

結論 從我們的統計來看於兩種麻醉方式對於瘻管手術都是安全有效的方式。然而，朦朧麻醉可提供較快的手術時間，減少術後麻醉恢復時間，術後疼痛也較不嚴重。

關鍵詞 肛門瘻管手術、朦朧麻醉、靜脈麻醉。