Original Article

Comparison of the Surgical Results of Hemorrhoidectomy under Intravenous General Anesthesia and Spinal Anesthesia

Chuang-Wei Chen[1,2]
Chung-Ming Chen[1,2]
Koung-Hong Hsiao[1,2]
[1]*Division of Colon and Rectal Surgery, Department of Surgery, Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, New Taipei City,*
[2]*School of Medicine, Tzu Chi University, Hualien, Taiwan*

Key Words
Hemorrhoidectomy;
Intravenous general anesthesia;
Spinal anesthesia;
Complication;
Satisfaction

Background. The purpose of this study is to evaluate the pros and cons of the two common anesthetic methods used for hemorrhoidectomy.
Methods. We prospectively collected a database of 81 consecutive patients whose symptomatic hemorrhoids were managed by LigaSure hemorrhoidectomy at our hospital. Among these patients, 40 received intravenous general anesthesia with perianal anesthetic infiltration (group 1) and 41 patients received spinal anesthesia (group 2). The groups were compared with respect to demographic data, operative time, total time in the operating room, postoperative pain score, narcotic consumption, complications, length of hospital stay, operative outcomes, and satisfaction level.
Results. All patients tolerated the whole course of the operation in the prone jackknife position without anesthetic or anesthetic-associated complications. There was no significant difference between the groups with respect to patient age, gender, ASA grade, preoperative hemoglobin level, operative time, duration of hospital stay, pain score of the first postoperative day, postoperative narcotic consumption, early or late complications, duration of follow-up, and patient satisfaction level. However, the mean time spent in the operating room was significant longer in group 2 than in group 1 (45.5 vs. 60.1 min, respectively, $p < 0.05$). At the completion of follow-up, all patients in both groups were fully continent and no instances of anal stricture or recurrent symptoms occurred.
Conclusion. Both anesthetic methods are safe and effective for hemorrhoidectomy without significant difference in operative outcomes, analgesic requirements, complications, and patient satisfaction. However, spinal anesthesia is associated with a longer time in the operating room.
[*J Soc Colon Rectal Surgeon* (*Taiwan*) *2014;25:85-91*]

Hemorrhoidal disease is a common pathology worldwide affecting approximately 4.4% of the population in the United States and 3.8% of the population in Taiwan.[1,2] Despite the fact that the majority of hemorrhoids can be managed with conservative treatment, hemorrhoidectomy remains the definitive treatment for symptomatic third or fourth degree hemorrhoids.[3,4] Hemorrhoidectomy can be performed under

Received: March 5, 2014. Accepted: June 9, 2014.
Correspondence to: Dr. Koung-Hong Hsiao, Division of Colon and Rectal Surgery, Department of Surgery, Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, No. 289, Jianguo Rd., Sindian City, Taiwan. Tel: +886-2-8792-7223; Fax: +886-2-2754-7566; E-mail: docallen.tw@yahoo.com.tw

different anesthetic methods including general anesthesia, spinal anesthesia, laryngeal mask anesthesia (LMA), intravenous general anesthesia combined with local anesthesia, intramuscular heavy sedation with local anesthesia, or perianal anesthetic infiltration only.[5-8] In our institution, hemorrhoidectomy is usually performed on an inpatient basis under one of two anesthetic methods, intravenous general anesthesia combined with local perianal infiltration or spinal anesthesia. Presently there is limited evidence concerning the advantages and disadvantages of these two methods for anorectal surgery. The aim of this study is to evaluate the two common anesthetic methods used for hemorrhoidectomy in our hospital with respect to their surgical features, complications, outcomes, and patient satisfaction.

Materials and Methods

Study population

A prospectively collected database of 81 patients with symptomatic prolapsed hemorrhoids (Grades III and IV) managed by LigaSure® hemorrhoidectomy in our hospital between March 1, 2010 and September 30, 2010 were analyzed retrospectively. Among these patients, 40 patients underwent hemorrhoidectomy under intravenous general anesthesia with perianal anesthetic infiltration (group 1) and 41 patients underwent hemorrhoidectomy under spinal anesthesia (group 2). In this study, one of our colorectal surgeons performed hemorrhoidectomy under spinal anesthesia to his patients during the period of the study and the other one performed the operation under intravenous general anesthesia. Both surgeons performed LigaSure hemorrhoidectomy with the same surgical principle. Written informed consent was obtained from all of the patients, and this study was approved by the Institutional Review Board of our hospital. Patients who had thrombosed hemorrhoids, previous perianal surgery, or any other anorectal disorders were excluded.

The grading system (I-V) of the American Society of Anesthesiologists (ASA) was used to evaluate the general condition of the patients prior to surgery. Patients who had a history of cardiovascular disease and were receiving anticoagulants or antiplatelet drugs were instructed to discontinue taking the medication for at least 1 week prior to surgery and not to restart the medication until 1 week after the operation. Demographic data of patient, operating room time (total time spent in the operating room including duration of the operation and anesthesia), surgical time (duration of the operation), duration of hospital stay, anesthesia-related complications, pain score after the operation, postoperative narcotic requirement, early complications (urinary retention, postoperative bleeding, thrombus, fecal impaction), and late complications (fecal incontinence, anal stenosis, recurrence) were recorded.

Surgical technique

All patients received surgery on the day of admission. Patients were given a sodium phosphate enema preoperatively, and all patients underwent surgery in the prone jackknife position. Exposure was achieved by means of a large-sized Hill-Ferguson retractor and all operations were performed by the same colorectal surgeon. LigaSure hemorrhoidectomy was performed by initially using the cutting mode of the electrocautery device to make a narrow V-shaped incision from the external component of the hemorrhoidal cushion to the mucocutaneous junction. A long-smooth forceps was used to grasp and lift up the hemorrhoidal plexus. The LigaSure Max device was then applied beneath the forceps for coagulation from the mucocutaneous junction to above the apex of the hemorrhoidal cushion. A scissor was used to cut along the coagulum line, and the hemorrhoidal tissue above the welting line was removed. Then, the wound was approximated with a continuous 4-0 Vicryl suture. Usually, it was necessary to perform excisions of three hemorrhoidal cushions. Anal packing was not performed after the operation.

Anesthetic methods

Intravenous general anesthesia was performed by an anesthesiologist. Patients had to fast for at least 8

hours before the operation. The anesthetic procedure included establishing an intravenous route, blood pressure and EKG monitors, oxygen supplementation via mask, and administration of anesthetic drugs. Drugs used in anesthesia consisted of fentanyl 2 ml (50 ug/ml), midazolam 2-5 ml (1 mg/ml), and propofol 2-10 ml (10 mg/ml). Perianal analgesia was performed by perianal infiltration with 40 ml of an anesthetic agent (20 ml 0.5% bupivacaine, 20 ml 1% xylocaine, and 0.2 ml epinephrine in a 1:1000 solution) after the patient was in deep intravenous sedation. Patients who received spinal anesthesia were also fasted for at least 8 hours before the surgery. Postoperatively, patients remained at bed rest in the supine position for 8 hours to prevent possible postlumbar complications. Urinary catheters were not used in either group before or after the surgery unless urinary retention occurred.

Postoperative management

Postoperatively, all patients were prescribed with oral metronidazole (250 mg four times daily) for 5 days and a bulk laxative (Normacol 1 pk/day) for 2 weeks. Oral diclofenic, 25 mg four times a day was given for pain control. If pain was not relieved, intramuscular meperidine (50 mg) was given every 6 hours. Patients were instructed to irrigate the anal wound with warm sitz baths four times a day, and after every bowel movement. Neomycin ointment was prescribed for topical use. Patients were instructed to complete a subjective pain survey using a visual analogue scale (VAS) ranging from 0 (no pain) to 10 (the worst pain) in the morning of each postoperative day during hospitalization. Patients were not discharged from the hospital until their pain was considered tolerable with oral analgesics and without any postoperative complications.

Follow-up

After discharge, patients were seen in the outpatient clinic at 1-2 week intervals for a least 3 visits. Digital examination or anoscopy was performed to detect any possible stenosis. Patients were instructed to return to the clinic if problems occurred in the future. A telephone follow-up using a standardized questionnaire was performed to evaluate the presence of recurrent symptoms, incontinence, stenosis, and the level of patient satisfaction. All records were documented by an independent assessor. Patients were asked to rate their satisfaction level regarding the whole course of treatment on a scale of 1 (completely unsatisfied) to 10 (extremely satisfied) and scored were categorized as unsatisfied, 1-3; fairly satisfied, 4-6, satisfied, 7-8; and very satisfied, 9-10.

Statistical analysis

Comparisons of the two groups with respect to age, gender, ASA score, preoperative laboratory values, duration of follow-up, surgical features, hospital stay, narcotic consumption, pain score, and postoperative complications were performed using the independent-samples t test and chi-square test. SPSS 18.0 for Windows was used to perform all statistical analyses and a value of $p < 0.05$ was considered statistically significant.

Results

A comparison of the two groups with respect to demographic data, physical status, preoperative laboratory data, and duration of follow-up is shown in Table 1. No statistically significant differences were detected between the groups with respect to age (44.1 vs. 42.6 years, $p = 0.587$), gender (male:female; 19/21 vs. 20/21, $p = 0.908$), ASA grade (33 ASA I and 7 ASA II in group 1 vs. 33 ASA I and 8 ASA II in group 2, $p = 0.816$), hemoglobin level (13.7 vs. 13.9 g/dl, $p = 0.561$), and duration of follow-up (6.9 vs. 7.1 months, $p = 0.566$). All patients tolerated the procedure well and there were no instances of major anesthetic associated complications such as respiratory compromise in either group.

Surgical features, postoperative pain scores, surgical complications, length of hospital stay, narcotic consumption, and patient satisfaction level were shown in Table 2. There were no statistically significant differences between the groups in procedure time (23.8

Table 1. Demographic data, physical status and duration of follow-up

	Group 1: Intravenous anesthesia (n = 40)	Group 2: Spinal anesthesia (n = 41)	p value
Mean age (years)	44.1 (27-76)	42.6 (26-68)	0.587
Male/female	19/21	20/21	0.908
ASA class			
I	33 (82.5%)	33 (80.5%)	0.816
II	7 (17.5%)	8 (19.5%)	
Mean hemoglobin (g/dl)	13.7 (7.9-16.9)	13.9 (10.4-17.8)	0.561
Mean duration of follow-up (mo)	6.9 (5-9)	7.1 (5-9)	0.566

Table 2. Comparison of surgical features, complications, pain score and patient satisfaction

	Group 1: Intravenous anesthesia (n = 40)	Group 2: Spinal anesthesia (n = 41)	p value
Procedure time (min)	23.8 (12-35)	22.7 (10-45)	0.642
Operating room time (min)	45.5 (22-71)	60.1 (35-82)	< 0.001[a]
Complications			
No	37	36	0.712[b]
Yes	3	5	> 0.999[b]
Urine retention	1	2	0.616[b]
Bleeding	2	1	0.505[c]
Headache	0	1	0.505[c]
Pain at spinal site	0	1	
Pain score postoperative day 1	4.5 (2-7)	4.6 (2-8)	0.729
Frequency of postoperative meperidine injection (50 mg/injection)	1.4 (0-4)	1.5 (0-5)	0.743
Hospital stay (days)	2.2 (1-4)	2.3 (1-5)	0.576
Patient satisfaction level (satisfied or very satisfied)	34/40	33/41	0.770

[a] Statistically significance, $p < 0.05$.
[b] Fisher's exact test.
[c] Yates' chi-squared test.

vs. 22.7 min, $p = 0.642$), early complications (3/40 in group 1 vs. 5/41 in group 2, $p = 0.712$), duration of hospital stay (2.2 vs. 2.3 days, $p = 0.576$), pain score postoperative day one (4.5 vs. 4.6, $p = 0.729$), postoperative use of meperidine (1.4 vs. 1.5 times per person, $p = 0.743$), and patient satisfaction level (satisfied or very satisfied: 34/40 in group 1 vs. 33/41 in group 2, $p = 0.770$). However, the mean time spent in the operating room was significant longer for group 2 than group 1 (45.5 vs. 60.1 min, $p < 0.05$).

Postoperative follow-up at mean duration of 7.0 months (range, 5 to 9 months) in both groups was performed, and all patients were fully continent and there were no instances of anal stricture, persistent anal pain, or recurrent symptoms.

Discussion

Although hemorrhoidectomy can be performed using different anesthetic methods, the procedure is most commonly performed in an inpatient setting with general or spinal anesthesia.[5,6] The most critical concern of surgeons and anesthesiologists when performing hemorrhoidectomy using general or spinal anesthesia is the management of respiratory complications,[9] especially when the procedure is performed with the patient in the prone position. It has been reported that the use of sedative agents combined with opioids may result in respiratory depression.[10] In recent years, local anesthesia with deep intravenous sedation for anorectal surgery had been reported by

some investigators as a safe and effective alternative.[8,11-13] Our results have also shown that hemorrhoidectomy under intravenous general anesthesia with perianal local infiltration is safe and effective. All patients tolerated the procedure well in the prone jackknife position and there were no instances of respiratory complications or hypotensive events.

Some authors believe that there is a higher incidence of urinary retention when anorectal surgery is performed under intravenous general anesthesia because of possible fluid overload.[15] Similarly, some authors report a higher rate of urinary retention when anorectal surgery is performed under spinal anesthesia.[16,17] In present study, we did not perform urinary catheterization in either group and the rates of urinary retention were low; 2.5% (1/40) in group 1 and 4.9% (2/41) in group 2 and the difference was not significant.

The advantage of hemorrhoidectomy under intravenous general anesthesia is that patients were unconscious during the entire course of the operation, including the perianal injection of local anesthetics. Therefore, patients were completely free of pain and anxiety during the operation. In addition, they can resume activity relatively quick after their consciousness recovered. In contrast, patients receiving spinal anesthesia need to rest supine for at least 8 hours after the operation in order to prevent postlumbar complications. This makes it inconvenient when they want to eat something after the operation and if they need to pass urine they must use a bed pan or may require urinary catheterization.

Complications reported in patients undergoing hemorrhoidectomy under spinal anesthesia include urinary retention, postlumbar puncture headache, hypotension and persistent backache.[16-18] In our study, postlumbar puncture headache occurred in one patient (2.4%). The patient's symptoms were mild and were relieved with analgesics. The use of a smaller catheter with the bevel aimed parallel to the long axis of the spine is a useful preventive measure during dural puncture in adult patients.[19] One patient experienced persistent backache at the spinal site during the follow-up period. This can be explained by tissue trauma during the performance of spinal anesthesia.[18] Also, we have noticed a tendency toward greater blood loss when hemorrhoidectomy was performed with spinal anesthesia. This may be due to the effect of vasodilatation associated with spinal anesthesia.[20] We usually do not perform perianal local anesthetic infiltration for patients who receive spinal anesthesia, and the local anesthetic solution contains epinephrine which can facilitate hemostasis during the operation. However, we did not compare the blood loss between the two groups in our study. It is difficult to precisely estimate the blood loss during hemorrhoidectomy in our clinical practice because some blood may flow into the rectum. Besides, we usually suction out the blood and irrigating saline solution with both suction tube instrument and gauze. The wet gauze contained both blood and normal saline so that it will make bios. Thus, we did not collect accurate blood loss in our data.

The choice of anesthetic method for hemorrhoidectomy is usually based on a decision made jointly by the surgeon and the patient in our practice. However, most of our patients whose general condition is not stable or have severe underlying cardiovascular or respiratory diseases (ASA III or IV) usually do not receive surgery; their hemorrhoids are treated medically. However, if surgery is necessary we prefer to perform hemorrhoidectomy under spinal anesthesia because it has a relatively less adverse effect on respiration. Some authors advocate that anorectal surgery can be performed with only local anesthesia. Most of our patients request sedatives when undergoing hemorrhoidectomy because the perianal injection of a local anesthetic is extremely painful, and many patients experience a high level of anxiety if they are not given any sedative or narcotics.

The limitation of this study is that our design is not a randomized control study and the sample size is small.

Conclusion

The results of this study indicate that hemorrhoidectomy under intravenous general anesthesia with perianal anesthetic infiltration or spinal anesthesia are both safe and effective without significant differences in surgical outcomes, analgesic requirements, early or

late postoperative complications, and patient satisfaction. However, spinal anesthesia is associated with a greater length of time in the operating room.

References

1. Bleday R, Pena JP, Rothenberger DA, Goldberg SM, Buls JG. Symptomatic hemorrhoids: current incidence and complications of operative therapy. *Dis Colon Rectum* 1992;35:477-81. doi: 10.1007/BF02049406
2. Holzheimer RG. Hemorrhoidectomy: indications and risks. *Eur J Med Res* 2004;9:18-36.
3. MacRae HM, McLeod RS. Comparison of hemorrhoidal treatment modalities: a meta-analysis. *Dis Colon Rectum* 1995; 38:687-94. doi: 10.1007/BF02048023
4. Pfenninger JL. Modern treatments for internal hemorrhoids. *BMJ* 1997;314:1211-2. doi: 10.1136/bmj.314.7089.1211
5. Kisli E, Agargun MY, Tekin M, Selvi Y, Karaayvaz M. Effects of spinal anesthesia and laryngeal mask anesthesia on mood states during hemorrhoidectomy. *Adv Ther.* 2007;24: 171-7. doi: 10.1007/BF02850005
6. Read TE, Henry SC, Hovis RM, Fleshman JW, Birnbaum EH, Caushaj PF, et al. Prospective evaluation of anesthetic technique for anorectal surgery. *Dis Colon Rectum* 2002;45: 1553-60. doi: 10.1007/s10350-004-6466-8
7. Lohsiriwat D, Lohsiriwat V. Outpatient hemorrhoidectomy under perianal anesthetics infiltration. *J Med Assoc Thai* 2005;88:1821-4.
8. Chen CW, Jao SW, Wu C-C, Lee TY, Feng CC, Hsiao CW. Comparison of Surgical Results of Hemorrhoidectomy under Intravenous General Anesthesia and Heavy sedation. *J Soc Colon Rectal Surgeons (Taiwan)* 2008;19:33-40.
9. Cohen MM, Duncan PG, Tate RB. Does anesthesia contribute to operative mortality? *JAMA* 1988;260:2859-63. doi: 10.1001/jama.260.19.2859
10. Badrinath S, Avramov MN, Shadrick M, Witt TR, Ivankovich AD. The use of a ketamine-propofol combination during monitored anesthesia care. *Anesth Analg* 2000;90:858-62. doi: 10.1213/00000539-200004000-00016
11. Li S, Coloma M, White PF. Comparison of the costs and recovery profiles of three anesthetic techniques for ambulatory anorectal surgery. *Anesthesiology* 2000;93:1225-30. doi: 10.1097/00000542-200009001-00012
12. Sungurtekin H, Sungurtekin U, Erdem E. Local anesthesia and midazolam versus spinal anesthesia in ambulatory pilonidal surgery. *J Clin Anesth* 2003;15:201-5. doi: 10.1016/S0952-8180(03)00032-1
13. Fleischer M, Marini CP, Statman R, Capella J, Shevde K. Local anesthesia is superior to spinal anesthesia for anorectal surgical procedures. *Am Surg* 1994;60:812-5.
14. Lohsiriwat V, Lohsiriwat D. Ambulatory anorectal surgery under perianal anesthetics infiltration: analysis of 222 cases. *J Med Assoc Thai* 2007;90:278-81.
15. Petros JG, Bradley TM. Factors influencing postoperative urinary retention in patients undergoing surgery for benign anorectal disease. *Am J Surg* 1990;159:374-6. doi: 10.1016/S0002-9610(05)81274-7
16. Prasad ML, Abcarian H. Urinary retention following operations for benign anorectal diseases. *Dis Colon Rectum* 1978; 21:490-2. doi: 10.1007/BF02586733
17. Sun MY, Canete JJ, Friel JC, McDade J, Singla S, Paterson CA, et al. Combination propofol/ketamine is a safe and efficient anesthetic approach to anorectal surgery. *Dis Colon Rectum* 2005;49:1059-65. doi: 10.1007/s10350-006-0572-8
18. Schwabe K, Hopf HB. Persistent back pain after spinal anaesthesia in the non-obstetric setting: incidence and predisposing factors. *Br J Anaesth* 2001;86:535-9. doi: 10.1093/bja/86.4.535
19. Leibold RA, Yealy DM, Coppola M, Cantees KK. Post-dural-puncture headache: Characteristics, management and prevention. *Ann Emerg Med* 1993;22:1863-70. doi: 10.1016/S0196-0644(05)80416-0
20. Kee WDN, Khaw KS, Ng FF. Prevention of Hypotension during Spinal Anesthesia for Cesarean Delivery: an Effective Technique Using Combination Phenylephrine Infusion and Crystalloid Cohydration. *Anesthesiology* 2005;103:744-50. doi: 10.1097/00000542-200510000-00012

原　著

比較痔瘡切除術在靜脈全身麻醉與脊椎麻醉下之手術結果

陳莊偉 [1,2]　陳宗明 [1,2]　蕭光宏 [1,2]

[1] 佛教慈濟醫療財團法人台北慈濟醫院　外科部　大腸直腸外科

[2] 慈濟大學　醫學院

目的　這個研究的目的是要評估兩種常使用於痔瘡切除手術的麻醉方式，分析其優劣及手術結果之間有無差異。

方法　我們前瞻性地收集連續八十一位診斷為第三、四度脫垂痔瘡的病患在我們醫院接受組織凝集器 (LigaSure) 痔瘡切除手術的資料。這些病人中，四十位接受靜脈全身麻醉合併局部肛門注射麻醉 (Group 1)，四十一位接受脊椎麻醉 (Group 2)。我們比較這兩組病人之基本資料、手術時間、手術室內所需花費的時間、術後疼痛指數、止痛劑使用量、併發症、住院天數、手術結果及病人滿意度。

結果　所有病人均能在趴臥傑克式剪刀 (prone jackknife position) 的姿勢下完成痔瘡切除手術且沒有術中麻醉相關併發症。這兩組病患在年齡 (age 44.1 vs. 42.6 years, p = 0.587)、性別 (male:female; 19/21 vs. 20/21, p = 0.908)、ASA 分級 (33 ASA I and 7 ASA II in group 1 vs. 33 ASA I and 8 ASA II in group 2, p = 0.816)、術前血色素值 (13.7 vs. 13.9 g/dl, p = 0.561)、手術時間 (23.8 vs. 22.7 min, p = 0.642)、平均住院天數 (2.2 vs. 2.3 days, p = 0.576)、平均術後第一天的疼痛指數 (4.5 vs. 4.6, p = 0.729)、平均術後止痛劑的使用劑量 (1.4 vs. 1.5 times per person, p = 0.743)、早期及晚期手術併發症 (3/40 in group 1 vs. 5/41 in group 2, p = 0.712)、平均術後追蹤時間 (6.9 vs. 7.1 months, p = 0.566) 及病患對整體手術的滿意度 (satisfied or very satisfied: 34/40 in group 1 vs. 33/41 in group 2, p = 0.770) 上均沒有統計上的顯著差別。然而，Group 2 的病患平均在手術室內所需花費的時間明顯比 Group 1 病患來的長 (45.5 vs. 60.1 min, respectively, p < 0.05)。在追蹤期間內，兩組病人均無排便失禁、肛門狹窄或復發症狀。

結論　這兩種麻醉方式對於痔瘡切除術均是安全有效的，並且在手術結果、止痛劑使用量、術後併發症及病患滿意度上均無顯著差別。然而，病患於脊椎麻醉下進行痔瘡手術比在靜脈全身麻醉下需要明顯較長的時間於手術室內。

關鍵詞　痔瘡切除術、靜脈全身麻醉、脊椎麻醉、併發症、滿意度。