

Original Article

Comparison of Surgical Results of Hemorrhoidectomy under Intravenous General Anesthesia and Heavy Sedation

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Key Words

Hemorrhoidectomy;

Heavy sedation;

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Complication;

Satisfaction

Purpose. The purpose of this study is to compare surgical results, including operation time, time spent in the operating room, pain score, complications, recurrence, and patient satisfaction between two different anesthetic methods for patients undergoing hemorrhoidectomy.

Methods. We retrospectively studied medical records of 64 consecutive patients who were diagnosed as fourth-degree hemorrhoids and underwent surgical treatment in our institute. Thirty patients underwent the procedure under intravenous general anesthesia with perianal anesthetics infiltration (Group 1) and thirty four patients under heavy sedation (intramuscular injections of meperidine and midazolam) with perianal anesthetics infiltration (Group 2). Both groups were compared in the areas of demographics, surgical features, pain score, complications, recurrence, and patient satisfaction.

Results. There were no significant difference between group 1 and group 2 in patient age (mean age 41 vs. 43 years, $p = 0.593$), gender (male vs. female was 13:17 vs. 19:15, $p = 0.316$), ASA grade (27 ASA I and 3 ASA II in group 1; 29 ASA I and 5 ASA II in group 2, $p = 0.713$), hemoglobin level (12.2 vs. 12.4 g/dl, $p = 0.711$), bleeding time value (4.1 vs. 3.9 min, $p = 0.658$) and duration of follow-up (4.3 vs. 4.4 months, $p = 0.703$). There was no incident of anesthetic associated complications occurred in both groups. All patients tolerated the hemorrhoidectomy in the prone jackknife position. There were also no statistic significance between both groups in procedure time (36.3 vs. 33.2 min, $p = 0.223$), early or late complications ($p = 0.940$), duration of hospital stay (2.9 vs. 2.7 days, $p = 0.489$), pain score on the morning of the first postoperative day (pain score of 5.1 vs. 5.3, $p = 0.524$) and the postoperative consumption of analgesics use (meperidine use of 105mg and 110mg per person in group 1 and group 2 respectively, $p = 0.585$). However, the mean time spent in the operating room was significant longer in Group 1 than in Group 2 (61.5 vs. 41.7 min, $p < 0.05$). Pain score during the operation was significant higher in Group 2 (pain score of 0.5 vs. 6.2, $p < 0.05$). Patient satisfaction level was superior in Group 1 (satisfied or very satisfied: 25/30 in group 1 vs. 14/34 in group 2, $p = 0.007$).

Conclusion. Both anesthetic methods for hemorrhoidectomy were safe and effective without significant difference in postoperative complications and recurrence. However, patients with intravenous general anesthesia needed more operating room time than those with heavy sedation, but it bears with a significantly lower pain score during the operation and a better satisfaction level. [*J Soc Colon Rectal Surgeon (Taiwan) 2008;19:33-40*]

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Hemorrhoidal disease is a commonly diagnosed disease worldwide. The prevalence rate of hemorrhoids was estimated to be 4.4% of population in the United States.^{1,2} Despite the fact that the majority of hemorrhoids can be managed with conservative treatment, surgical intervention remains to be the treatment of choice for the third or fourth degree hemorrhoids.^{3,4} Patients treated with hemorrhoidectomy can be placed under different anesthetic alternatives including general anesthesia, spinal anesthesia, laryngeal mask anesthesia (LMA), intravenous general anesthesia (intravenous sedation) combined with local anesthesia, or perianal anesthetics infiltration.⁵⁻⁷ In our institution, hemorrhoidectomy is usually performed at inpatient base under two anesthetic methods: local perianal infiltration combined with either intravenous general anesthesia or the heavy sedation (intramuscular injection of sedatives and analgesics). Up to present, it still lacks evidence concerning the advantage and disadvantage among these different anesthetic ways for anorectal surgery. This study is aimed to compare the two common anesthetic methods used for hemorrhoidectomy in our hospital, with respect to their surgical features, complications, recurrence and patient satisfaction level.

Patients and Methods

We retrospectively studied the medical records of 64 consecutive patients who underwent hemorrhoidectomy for the fourth degree hemorrhoids between January 2006 and July 2006 in our institution. Among these patients, 30 patients underwent hemorrhoidectomy under the intravenous general anesthesia with perianal anesthetics infiltration (Group 1), 34 patients underwent hemorrhoidectomy under the heavy sedation with perianal anesthetics infiltration (Group 2). Charts were reviewed on the demographics, surgical indications, operative features, pain score during or after the operation, complications, surgical results and patient satisfaction level.

Patients who had thrombosed hemorrhoids, previous perianal surgery or any other anorectal disorders were excluded to this study. The grading system (I-V) of the American Society of Anesthesiologists (ASA) was

used to evaluate patient's general condition before the operation. Group 1 had 27 patients with ASA I and 3 patients with ASA II; Group 2 had 29 patients in ASA I and 5 patients in ASA II. Patients who had a history of cardiovascular disease and took anticoagulant or antiplatelet drugs were instructed to discontinue taking the medication for at least one week prior to the admission.

Patients were instructed to take phosphate enema on the morning of surgery. All patients received operations in the prone jack knife position. Heavy sedation was performed by the nurse in the ward with intramuscular injections of Demerol (meperidine, 1 mg/kg) and midazolam (5 mg) approximately 30 minutes before the operation. Patients who will receive heavy sedation do not need to fast before the operation. Blood pressure was monitored in patients with heavy sedation during the operation. Intravenous general anesthesia was performed by the anesthesiologist. Patients who will receive intravenous general anesthesia need to fast at least 8 hours before the operation and 4 hours after the operation. The anesthetic procedure included setting up an intravenous route, blood pressure and EKG monitors, oxygen supplement with mask, and administration of anesthetic drugs. Fentanyl 2 ml (50 ug/ml), midazolam 2-5 ml (1 mg/ml), and propofol 8-10 ml (10 mg/ml) were administered during the intravenous general anesthesia. Perianal anesthetics infiltration was performed in both groups by perianal infiltration with 60 ml anesthetic agent (0.5% bupivacaine 30 ml + 2% xylocaine 15 ml + diswater 15 ml + epinephrine 0.4 ml of a 1:1000 solution). In Group 1, the perianal anesthetics infiltration was performed after the patient was in deep intravenous sedation.

All patients were given clindamycin (300 mg intravenously) at induction of the procedure and were prescribed with oral metronidazole (500 mg three times a day for 5 days). Closed hemorrhoidectomy (Ferguson technique) was conducted in all patients by the same colorectal surgeon. After the operation, a small piece of hemostatic gauze (kaltostat, Bristol-Myers Squibb, Convatec, medical Taiwan) was packed in the anal canal for 4 hours. Oral analgesic agents were prescribed for every patient after the operation with Flurbiprofen (Lefenine) 100 mg twice a day. If the patient still felt severely painful, 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) to detect the pain score during the operative process (the highest pain score during the operation) and on the morning of the first postoperative day. Patients who were in the group of intravenous general anesthesia were asked to answer the intraoperative pain score after they were conscious. The operating room time (total time spent in the operating room), procedure time of hemorrhoidectomy, duration of hospital stay, early complications (urinary retention, postoperative bleeding, fecal urgency, and urinary tract infection) and late complications (fecal incontinence, anal stenosis, and recurrence) were recorded. After being discharged, each patient was given an instruction sheet and arranged with an outpatient appointment on the 7th days, 14th days, and 21st days. Digital examination or anoscopy was performed to detect any possible stenosis. Consequently, the follow-up was performed by telephone every month. Patients were asked with a standardized questionnaire aiming to evaluate the presence of symptoms including persistent anal pain, prolapse, bleeding, fecal incontinence and any degree of outlet obstruction. Patient satisfaction level about the whole course was also inquired with different satisfied degree (unsatisfied, acceptable, satisfied, and very satisfied) using a questionnaire (Appendix 1).

As far as statistics, the comparison of the two groups with different anesthetic methods was performed on age, gender, ASA score, preoperative laboratory values, duration of follow-up, surgical features, hospital stay, narcotics consumption, pain score and postoperative complications by Independent-Samples t test and chi-square tests. SPSS 12.0 for Windows was utilized to perform all the statistical analyses and a value of less than 0.05

was considered statistical significant.

Results

Table 1 showed the comparison in both groups with regard to patient demographics, physical status, preoperative laboratory data, and duration of follow-up. No statistic significance was detected between group 1 and group 2 in patient age (mean age 41 vs. 43 years, $p = 0.593$), gender (male: female was 13:17 vs. 19:15, $p = 0.316$), ASA grade (27 ASA I vs. 3 ASA II in group 1; 29 ASA I vs. 5 ASA II in group 2, $p = 0.713$), hemoglobin level (12.2 vs. 12.4 g/dl, $p = 0.711$), values of bleeding time (4.1 vs. 3.9 min, $p = 0.658$), and duration of follow-up (4.3 vs. 4.4 months, $p = 0.703$). There were no instances of anesthetic associated complications such as respiratory compromise occurred in both groups during the operation. All patients tolerated the whole course of hemorrhoidectomy in the prone jackknife position.

Table 2 showed the results on surgical features, pain scores during or after the operation, surgical complications, hospital stay, narcotics consumption, and patient satisfaction level. There were no statistically significant difference between both groups in the procedure time (36.3 vs. 33.2 min, $p = 0.223$), early or late complications ($p = 0.940$), duration of hospital stay (2.9 vs. 2.7 days, $p = 0.489$), pain score on the morning of the 1st postoperative day (pain score of 5.1 vs. 5.3, $p = 0.524$), and the postoperative consumption of Demerol use (meperidine use of 105 mg and 110 mg per person in group 1 and group 2 respectively, $p = 0.585$). However, the mean time spent in the operating room was significant longer in Group 1 than in Group 2 (61.5 vs. 41.7 min, $p < 0.05$). Pain

Table 1. Demographics, physical status, and duration of follow-up in both groups

	Group 1 (IVG, n = 30)	Group 2 (Heavy sedation, n = 34)	P value
Mean age (years)	41 (22-60)	43 (20-63)	0.593
Male/female ratio	13/17	19/15	0.316
ASA class			
I	27	29	0.713
II	3	5	
Mean hemoglobin (g/dl)	12.2 (9.0-15.3)	12.4 (8.9-16.0)	0.711
Mean bleeding time (min)	4.1 (2-7)	3.9 (2-6.5)	0.658
Mean duration of follow-up (mo)	4.3 (2-8)	4.4 (2-9)	0.703

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

	Group 1 (IVG, n = 30)	Group 2 (Heavy sedation, n = 34)	P value
Procedure time (min)	36.3 (19-65)	33.2 (15-60)	0.223
Operating room time (min)	61.5 (42-91)	41.7 (19-70)	0.000 ^a
Early complication			
Urine retention	1	2	
Postoperative bleeding	0	0	0.940
Fecal urgency	3	4	
Urinary tract infection	1	2	
Late complication			
Stricture	0	0	
Incontinence	0	0	
Recurrence	0	0	
Pain score			
Intraoperative	0.5 (0-1)	6.2 (3-9)	0.000 ^a
Postoperative	5.1 (2-7)	5.3 (2-8)	0.524
Frequency of Demerol injection postoperatively (50 mg/per time)	2.1 (0-4)	2.2 (0-4)	0.585
Hospital stay (days)	2.9 (2-7)	2.7 (1-6)	0.489
Patient satisfaction level (satisfied or very satisfied)	25/30	14/34	0.007 ^a

^a: statistic significance ($p < 0.05$), Intraoperative pain score: the highest pain score during surgery, Postoperative pain score: the pain score on the morning of the 1st postoperative day.

score during the operation was significant higher in Group 2 (0.5 vs. 6.2, $p < 0.05$). Patient satisfaction level was superior in Group 1 (satisfied or very satisfied: 25/30 in group 1 and 14/34 in group 2 respectively, $p = 0.007$).

Post-operative follow-up at mean duration of 4.4 months (range, 2 to 9 months) in both groups was performed, all patients were continent, and there was no instance of anal stricture, persistent anal pain or recurrent symptoms found.

Discussion

Although hemorrhoidectomy can be performed under different anesthetic methods including perianal anesthetics infiltration, local anesthesia with heavy sedation (intramuscular sedation), intravenous general anesthesia combined with local anesthesia, laryngeal mask anesthesia, spinal anesthesia, and general anesthesia.⁵⁻⁷ The procedure are most commonly performed in inpatient setting with general or spinal anesthesia.^{3,8} A literature review concerning the pro and con among these anesthetic methods for he-

morrhoidectomy is limited. To our knowledge, the comparison between hemorrhoidectomy under local anesthetics infiltration combined with either heavy sedation or intravenous general anesthesia had not been discussed. Our effort in this study is made to disclose the advantage and disadvantage between patients undergoing hemorrhoidectomy using these two different anesthetic methods. The preliminary result showed no significant difference in postoperative complications and recurrence. However, there was more time spent in the operating room yet better patient satisfaction level in the group of perianal anesthetics infiltration combined with intravenous general anesthesia.

The most critical concern from surgeons and anesthesiologists to perform the hemorrhoidectomy using general or spinal anesthesia is the management of respiratory complications,⁹ especially when the anorectal procedure is usually taken in the prone position. In addition, it has been reported that the use of sedative agents combined with opioids may result in respiratory depression.¹⁰ In recent years, the local anesthesia with deep intravenous sedation for anorectal surgery had been presented by some investigations.¹¹⁻¹³ In one prospective, randomized study reported by Li

et al¹¹ showed the safety and benefits of efficacy and cost-effectiveness by using intravenous sedation along with local anesthesia comparing to spinal or general anesthesia in anorectal surgery.¹¹ Recently, the performance of hemorrhoidectomy under only perianal anesthetics infiltration in an outpatient setting had also been reported to be an alternative approach for the treatment of hemorrhoidal disease effective and well tolerated by patients.^{7,14} Possible reasons that may influence surgeons to use different anesthesia for hemorrhoidectomy also include the shape of the buttocks. Nivatvongs et al¹⁵ reported in 1983 that recognition of the different shapes of the buttocks was a useful guide for selection of anesthesia in anorectal surgery. They sorted buttocks in three types. In Type A, the mounds of the buttock make a low and gentle slope with the anal verge. In Type B, the mounds of the buttock are high and rise almost straight up from the anal verge. In Type C, the anus is located more anteriorly than normally. Patients with Type A buttocks are ideal candidates to use local anesthesia for hemorrhoidectomy because it is easy to infiltrate the anesthetic agent into the anal canal. With Type C, this is somewhat more difficult, but no significant problem exists. For Type B buttocks, general or spinal anesthesia is recommended.

In our experiences, hemorrhoidectomy under perianal local infiltration combined with either heavy sedation or intravenous general anesthesia is both safe and effective. There was no instance of respiratory complications occurred. All patients tolerated the surgical process well in the prone jackknife position without returning to supine position. Some authors considered a higher incidence of urinary retention when anorectal surgery was done under the anesthesia requiring intravenous settings that may lead to fluid overloading.¹⁶ In our results, the incidence of urinary retention did not have significant difference between both groups. The mean administration of fluid in the group of intravenous general anesthesia was approximately 200 ml and all patients were informed for postoperative fluid restriction before they could pass the urine. The advantages of hemorrhoidectomy under intravenous general anesthesia rest on the fact that patients were placed in an unconscious situation during the entire course of the operation including the perianal injection of local anesthetics. Therefore, pa-

tients were free of pain and anxiety during the operation, the surgeon was able to complete the procedure with reduced stress. Nevertheless, the cost of intravenous general anesthesia is much higher than heavy sedation. It includes more preoperative assessment such as EKG and chest film, intraoperative monitors, oxygen equipment, and intravenous settings. Also, patients need to fast for at least half a day. Oppositively, patients undergoing hemorrhoidectomy under the heavy sedation do not need to fast before or after the operation. But the main disadvantage of hemorrhoidectomy with heavy sedation is that patients may still feel severely painful and anxious especially during the performance of perianal anesthetics infiltration. This caused the decrease in patient satisfaction in this group. The choice of different anesthetic methods for the hemorrhoidectomy was based on the decision made jointly by the surgeon and the patient in our practice. Moreover, most of our patients whose general condition are not stable or have severely underlying cardiovascular or respiratory diseases (ASA III or IV) usually receive the treatment for hemorrhoidal disease with more conservative approaches. However, if the surgery is indicated, we prefer to perform hemorrhoidectomy under the local anesthesia combined with heavy sedation with administration of the sedative agents or opioids adjusted to a smaller dose in these patients.

Publications showed that there were some complications being reported in patients undergoing hemorrhoidectomy under the spinal anesthesia including urinary retention, postlumbal headache, backache, and hypotension.^{17,18} Also, we have noticed a tendency toward more blood loss when hemorrhoidectomy was performed with the spinal anesthesia. This may be due to the effect of vasodilation associated with spinal anesthesia. On the other hand, despite some authors advocated only local anesthesia applied in the ambulatory anorectal surgery, most of our patients requested for taking hemorrhoidectomy under a sedative condition. Moreover, the perianal injection of local anesthetic agents is an extremely painful procedure for the patient and many patients present high level of anxiety during the operation if they are not given any sedative or narcotic agents. Therefore, we prefer to perform hemorrhoidectomy using perianal anesthetics infiltration under either heavy sedation or intravenous general anesthesia.

Appendix 1: Standardized questionnaire for evaluation of patient satisfaction

Four Questions	Patient Answers		
	Conscious	Semi-conscious	Unconscious
1. Were you clear during the operation?	Conscious (0)	Semi-conscious (1)	Unconscious (2)
2. Did you feel painful during the operation?	Very painful (0)	Painful (1)	Mild or No (2)
3. Did you feel anxious during the operation?	Very anxious (0)	Moderate anxious (1)	Mild or No (2)
4. Pain score on the morning of the first postoperative day	Very painful (0)	Painful (1)	Mild or No (2)

*Question 2 and Question 4: "Very painful" means that the pain score > 6; "painful" means pain score of 4-6; "mild or no" means pain score of 0-3.

*Every patient answers four questions. For example, if his answer of the first question is "conscious", then he would get "0" point. Accumulating the four questions' points, the sum of the four points means the patient's satisfaction level. If the sum is "7"; it means he is very satisfied with the operation.

Satisfaction Level	Sum of Points (0-8)
Very satisfied	7-8
Satisfied	5-6
Acceptable	3-4
Unsatisfied	0-2

Conclusion

Based upon the study results, we suggest that hemorrhoidectomy under perianal anesthetics infiltration combined with intravenous general anesthesia or heavy sedation has no significant difference in early or late postoperative complications and recurrence. However, in the group of perianal anesthetics infiltration combined with intravenous general anesthesia, there was more time spent in the operating room yet better patient satisfaction level.

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原 著

比較痔瘡切除術在靜脈全身麻醉與朦朧麻醉下之手術結果

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目的 這個研究的目的是比較病患在進行痔瘡切除手術時，於不同的麻醉方式下，分析其手術結果包括手術時間、在手術房的時間、疼痛指數、併發症、復發率、及病患滿意度之間有無差異。

方法 我們回溯性地研究連續六十四個診斷為第四度痔瘡的病患在我們醫院接受痔瘡切除術的病歷。其中三十位病患於靜脈全身麻醉合併局部肛門注射下接受手術（第一組），三十四位病患於朦朧麻醉合併局部肛門注射下接受手術（第二組）。我們比較這兩組病患之基本資料、生理狀況、手術情形、疼痛指數、併發症、復發及病人對手術的滿意度。

結果 第一組病患和第二組病患的比較，在年齡（41 歲比 43 歲， $p = 0.593$ ）、性別（男女比率為 13:17 與 19:15， $p = 0.316$ ）、ASA 分級（第一組 ASA I 有 27 人，ASA II 有 3 人；第二組 ASA I 有 29 人，ASA II 有 5 人， $p = 0.713$ ）、血色素值（12.2 比 12.4 g/dl， $p = 0.711$ ）、凝血時間（4.1 比 3.9 分鐘， $p = 0.658$ ）及平均術後追蹤時間（4.3 比 4.4 月， $p = 0.703$ ）上均沒有顯著差別。此外，這兩組病患在手術過程中，都沒有發生和麻醉相關的併發症，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。兩組病患在手術時間（36.3 比 33.2 分鐘， $p = 0.223$ ）、早期及晚期手術併發症、平均住院天數（2.9 比 2.7 天， $p = 0.489$ ）、平均術後第一天早上的疼痛指數（5.1 比 5.3， $p = 0.524$ ）及平均術後止痛劑的使用劑量上（第一組與第二組平均每位病人 meperidine 的使用量分別為 105 mg 與 110 mg， $p = 0.585$ ）也沒有統計上的差異。然而，第一組的病患平均在手術室內所需花費的時間明顯比第二組的病患來的長（61.5 比 41.7 分鐘， $p < 0.05$ ），而術中的疼痛指數在第二組病人明顯較高（0.5 比 6.2， $p < 0.05$ ），病患對整體手術的滿意度評估則是第一組明顯較好（滿意或非常滿意的病人比率在第一組為 25/30，而在第二組為 14/34， $p = 0.007$ ）。

結論 這兩種麻醉方式對於痔瘡切除術均是安全有效的，並且在術後併發症及手術結果上無顯著差別。然而，病患於靜脈全身麻醉下進行痔瘡手術比在朦朧麻醉下需要明顯較長的時間於手術室內，但病患術中的疼痛指數明顯較低且滿意度較高。

關鍵詞 痔瘡切除術、朦朧麻醉、靜脈全身麻醉、併發症、滿意度。