Perianal Blockage with 0.5% Bupivacaine for Postoperative Pain Relief in Hemorrhoidectomy

Siriwan Jirasiritham MD*,
Kamthorn Tantivitayatan MD*, Sopon Jirasiritham MD**

** Department of Anesthesiology, Ramathibodi Hospital, Faculty of Medicine, Mahidol University*
*** Department of Surgery, Ramathibodi Hospital, Faculty of Medicine, Mahidol University*

Hemorrhoidectomy can be done in many positions under many anesthetic techniques as an ambulatory surgery. Post-procedural pain is frequently severe enough to delay home discharge. A combination between preincisional local anesthetics and general anesthesia looks attractive in terms of preemptive analgesia and starting time of surgery. The study aimed to compare anesthetic time, pain-free period and pain relief in patients with and without 0.5% plain bupivacaine infiltration after mask inhalation, total intravenous anesthesia or endotracheal tube general anesthesia.

Material and Method : *142 patients were randomized into control(C) and study(S) groups with n = 70 and 72 respectively. Patient characteristics in both groups were : age 40.45 ± 13.03 VS 37.48 ± 13.63 years old, BW 59.77 ± 11.19 VS 58.80 ± 9.76 kg, male : female 31/39 VS 43/29, PS 1/2/3/E = 48/19/1/2 VS 53/15/3/1 for C and S respectively. All underwent surgery in lithotomy under ET/TIVA/mask : 53/13/4 VS 22/27/23 and anesthetic time was 49.02 ± 18.04 VS 33.33 ± 10.31 min ($p < 0.05$).*

Results : *Pain-free periods in C and S were 204.44 ± 878.07 and 540 ± 298.03 min with median times of 57.5 (n = 67) VS 560 (n = 58) min. Pain severity in S was mainly none or mild degree while in C it was moderate or severe, apparently when analysed in subgroups of ET and TIVA. Analgesic requirements were statistically more in group C.*

Conclusion : *Better postoperative pain relief could be accomplished by preincisional 0.5% plain bupivacaine infiltration after general anesthesia. The technique helped relax anal muscles for surgical ease and avoided patient discomfort in case of a prolonged procedure. Preemptive analgesia and key pain management were discussed.*

Keywords : *Anal surgery, Hemorrhoid, Local anesthetic, Preemptive analgesia*

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Hemorrhoids are enlarged veins that become irritated and inflamed, causing pain, itching, bleeding or clot. The incidence is 0.2%[1] and some hemorrhoids are indicated for surgery which can be done under local or general anesthesia. Because the perineum is a pain-sensitive area and hemorrhoid removal is a noxious stimulus that lasts for a couple of days post-operatively, benefits of postoperative pain relief are evident and the concept of preemptive analgesia is concerned with sensation block prior to surgery. Performing both local anesthetic infiltration and general anesthesia sensibly provides pain relief from the intraoperative period until recovery. The authors chose to study bupivacaine infiltration due to its long effect and no need for added adrenaline, combined with general anesthesia to see if there was any better pain control quality.

Correspondence to : Jirasiritham S, Department of Anesthesiology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand.

Material and Method

The study was a prospective parallel design and approved by the Ethics Committee of the hospital. After informed consent, a total of 142 patients scheduled for hemorrhoidectomy was randomized into control(C) and study(S) groups. All were given general anesthesia by SJ via balanced technique with endotracheal intubation (ET), mask inhalation (M) or total intravenous anesthesia (TIVA). Muscle relaxants

such as atracurium, vecuronium, alloferine were used in ET but none in the other techniques. Sevoflurane, isoflurane or halothae was used for mask inhalation. Thiopental or propofol was bolused and intermittently given for maintenance in TIVA. Narcotics like fentanyl, alfentanil, morphine and meperidine were titrated as appropriate. Patients with associated anal fissures, anal spasm or infective anal pathologies like cryptitis or proctitis, and patients who refused to sign an informed consent form were excluded from the study. After proctoscopy, the surgeon (SJ) injected 0.5% bupivacaine 1-3 ml around the base of each hemorrhoid 10 minutes before operation in the S group. Patients were interviewed and graded for pain within 6 hours as none, mild, moderate or severe in PACU. MO, pethidine, tramadol or paracetamol was prescribed postoperatively. Demographic data, anesthetic time, pain-free period and degree of pain were recorded. Using Microsoft @ Excel 97 version 8.0, parametric data were analysed as mean $\pm$ SD, range and median; X^2 test for counted data and $p < 0.05$ was considered as statistically significant.

Result

One hundred and forty two patients were enrolled with their characteristics shown in Table1. Male gender was slightly more than female in the S group and there were 3 emergency cases; 2 in C due to severe pain while 1 in S had bleeding. Coexisting diseases in ASA physical status 2 and 3 were diabetes, hypertension, asthma, valvular heart diseases, renal transplant and history of convulsion. In group S anesthetic time was statistically shorter probably because techniques comprised mostly TIVA and mask inhalation in which operation could start in a minute.

Time to first pain perception varied from minutes to hours as in Table 2. The median pain -free period in S was 10 times longer and degree of pain was mostly none or mild in S. Since anesthetic techniques might mask any differences, subgroups of TIVA and ET in both groups were analysed and revealed the same skewed data of pain-free period. Almost half of pain severity data were missing in TIVA,anyway pain severity was less in S (Table 3 and 4).

Postoperative analgesics were prescribed as routine PRN and number of agents are shown in Table 5. No medication requirement was apparent in the study group.

Table 1. Demographic data (n=142) mean $\pm$ SD

	Control group (n = 70)	Study group (n = 72)	p
Age(year)	40.45±13.03	37.48±13.63	0.18
BW(kg)	59.77±11.19	58.80±9.76	0.58
Sex M/F	31/39	43/29	0.06
PS 1/2/3/E	48/19/1/2	53/15/3/1	0.55
Anesthetic techniques ET/TIVA/mask	53/13/4	22/27/23	< 0.001*
Anesthetic time(min)	49.02±18.04	33.33±10.31	< 0.001*

M = male, F = female, PS = ASA physical status, E = emergency, ET = endotracheal intubation, TIVA = total intravenous anesthesia

Table 2. Pain relief

	Control group (n = 70)	Study group (n = 72)	p
Pain-free period(min)	204.44±878.07	540±298.03	< 0.001*
Range	5-7,200	30-1,440	
Median	57.5 (n = 67)	560 (n = 58)	
Pain severity			
None	0	13	< 0.001*
Mild	10	33	
Moderate	46	10	
Severe	10	1	
NA	4	15	

Table 3. ET groups

	Control group (n = 53)	Study group (n = 22)	p
Anesthetic time(min)	52.98±17.74	42.95±9.71	0.002*
Pain-free period(min)	259.8±1012.86	238.18±188.19	0.906
Pain severity			< 0.001*
None	0	3	
Mild	9	9	
Moderate	34	8	
Severe	9	1	
NA	1	1	

Table 4. TIVA groups

	Control group (n = 13)	Study group (n = 27)	p
Pain severity			
None	0	5	< 0.001*
Mild	10	12	
Moderate	1	0	
Severe	1	0	
NA	1	10	

Table 5. Postoperative analgesics

	Control group (n = 70)	Study group (n = 72)	p
Tramadol	3	0	< 0.001*
Paracetamol	21	15	
Morphine	9	19	
Meperidine	24	5	
None	12	33	
NA	1	0	

Neither surgical nor anesthetic complications occurred that needed reinterventions

Discussion

There are different techniques of anesthesia and patient positions to optimize hemorrhoidectomy in terms of hemorrhoid site, assistant position, surgical procedures, postoperative pain relief and ambulatory surgery. Our 142 patients underwent hemorrhoidectomy by the same surgeon and were anesthetized by the same anesthesiologist. Anesthetic techniques varied from simple mask inhalation, endotracheal tube general anesthesia to total intravenous anesthesia according to personal preferences and time permit. In group C, the topmost anesthetic technique was endotracheal intubation while in group S, TIVA played a major part. This could explain why anesthetic time spent in the latter group was significantly shorter than the former. Due to different agents, subgroups of TIVA and ET in both groups were analysed and found that degree of immediate postoperative pain and pain-free period was better in group S, especially with TIVA. Postoperative analgesics within 6 hours consisted of oral paracetamol, intramuscular meperidine, intravenous tramadol and intravenous morphine. Most of group S patients required none. Patients under mask inhalation were not statistically analysed due to too small a sample size. There are many options of anesthetic technique for hemorrhoidectomy: local anesthetic infiltration, regional anesthesia like caudal, epidural or spinal block, intravenous general anesthesia, mask inhalation anesthesia and endotracheal general anesthesia[2]. Local anesthetic infiltration was reported to give more than 75% satisfaction in thrombosed hemorrhoid excision as an ambulatory surgery, but before pain relief took place, it was severely painful during injection[3]. More than 10% declined to have this technique again. The technique alone can cause suboptimal anal relaxation and movement that hinders a smooth procedure. In that case, patients tend to be sedated but they may take the risk of respiratory depression especially if they are in the prone position[2,4]. The authors combined local anesthesia with general anesthesia because over half had 2-4 quadrants of hemorrhoids which took time for operation. The solution was 0.5% plain bupivacaine without any mixing with adrenaline or sodium bicarbonate. Adrenaline can prolong analgesic effect and induce vasospasm around the area. At the same time, adrenaline can cause palpitations from systemic absorption while sodium bicarbonate can alleviate pain on injection with a tradeoff of inconvenience in preparation[2]. Injection was done after the patient was unconscious in the lithotomy position with 1-3 ml around each base of hemorrhoid. The authors found that the position was good for airway care and the operation could start right away, although hemorrhoid in the dorsal site might be harder and there is not quite enough room for an assistant in this position. WAND™ was a new local anesthetic delivery system which is claimed to cause less pain on injection[5]. Ketolorac mixed together with local anesthetics was reported to improve postoperative pain and bladder function[6]. Induction agents used were either thiopentone or propofol and maintenance accomplished with fentanyl, midazolam and volatile anesthetics. All have more or less cardiovascular and respiratory depressive effects about which anesthesiologists should be cautioned. Read mentioned a few patients operated in the prone position had to be turned back in the midst of the operation because of respiratory depression[2].

Bupivacaine was injected before the surgical procedure according to the concept of preemptive analgesia[7]. If any impulse from noxious stimuli passes through to the central cord, it could wind up the pain signal and aggravate unpleasant perception. Central sensitization is evidently prevented by presurgical analgesia with local anesthetics or epidural catheter. Timing of intervention is important; it was shown that local infiltration at conclusion of the surgical procedure did not contribute to preemptive analgesia[7]. The potential central sensitization exists in the unconscious patient under inhalation anesthesia who appears to be clinically unresponsive to surgical stimuli. Even when the operation lasted almost an hour, the authors injected local anesthetics before incision. Long-acting local anesthetics such as bupivacaine have long-term preemptive analgesia benefits probably for years like phantom limb pain. The analgesic effect of bupivacaine ranges from 4-6 hours and when

combined with other analgesics could relieve acute proctal pain for a couple of days[2]. Degree of pain was classified into none, mild, moderate and severe by both subjective and objective evaluations such as observing painful expression on interviews. Pain that was tolerable without medication was classified as mild, while continuous or intermittent bouts of tolerable pain after medication was moderate. Severe pain would need more medications and patients complained it was unbearable. The authors did not assess visual analog scale because anesthetic techniques varied quite a lot.

Pain is one of the postoperative complications that requires longer stay in the postanesthetic care unit(PACU)[8]. Thus, it costs more for medical personnel and does not conform to the goal of office-based or ambulatory surgery. Pain after home discharge is correlated with degree of pain immediately after operation, therefore the key is to suppress pain throughout the recovery period. Time spent in injection did not delay any operative time. Local anesthetic infiltration with plain 0.5% bupivacaine before starting the operation in the study was beneficial in patients undergoing minor surgery like hemorrhoidectomy.

Conclusion

Hemorrhoidectomy in spite of being a minor surgery can be very painful and prolong PACU or home discharge. Various anesthetic techniques and surgical performances have been developed to better pain management, one of which is a combination between preincisional local anesthetic infiltration and general anesthesia. The study showed a longer pain-free period and less severity of immediate postoperative pain. Preemptive analgesia concept was explained for clinical correlation so that pain-free management in PACU is a key to prevent central sensitization and also conferring benefit in the long term.

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การทำ Perianal blockage ด้วย 0.5% Bupivacaine สำหรับระงับปวดหลังการผ่าตัดริดสีดวงทวาร

ศิริวรรณ จิรสิริธรรม, กำธร ตันติวิทยาทันต์, โสภณ จิรสิริธรรม

การผ่าตัดริดสีดวงทวารเป็นการผ่าตัดที่มีความปวดสูงมากชนิดหนึ่ง ในปัจจุบันศัลยแพทย์นิยมผ่าตัดริดสีดวงทวารในผู้ป่วยนอกมากขึ้น เพื่อประหยัดค่าใช้จ่ายในการรับผู้ป่วยไว้ในโรงพยาบาล วิสัญญีแพทย์จึงต้องหาวิธีการระงับความรู้สึกที่เหมาะสม ไม่มีภาวะแทรกซ้อน และสามารถระงับปวดได้อย่างมีประสิทธิภาพ การศึกษานี้จึงมีวัตถุประสงค์เพื่อศึกษาว่า การทำ perianal blockage ด้วยยา 0.5% bupivacaine ในการผ่าตัดริดสีดวงทวารโดยฉีดให้ก่อนเริ่มผ่าตัดภายใต้การระงับความรู้สึกแบบทั่วไป จะมีประสิทธิภาพระงับปวดได้ดีมากน้อยเพียงใด เมื่อเทียบกับการระงับปวดด้วยการให้ยากลุ่ม opioids หรือยาแก้ปวดชนิดรับประทานที่ใช้กันอยู่ทั่ว ๆ ไป

***วิธีการ** : ผู้ป่วยจำนวน 142 ราย ทุกรายจะได้รับการระงับความรู้สึกชนิดทั่วไป (general anesthesia) แบ่งเป็นกลุ่มควบคุม (control: C) 70 ราย และกลุ่มศึกษา (study: S) จำนวน 72 ราย โดยศัลยแพทย์จะทำ perianal blockage ด้วย ยาชา 0.5% Bupivacaine ก่อนเริ่มผ่าตัด จำนวน 10 มล. อายุเฉลี่ยของผู้ป่วยในกลุ่ม C และ S = 40.45 $\pm$ 13.03 เทียบกับ 37.48 $\pm$ 13.63 ปี น้ำหนักร่างกาย 59.77 $\pm$ 11.19 เทียบกับ 58.80 $\pm$ 9.76 กิโลกรัม เพศชาย : เพศหญิง 31/39 เทียบกับ 43/29 ราย physical status 1/2/3/E = 48/19/1/2 เทียบกับ 22/27/23 ระยะเวลาระงับความรู้สึก 49.02 $\pm$ 18.04 เทียบกับ 33.33 $\pm$ 10.31 นาที ($P < 0.05$) ตามลำดับ*

***ผลการศึกษา** : พบว่าผู้ป่วยกลุ่ม C และ S มีระยะเวลาที่ไม่ปวดแผลเป็นเวลา 204.44 $\pm$ 878.07 เทียบกับ 540 $\pm$ 298.03 นาที โดยมีค่าเฉลี่ยของเวลา 57.5 ($n = 67$) เทียบกับ 560 ($n = 58$) นาที ความรุนแรงของความปวดในกลุ่ม S จะไม่พบเลยหรือปวดเพียงเล็กน้อย ในขณะที่กลุ่ม C จะปวดปานกลางถึงปวดมาก ซึ่งกลุ่ม C นี้จะต้องการยาระงับปวดหลังผ่าตัดมากกว่ากลุ่ม S อย่างมีนัยสำคัญทางสถิติ*

***สรุป** : การศึกษานี้พบว่า การทำ perianal blockage ด้วย 0.5% bupivacaine ในผู้ป่วยที่ได้รับการระงับความรู้สึกชนิดทั่วไป ก่อนเริ่มผ่าตัดสามารถระงับปวดหลังผ่าตัดได้อย่างมีนัยสำคัญ โดยที่จะไม่มีความปวดหรือปวดเพียงเล็กน้อยเท่านั้น ซึ่งต้องการเพียงยาแก้ปวดชนิดรับประทานก็เพียงพอแล้ว*