Comparison of Postanesthetic Complaints after General and Spinal Anesthesia in Patients Undergoing Lower Limb Surgery

Banjong Krobbuaban, MD*, Sujarit Kumkeaw, RN*,
Natha Pakdeesirivong, RN*, Siriwan Diregpoke, RN*

** Department of Anaesthesiology, Chaiyaphum Hospital, Chaiyaphum*

Background: *The choice of anesthesia is one of the most important decisions made by anesthesiologists after preoperative visits with orthopedic patients. No published study has yet quantified the incidence of postanesthetic complaints for either technique. The present study was designed to compare the incidences of postanesthetic complaints after the application of the standardized techniques of spinal anesthesia, using a 27 - gauge needle, and two forms of general anesthesia in patients undergoing lower limb surgery.*
Material and Method: *In a prospective, randomized, observer blind trial, 260 orthopedic patients who underwent lower limb surgery were randomized into 3 groups; 1) spinal anesthesia (SA), 2) general anesthesia via facemask (GA-M), 3) general anesthesia via endotracheal intubation (GA-T). On postoperative days 1 and 3, patients were interviewed specifically about postanesthetic complaints.*
Results: *The present study indicated that the incidence of backache was significantly higher in SA (p = 0.01), while nausea/vomiting (p = 0.00) and headache (p = 0.02) were more frequent in GA-M and GA-T on the first postoperative day. In the 3-day period of observation in the ward, the incidence of postoperative complaints did not significantly differ among the three groups.*
Conclusion: *Spinal anesthesia using a 27-gauge Quincke needle is associated with a lower incidence of postanesthetic complaints compared with general anesthesia. This technique may be recommended for patients undergoing lower limb surgery.*

Keywords: *Orthopedic, Anesthesia, General, Spinal, Postanesthetic complaints*

J Med Assoc Thai 2005; 88(7): 909-13
Full text. e-Journal: *http://www.medassocthai.org/journal*

Postdural puncture headache (PDPH) is a known and most distressing complication of spinal anesthesia. Estimates of prevalence vary from 1.2% to 14.5%[1-4]. Reports have been demonstrated to depend on age, sex, needle size and technique[5-8]. A prospective study showed that patients may also suffer from headache following general anesthesia[9]. Additionally, general anesthesia, many factors, e.g. administration of opioids or volatile anesthetics can induce nausea and vomiting[10]. It, thus, seems plausible to speculate that general anesthesia may be associated with an increased risk of nausea and vomiting, and additional medical treatment may prolong the postoperative period and increase the costs of general anesthesia[11]. However, little is known about postanesthetic complaints after general anesthesia in each technique in lower limb surgery. No study has yet reported the incidence of postanesthetic complaints for either technique of anesthesia in lower limb surgery. Most studies have demonstrated PDPH and complication spinal versus general anesthesia via endotracheal intubation. Other prospective studies do not extend beyond general anesthesia via facemask for this common procedure. The authors aimed to elucidate the incidences of postanesthetic complaints after the application of the standardized techniques of spinal anesthesia and two forms of general anesthesia in lower limb surgery.

Correspondence to : Krobbuaban B, Department of Anaesthesiology, Chaiyaphum Hospital, Bannakan Rd, Maung, Chaiyaphum 36000, Thailand. E-mail: albkb @diamond.mahidol.ac.th

Material and Method

Following the approval of the Ethical committee and informed patients' consent, the authors studied 260 ASA physical status I-II orthopedic patients, aged 18-65, undergoing elective lower limb surgery. On the day of surgery, the patients were randomly allocated, using computer generated randomization, into one of three groups. Group 1 patients received spinal anesthesia (SA); Group 2 patients received general anesthesia via facemask (GA-M); and Group 3 patients received general anesthesia via endotracheal intubation (GA-T). Each anesthetic technique was applied according to the standard procedures in Chaiyaphum Hospital at the time of the study. Patient in whom " mask anesthesia" would be considered inappropiate (obesity, difficult ventilation, gastric reflux) and multiple trauma were excluded from the study.

Before the induction of anesthesia, all patients received intravenous hydration with 500 ml of Ringer's solution, continued at a rate of 500 ml/h. The patients were monitored by ECG, non-invasive measurement of blood pressure and pulse oximetry. No premedication was given (midazolam or NSAIDS).

In group 1 (SA), the lumbar puncture was performed between L2 and L5 in the sitting or lateral position. Using the midline approach, a 27-gauge Quincke needle (Spinocan , B. Braun, Melsungen AG) was inserted through a 20-gauge introducer needle into the subarachnoid space, with the needle bevel parallel to the dural fibres. When free flow of cerebrospinal fluid was obtained, 2.5-3.0 ml of 0.5% hyperbaric bupivacaine (Marcain , AstraZeneca) were injected to reach a minimal analgesic level of T_{12}. Difficulties with the dural puncture (more than two attempts) were recorded. Bradycardia (< 50 beats/min) was treated by IV application of atropine 0.3-0.6 mg, and hypotension (mean arterial blood pressure 30% below baseline) was treated by IV injection of ephedrine.

In group 2 (GA-M), the patients received intravenous administration of 1-2 mcg/kg fentanyl and 5 mg/kg thiopentone, maintained with 70% nitrous oxide and 1.5-2% sevoflurane in oxygen. Treatment of hemodynamic reactions and volume replacement were similar to those for the spinal anesthesia group.

In group 3 (GA-T), the patients received IV administration of 1-2 mcg/kg fentanyl, 5 mg/kg thiopentone and 0.5 mg/kg atracurium prior to endotracheal intubation. Difficulties with intubation (more than two attempts) were recorded. Mechanical ventilation was performed with 50% nitrous oxide and 1-1.5% sevoflurane in oxygen. Treatment of hemodynamic reactions and volume replacement were similar to those for the spinal anesthesia group.

In all groups, the patients received intravenous Ringer's solution 20 ml/kg/hr as fluid replacement for blood loss. The times of the operations were recorded. Postoperatively, all patients were transferred to the recovery room. Postoperative pain relief was performed by IV administration of 1-2 mcg/kg fentanyl if required.

On days 1 (next day of surgery) and 3 postoperatively, the patients were asked specifically about postanesthetic complaints. One of the nurse anesthetists, who was not informed about the anesthetic treatments, interviewed the patients by direct questioning using a standardized questionnaire. The patients were asked about the onset and duration of headaches (especially posture dependent headaches), backache, urinary dysfunction, dizziness, nausea/vomiting, sore throats and awareness. Three days after their operations, patients were asked if they would choose the same anesthetic technique again in the event of a future lower limb surgery.

The present study was designed to test the preferability of spinal anesthesia over general anesthesia for the avoidance of post-anesthetic complaints. Previous studies found that 9% of patients suffered from headaches following general anesthesia[9]. Spinal anesthesia using a 27-gauge Quincke needle should reduce the incidence of headaches to only 0.1%. The authors set $\alpha = 0.05$ with a power ($1-\beta$) of 80%. It was calculated that 84 patients per group would be required.

Analyses of variance were used in the comparisons between the three groups of all continuous variables. The Chi-square test was used for the analysis of categorical demographic data. The differences in the incidences of postanesthetic complaints between the groups were evaluated using the Chi-square tests or Fisher's exact test where appropriate. A p-value of less than 0.05 was considered to be statistically significant.

Results

There were no significant differences among the three groups with respect to demographic data, type of surgery or anesthetic data (Table 1).

In group 1 (SA), all patients achieved sufficient analgesia for the operation. Eleven percent of

Table 1. Demographic characteristics, type and time of anesthesia in each group. Data are mean (SD) or number

Characteristics	Spinal n = 86	GA-M n = 85	GA-T n = 89
Sex (n)			
Male	45	47	51
Female	41	38	38
Age (yrs)	41 (20)	38 (17)	35 (17)
Weight (kg)	58 (13)	56 (8)	57 (9)
Height (cm)	161 (8)	168 (7)	160 (18)
ASA physical status (n)			
I	66	68	68
II	20	17	21
Type of operation			
Hip/upper leg	43	36	43
Knee	26	28	27
Below knee	17	21	19
Anesthetic time (min)	86 (52)	71 (15)	73 (41)

the patients had a difficult lumbar puncture. In group 3 (GA-T) no patient had a difficult intubation.

On the first postoperative day, the incidences of nausea/vomiting, headaches and backache were significantly different, comparing the group 1(SA) vs group 2 (GA-M), and group 1(SA) vs group 3 (GA-T) (Table 2). The incidences of backache were higher in group 1 (SA), while nausea/vomiting and headache were more frequent in group 2 (GA-M) and group 3 (GA-T).

The difference in the incidences of post-anesthetic complaints on the third postoperative day between the groups was not statistically significant.

The incidences of dizziness, urinary dysfunction, sore throat and awareness were not significantly different among the three groups.

The proportion of patients who would like to have the same anesthetic technique if they needed lower limb surgery again was significantly different. Ninety five percent of the patients in the SA group responded and mentioned, that they would seek spinal anesthesia again. Only seventy percent of the patients in the general anesthesia groups would choose to repeat the technique that they had received.

Discussion

The choice of anesthesia is one of the most important decisions made by anesthesiologists after preoperative visits with orthopedic patients. The decision depends on the condition of the patient, nature of the operation, expectations of the patient, and expertise of the surgeon and anesthesiologist. There have been no studies to confirm the incidences of postanesthetic complaints for either of the techniques examined in the presented paper. The present study intended to evaluate the advantages of the respective techniques with regard to the postoperative period.

Using a 27-gauge spinal needle in orthopedic patients, there was no incidence of PDPH in the present study, which was lower than reported in the previous studies[1-4]. The absence of any PDPH after dural puncture with the 27-gauge Quinche needle may be explained by the technique of the dural puncture, which has been shown to significantly reduce the incidence of PDPH[12].

Table 2. Incidence of complaints on the first and third postoperative day after spinal (SA), general anesthesia via facemask (GA-M) or general anesthesia via endotracheal intubation (GA-T). Data are number (%)

	Headache	Dizziness	Backache	Urinary retention	N/V	Sore throat	Awareness
On the first Postoperative day							
Spinal	0	2 (2.3%)	6 (7.0%)*	2 (2.3%)	0	0	-
GA-M	6 (7.7%)*	4 (4.7%)	0	2 (2.4%)	12 (14.1%)	0	0
GA-T	8 (9.0%)**	3 (3.4%)	1 (1.1%)	0	12 (13.5%)	1	1
On the third Postoperative day							
Spinal	0	1 (1.2%)	2 (2.5%)	2 (2.5%)	0	0	0
GA-M	2 (3.4%)	0	0	0	0	0	0
GA-T	4 (4.7%)	5 (5.8%)	0	0	0	1 (1.2%)	0

*$p < 0.05$; spinal vs general anesthesia via facemask
*$p < 0.05$; spinal vs general anesthesia via endotracheal intubation

Nausea and/or vomiting is a frequent unfavorable event after general anesthesia, Administration of opioids or volatile anesthetics for intraoperative treatment, and the higher postoperative requirement of opioids in patients following general anesthesia, may increase the incidences of nausea and vomiting. The costs of the prolonged postoperative surveillance and additional medical treatment required should be evaluated.

Postoperative backache is a common complaint after spinal anesthesia. Factors involved in the pathogenesis of postoperative back pain include the type and duration of surgery, duration of immobilization, and the position of the patient during spinal puncture[13]. Several authors reported the incidence of back pain on the third postoperative day, ranging from 5.91%[14] to 22%[15]. In the present study, the incidence of back pain on the third postoperative day was in the lower range of those reported in the literature. This may be, in part, because of the short duration of immobilization in the presented patients.

The present results demonstrate some advantages of spinal anesthesia over general anesthesia. Nevertheless, anesthesiologists have to consider the patients' wishes and concerns with regard to the postanesthetic outcome in the selection of an anesthetic technique.

In conclusion, spinal anaesthesia using a 27-gauge Quincke needle is highly effective and has a small incidence of postanesthetic complaints in orthopedic patients. Therefore, this technique may be recommended for patients undergoing elective lower limb surgery.

References

1. Vallejo MC, Mandell GL, Sabo DP. Postdural puncture headache: a randomized comparison of five spinal needles in obstetric patients. Anesth Analg 2000; 91: 916-20.
2. Devcic A, Sprung J, Patel S, Kettler R, Maitra-D' Cruze A. PDPH in obstetric anesthesia: comparison of 24-gauge Sprotte and 25-gauge Quincke needles and effect of subarachnoid administration of fentanyl. Reg Anesth 1993; 18: 222-5.
3. Cesarini M, Torrielli R, Lahaye F, Mene JM, Cabiro C. Sprotte needle for intrathecal anaesthesia for caesarean section: incidence of postdural puncture headache. Anaesthesia 1990; 45: 656-8.
4. Lambert DH, Hurley RJ, Hertwig L, Datta S. Role of needle gauge and tip configuration in the production of lumbar puncture headache. Reg Anesth 1997; 22: 66-72.
5. Gielen M. Post dural puncture headache (PDPH): a review. Reg Anesth 1989; 14: 101- 6.
6. Reid JA, Thorburn J. Headache after spinal anaesthesia. Br J Anaesth 1991; 67: 674-7.
7. Barker P. Are obstetric spinal headaches avoidable? Anaesth Intens Care 1990; 18: 553-4.
8. Sarma VJ, Bostrom U.Intrathecal anaesthesia for day-care surgery. Anaesthesia 1990; 45: 769-71.
9. Dahl JB, Schultz P, Anker-Moller E, Christensen Ei Staunstrup HG, Carlsson P. Spinal anaesthesia in young patients using a 29-gauge needle: technical considerations and an evaluation of postoperative complaints compared with general anaesthesia. Br J Anaesth 1990; 64: 178-82.
10. Watcha MF, White PF. Postoperative nausea and vomiting its etiology, treatment and prevention. Anesthesiology 1992; 77: 162-84.
11. Meeks GR, Waller GA, Meydrech EF, Flautt FH. Unscheduled hospital admission following ambulatory gynecologic surgery. Obstet Gynecol 1992; 80: 446-50.
12. Mihic DN. Postspinal headache and relationship of needle bevel to longitudinal dural fibers. Reg Anesth 1985: 10: 76-81.
13. Brattebo G, Wisborg T, Rodt SA. Intrathecal anaesthesia in patients under 45 years: incidence of postdural puncture symptoms after spinal anaesthesia with 27-G needles. Acta Anaesthesiol Scand 1993; 37: 545-8.
14. Schultz AM, Ulbing S, Kaider A. Postdural puncture headache and back pain after spinal anesthesia with 27-gauge Quincke and 26-gauge Atraucan needles. Reg Anesth 1996; 21: 461-4.
15. Sharma SK, Gambling DR, Joshi GP. Comparison of 26-gauge Atraucan and 25-gauge Whitacre needles: insertion characteristics and complications. Can J Anaesth 1995; 42: 706-10.

การเปรียบเทียบภาวะไม่พึงประสงค์หลังการให้ยาระงับความรู้สึก ในผู้ป่วยที่เข้ารับ การผ่าตัด lower limb ภายใต้การให้ยาระงับความรู้สึกทั่วไป และแบบเฉพาะส่วน

บรรจง ครอบบัวบาน, สุจริต คำแก้ว, ณัฐา ภักดีศิริวงศ์, ศิริวรรณ ดิเรกโภค

***ที่มา**: การเลือกชนิดของการให้ยาระงับความรู้สึก เป็นหนึ่งในการตัดสินใจของผู้ให้ยาระงับความรู้สึก หลังจากเยี่ยมประเมินผู้ป่วยก่อนการผ่าตัด ยังไม่พบการศึกษาที่ศึกษาถึงอุบัติการณ์ของภาวะไม่พึงประสงค์หลังการให้ยาระงับความรู้สึกชนิดต่าง ๆ ที่ใช้กันอยู่ในปัจจุบัน*

***วัตถุประสงค์**: เพื่อศึกษาเปรียบเทียบ อุบัติการณ์ของภาวะไม่พึงประสงค์หลังการให้ยาระงับความรู้สึกตามมาตรฐานการให้ยาระงับความรู้สึกเฉพาะส่วน โดยใช้เข็ม spinal เบอร์ 27 และการให้ยาระงับความรู้สึกทั่วไป ทั้งสองรูปแบบ (ใส่ท่อช่วยหายใจ และครอบหน้ากาก) ในผู้ป่วยที่เข้ารับการผ่าตัด lower limb*

***วัสดุและวิธีการ**: เป็นการศึกษาแบบ prospective, randomized, observer blind trial ในผู้ป่วยทางกระดูกและข้อจำนวน 260 ราย ที่เข้ารับการผ่าตัด lower limb ผู้ป่วยได้รับการสุ่มให้ได้รับการให้ยาระงับความรู้สึก แบบใดแบบหนึ่งใน 3 แบบ คือ 1) แบบเฉพาะส่วน (SA) 2) แบบทั่วไปร่วมกับการครอบหน้ากาก (GA-M) และ 3) แบบทั่วไปร่วมกับการใส่ท่อช่วยหายใจ (GA-T) และติดตามประเมินภาวะไม่พึงประสงค์ ในวันที่ 1 และวันที่ 3 หลังการให้ยาระงับความรู้สึกโดยการสัมภาษณ์ อย่างเจาะจง*

***ผลการศึกษา**: วันที่ 1 หลังการให้ยาระงับความรู้สึก ผู้ป่วยที่ได้รับการให้ยาระงับความรู้สึกแบบเฉพาะส่วนมีอาการปวดหลังสูงกว่าผู้ป่วยที่ให้ยาระงับความรู้สึกทั่วไปอย่างมีนัยสำคัญทางสถิติ ($p < 0.05$) ในขณะที่ผู้ป่วยที่ได้รับยาระงับความรู้สึกทั่วไป มีภาวะคลื่นไส้ อาเจียน และปวดศีรษะ มากกว่าผู้ป่วยที่ได้รับการให้ยาระงับความรู้สึกแบบเฉพาะส่วนอย่างมีนัยสำคัญทางสถิติ ภาวะไม่พึงประสงค์หลังการให้ยาระงับความรู้สึก 72 ชั่วโมงในผู้ป่วยที่ได้รับการให้ยาระงับความรู้สึกแต่ละกลุ่มพบว่า มีความแตกต่างอย่างไม่มีนัยสำคัญทางสถิติ*

***สรุป**: การให้ยาระงับความรู้สึกแบบเฉพาะส่วนโดยใช้เข็ม spinal เบอร์ 27 สัมพันธ์กับการเกิดภาวะไม่พึงประสงค์หลังการให้ยาระงับความรู้สึกต่ำกว่าการให้ยาระงับความรู้สึกทั่วไป ดังนั้น การให้ยาระงับความรู้สึก ชนิดนี้ควรถูกเลือกใช้ในผู้ป่วยที่เข้ารับการผ่าตัด lower limb*