Comparison of Different Doses of Epidural Morphine for Pain Relief Following Cesarean Section

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Abstract

Although epidural opioid analgesia after cesarean section can provide excellent postoperative pain relief, serious complications may occur after epidural morphine. Therefore, we performed this study to compare the efficacy and side effects of three different doses of epidural morphine for analgesia following cesarean section.

Ninety healthy pregnant women who underwent cesarean delivery were randomly assigned to receive either 2.5, 3 or 4 mg of epidural morphine for postoperative analgesia. Pain intensity at rest and on movement using a visual analogue scale (0-10) was regularly assessed for 48 hours, the time to first analgesic requirement, the total analgesic dose, patient satisfaction and side effects were recorded. Chi square and ANOVA tests were used for statistical analyses.

We were unable to demonstrate any difference in pain relief, patient satisfaction, and side effects among the three groups. Epidural morphine provided sufficient pain relief for approximately 24 hours. About 27 per cent of the patients from each group were pain-free for up to 48 hours without further analgesics. Mild pruritus and nausea occurred in all three groups and there was no significant difference between them. No serious complications were observed. In conclusion low dose epidural morphine is effective in providing adequate analgesia following cesarean delivery.

Key word : Epidural Morphine, Pain Therapy, Cesarean Section

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Continuous epidural anesthesia is a standard anesthetic technique for pregnant women undergoing cesarean section worldwide, because the dosage of local anesthetic agent can be adjusted in order to avoid hemodynamic instability. This technique is also free from the headache often experienced after spinal anesthesia, and provides good postoperative pain relief[1-7]. The patient can ambulate early on, and interact with her baby, while the risk of breast feeding associated delivery of opiate to the baby is diminished by the low dose of opiate needed with an epidural compared with an intravenous technique.

Doses of epidural morphine ranging from 2 mg to 8 mg have been reported. Adverse side effects are dependent on the dose given[3,7]. However, there have not been any previous studies done in Thailand, therefore, we performed this study to investigate the efficacy of different doses of epidural morphine, and to observe any side effects. We also looked for the most appropriate dose for post operative analgesia in women who had undergone cesarean section.

PATIENTS AND METHOD

After approval from the Faculty committee for human rights, we performed this study in 90 pregnant women ASA status I and II, aged 15-50 years who had undergone cesarean section. Each participating patient signed the consent form, after the steps of the study and possible complications had been explained to her.

Table 1. Demographic data, indication for cesarean section, total doses of local anesthetic, anesthetic time, surgical time (mean ± SD) for each group.

	Group 1 n=30	Group 2 n=30	Group 3 n=30	P
Age (yr)	30.6 ± 5.08	31.69 ± 5.47	30.27 ± 5.12	0.54
Weight (kg)	71.31 ± 12.82	70.50 ± 8.46	68.64 ± 13.30	0.667
Height (cm)	157.77 ± 6.52	156.88 ± 5.07	156.52 ± 6.03	0.72
ASA 1/2	25/5	22/8	26/4	0.34
Indication	%	%	%	0.124
Previous C/S	11 36.7	17 56.7	9 30	
CPD	14 46.7	8 26.7	18 60	
Others	5 16.7	5 16.7	3 10	
Total doses of local anesthetic (ml)	21.7 ± 3.7	22.2 ± 3.6	22.6 ± 3.9	0.652
Anesthetic time (min)	67.4 ± 20.7	63.7 ± 16.4	69.5 ± 18.9	0.479
Surgical time (min)	54.1 ± 18.6	50.9 ± 16.8	56.7 ± 19.3	0.48

Group 1 : epidural morphine 2.5 mg
Group 2 : epidural morphine 3 mg
Group 3 : epidural morphine 4 mg
C/S = cesarean section, CPD = cephalopelvic disproportion

Table 2. Intraoperative problems and supplementary anesthetics needed.

	Group 1 n=30	%	Group 2 n=30	%	Group 3 n=30	%	P
Intraoperative problem							0.757
Nil	23	76.7	19	63.3	22	73.3	
Pain	0		2	6.7	1	3.3	
Shivering	4	13.3	5	16.7	2	6.7	
Nausea and vomiting	1	3.3	1	3.3	2	6.7	
Incomplete block	0		2	6.7	0		
Fear	1	3.3	1	3.3	1	3.3	
Hypotension	1	3.3	2	6.7	2	6.7	
Supplementary anesthetic							0.561
Used	16	53.3	17	56.7	15	50	
Not used	14	46.7	13	43.3	15	50	

The patients were given between 500-1,000 ml of Ringer's Lactate solution while monitoring blood pressure, ECG, and pulse oximetry non-invasively, before lumbar epidural anesthesia was performed using the loss of resistance technique. An epidural catheter was placed 3-5 cm into the epidural space. A test dose of 3 ml of 2 per cent lidocaine with epinephrine 1 : 200,000 was given to rule out accidental subarachnoid block or intravascular injection, then a full dose of lidocaine with epinephrine 1 : 200,000 (18-20 ml) was administered to achieve an anesthetic level at T_4-T_6. If the patients did not have adequate anesthesia, supplementary 50 per cent N_2O in O_2 or 25 mg ketamine was administered or general anesthesia was performed.

The patients were then randomly assigned into 3 groups to receive different doses of epidural morphine for postoperative analgesia, Group 1 received 2.5 mg morphine, Group 2 received 3 mg morphine, and Group 3 received 4 mg morphine. Epidural morphine diluted to 3 ml with normal saline solution was administered after delivery of the infant. The syringe was prepared by one member of the research team (SC) and was administered with both the patient and the two observers (PS & RC) blind to the dose of morphine given.

Time to first analgesic requirement, postoperative pain scores, complications of epidural morphine (pruritus, nausea and vomiting), respiratory rate, and total dose of analgesics administered within the 48 hours postoperative period were recorded by the two observers who were blinded to the group allocation. The patient recorded their pain or other symptoms every 3 hours postoperatively.

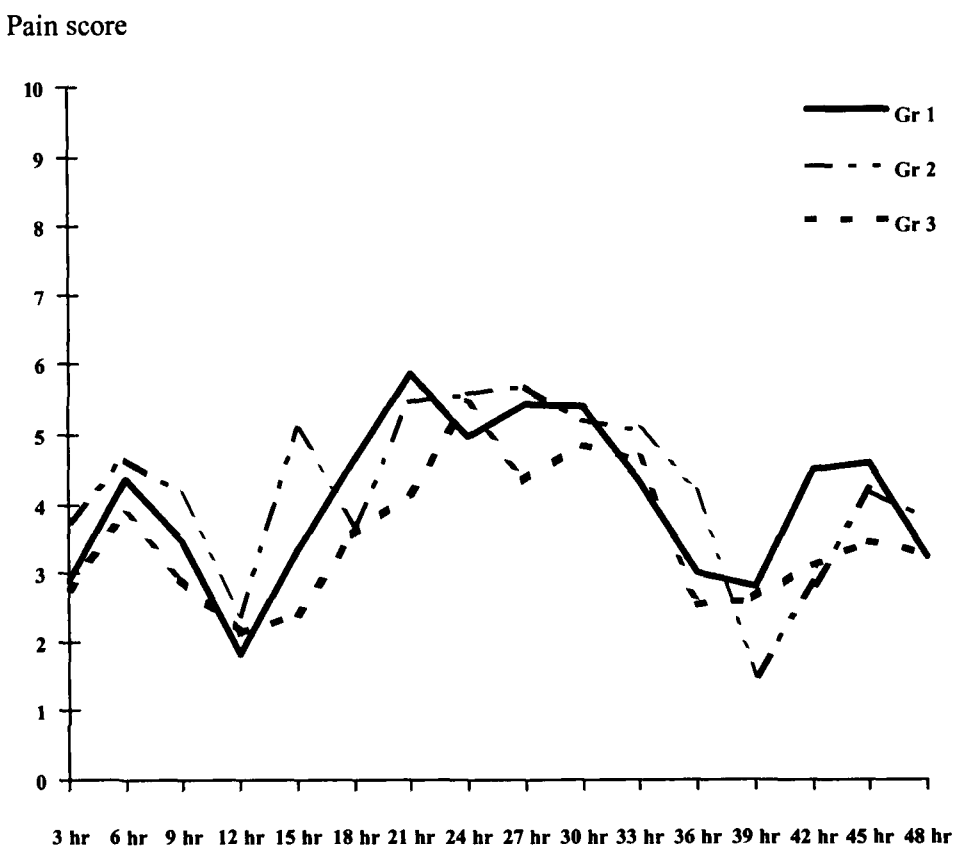

Fig. 1. Mean pain scores during movement at three hourly intervals post cesarean section for 48 hours.

Rating scales for complications of epidural morphine:

Pruritus (4-point scale)
0 = no pruritus
1 = minimal pruritus, treatment not necessary
2 = moderate pruritus, treatment desirable
3 = severe pruritus and scratching, treatment necessary

Pain score 0-10
0 = no pain
10 = worst pain imaginable

Nausea and vomiting
0 = no nausea or vomiting
1 = queasy
2 = severe nausea
3 = vomiting

Statistical analysis: Chi-square was calculated for inter-group comparison of discrete data, and one-way analysis of variance was used for inter-group comparison of continuous data. A p-value of less than 0.05 was considered to be significant.

RESULTS

Ninety pregnant patients were studied. The demographic data, indications for cesarean section, total dose of local anesthetic, total volume of intravenous fluid administered, surgical blood loss, total surgical time, and anesthetic time are shown in the Table 1. No significant differences among the groups were found.

Intraoperative problems and the need for supplementary anesthetic were not significantly different among the groups (Table 2).

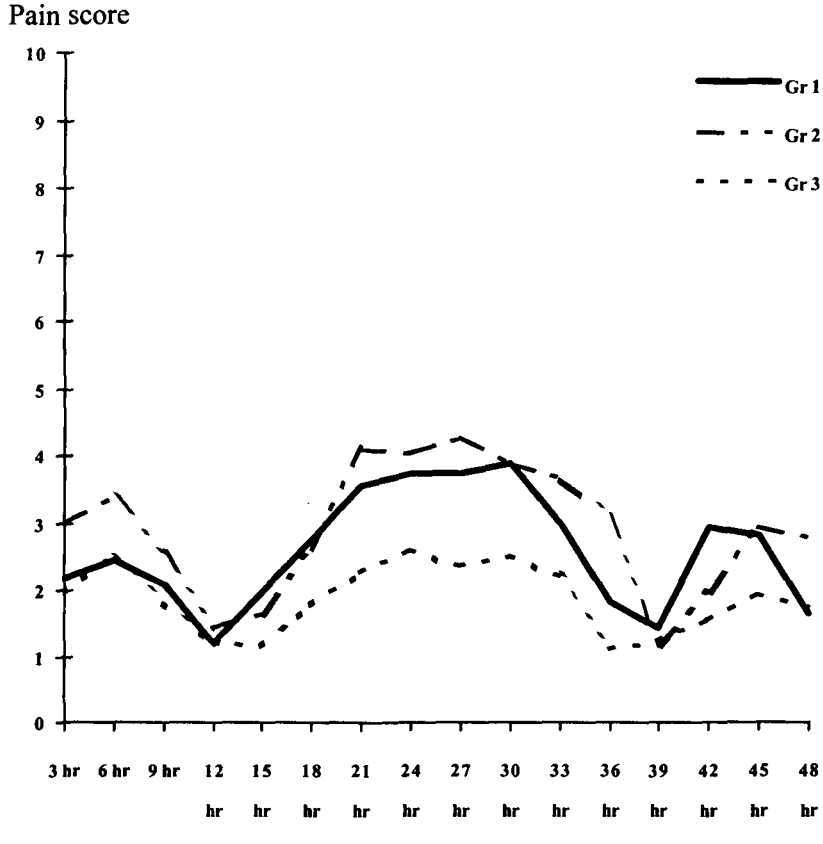

Fig. 2. Mean pain scores at rest at three hourly intervals post cesarean section for 48 hours.

Pain scores recorded at 3-hour intervals both at rest and during movement are shown in Fig. 1 and 2, and there are no differences among the groups. The mean pain scores are lowest around 12 hours and 39 hours after operation.

Postoperative analgesic requirements for postoperative day 1 and 2 are shown in Table 3. There are 8 patients of each groups (27%) who did not require any form of additional postoperative analgesia. The average time to first analgesic requirement in groups I, II and III was 23.27, 24.06, and 23.15 hours, respectively and there was no difference among the groups (Table 3).

The incidence of adverse side effects among the groups, that is: itching, nausea and vomiting were comparable (Table 4). There were no reports of headache, urinary retention, or respiratory depression. The time to first ambulation, time to removal of urethral catheter, and patient satisfaction were not different among the groups.

DISCUSSION

There have been previous reports concerning epidural analgesia for cesarean section, using different doses of morphine ranging from 2 mg to 8 mg. Some studies have found that a 2 mg dose reduces

Table 3. Postoperative analgesic requirements for postoperative day 1 and 2, time to first analgesic requirement and numbers of patients who did not require postoperative analgesics.

	Group 1	Group 2	Group 3	P
DAY 1				
Paracetamol (mg)	433 ± 697	333 ± 547	600 ± 770	0.304
Pethidine (mg)	3.33 ± 12.68	8.33 ± 26.53	3.33 ± 12.68	0.484
DAY 2				
Paracetamol (mg)	900 ± 994	800 ± 205	733 ± 740	0.749
Pethidine (mg)	0	0	0	
Patients who did not require postoperative analgesics (%)	8 (27)	8 (27)	8 (27)	
Time to first analgesic need (h)	23.27	24.06	23.15	0.280

Table 4. The incidence of adverse effects ; pruritus, nausea and vomiting on postoperative day 1 and 2.

	Group 1	%	Group 2	%	Group 3	%	P
Pruritus : day 1	**30**	**66**	**30**	**73**	**30**	**66**	**0.206**
No	10	33.3	8	26.7	10	33.3	
Minimal	16	53.3	20	66.7	17	56.7	
Moderate	3	10	2	6.7	3	10	
Severe	1	3.3	0		0		
Pruritus : day 2							**0.919**
No	25	83.3	25	83.3	25	83.3	
Minimal	5	16.7	5	16.7	4	13.3	
Moderate	0	0	0				
Severe	0	0	0				
Nausea, vomiting day 1	**30**	**23**	**30**	**30**	**30**	**46**	**0.399**
No	23	76.7	21	70	16	53.3	
Queasy	6	20	7	23.3	11	36.	
Severe nausea	1	3.3	2	6.7	3	10	
Vomiting	0		0		0		
Nausea, vomiting day 2							**0.129**
No	30		30		28		
Queasy	0		0	2	6.7		
Severe nausea	0		0		0		
Vomiting	0		0		0		

the postoperative analgesic requirement[2,4,8], but one study showed that 2 mg dose was not enough for postoperative pain relief after cesarean section[3]. While a 3 mg dose has been found to produce good postoperative pain relief[1,3,4,6,7], higher doses of epidural morphine have increased the incidence of unwanted side effects[3,7], although not affecting pain scores.

Therefore, our study chose doses of epidural morphine of 2.5, 3 and 4 mg in order to investigate whether or not any differences in postoperative analgesic requirements and side effects could be found. We have demonstrated that a dose of 2.5 mg of morphine was no different from a dose of 3 or 4 mg morphine with respect to effectiveness in relieving pain or unwanted side effects.

The time for first postoperative analgesic in this study is the same as previous studies[3,4,7], and shows no differences among the groups. The mean pain score of all the groups was lowest at 12 hours which should be the time of maximal effect of the epidural morphine.

Pruritus was reported by 68.9 per cent, and nausea and vomiting was found in 33.3 per cent, but we did not receive any reports of respiratory depression or urinary retention (48 hours follow-up). Pruritus is the most common side effects reported after epidural morphine analgesia, and it has been found that its severity is associated with the dose given[3,7].

In summary, 2.5 mg epidural morphine was as effective as a larger dose (3 or 4 mg) for relief of post cesarean pain. 27 per cent of the patients did not require any additional form of analgesia within 48 hours postoperatively. There were no differences in the side effects observed among the three groups.

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ประสิทธิภาพของมอร์ฟีนขนาด 2.5, 3, 4 มิลลิกรัมทางนอกช่องดูรา ภายหลังผ่าตัดคลอดบุตรทางหน้าท้อง

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วัตถุประสงค์ : ศึกษาประสิทธิภาพของมอร์ฟีนนอกช่องดูรา ขนาด 2.5, 3 หรือ 4 มก ในการระงับปวดหลังผ่าตัดคลอดบุตรทางหน้าท้อง และผลข้างเคียงของยาดังกล่าว

วิธีการ : ศึกษาผู้ป่วยที่มารับการผ่าตัดคลอดบุตรทางหน้าท้อง และไม่มีข้อห้ามต่อการให้มอร์ฟีนทาง epidural โดยแบ่งผู้ป่วยเป็น 3 กลุ่ม กลุ่มละ 30 คน โดยวิธีสุ่ม กลุ่มที่ 1 ได้รับมอร์ฟีนขนาด 2.5 มก ทาง epidural, กลุ่มที่ 2 ได้รับมอร์ฟีนขนาด 3 มก ทาง epidural, และกลุ่มที่ 3 ได้รับมอร์ฟีน 4 มก ทาง epidural ภายหลังเด็กออกผ่านทางสายสวนช่องนอกดูราและผสมในน้ำเกลือนอร์มัล 3 มล และบันทึก ระยะเวลาในการให้ยาระงับความรู้สึกและการผ่าตัดเวลาที่เด็กออก, Apgar Score บันทึกเวลาที่ผู้ป่วยต้องการยาแก้ปวดครั้งแรก คะแนนความปวด ผลข้างเคียง และปริมาณยาแก้ปวดที่ได้รับใน 48 ชม ภายหลังการผ่าตัด

ผลการศึกษา : ผลข้างเคียงและผลการระงับปวดไม่มีความแตกต่างกันทั้ง 3 กลุ่ม ภายหลังได้รับมอร์ฟีนทางช่องนอกดูราขนาด 2.5, 3, และ 4 มก ระยะเวลาที่ต้องการยาแก้ปวดครั้งแรกเฉลี่ยของแต่ละกลุ่มไม่มีความแตกต่างกัน ได้แก่ 23.27 ชม, 24.06 ชม และ 23.14 ชม ตามลำดับ พบว่าผู้ป่วยร้อยละ 27 ไม่ต้องการยาระงับปวดด้วยวิธีอื่น ๆ ภายหลังผ่าตัด 48 ชม ผลแทรกซ้อนที่พบทั้ง 3 กลุ่มมีอาการคันใกล้เคียงกันมากคือร้อยละ 70 คลื่นไส้อาเจียนร้อยละ 23, 30 และ 46 ในผู้ป่วยกลุ่ม 1, 2 และ 3 ตามลำดับ การศึกษานี้ไม่พบผู้ป่วยหายใจช้ากว่าปกติ

สรุป : การให้มอร์ฟีนทางช่องนอกดูรา ขนาด 2.5, 3, และ 4 มก ไม่มีประสิทธิภาพแตกต่างกันในแง่ของการระงับปวดภายหลังการผ่าตัดคลอดบุตรทางหน้าท้อง และอุบัติการณ์ของผลข้างเคียงก็ไม่แตกต่างกัน

คำสำคัญ : มอร์ฟีน, การระงับปวดทางช่องนอกดูรา, ผ่าตัดคลอดบุตรทางหน้าท้อง

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