

## Comparison Between Pethidine and Nalbuphine Hydrochloride Combating Epigastric Pain During Mopping of Intraperitoneal Blood in Lower Uterine Caesarean Section Operation

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### Abstract

A randomized prospective single blind trial was conducted in the Department of Anaesthesia, Analgesia, Palliative and Intensive Care Medicine, Dhaka Medical College Hospital, Dhaka, Bangladesh, between July 2021 and February 2022, to compare the effects of intravenous pethidine and nalbuphine hydrochloride combating epigastric pain and discomfort during mopping of intraperitoneal blood in lower uterine caesarean section (LUCS) operation. A total of 120 women participated in the study. They were randomly divided into two groups: group A (n=60) received intravenous diluted (with normal saline) 20-25 mg of pethidine, while group B (n=60) received intravenous diluted 10-20 mg of nalbuphine hydrochloride. There were no differences observed in mean age, weight, height, and duration of operation between two groups ( $P>0.05$ ). However, participants of group B reported less or no epigastric pain and discomfort during mopping of intraperitoneal blood than that of group A ( $P<0.05$ ), i.e., episode and intensity of pain measured by using visual analogue scales indicated that nalbuphine hydrochloride has a longer duration of action than pethidine. Our study revealed that intravenous diluted nalbuphine hydrochloride works better than pethidine to minimize epigastric pain and discomfort during mopping of intraperitoneal blood in lower uterine caesarean section (LUCS) operation.

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## Introduction

Lower uterine caesarean section (LUCS) is a common obstetric procedure in our country to deliver babies, which is usually done under subarachnoid block (SAB).<sup>1</sup> 12.5-15 mg of injection bupivacaine heavy is used and patient is positioned supine immediately after giving subarachnoid block.<sup>2</sup>

After delivery of the baby, placenta and after repair of the uterine wound some amount of blood usually remain intraperitoneally and surgeons usually do mop to clean the blood. At this stage of operation patient usually feels stretching epigastric pain and discomfort. Epigastric pain and discomfort during mopping is due to traction on mesenteric folds.<sup>3</sup> The mesentery is fan shaped and consists of two layers of peritoneum, containing jejunum, ileum, blood vessels, nerves, lymph nodes and fat.<sup>4,5</sup> It is attached superiorly to the posterior abdominal wall along an oblique line running from left side of body of second lumbar vertebra to the right sacroiliac joint. This line of attachment is called the root of mesentery.<sup>4,5</sup> The visceral peritoneum has no afferent supply, pain from viscera is due to traction of mesenteric folds. The superior mesenteric ganglion (T5-T9) innervates the small intestine.<sup>4,5</sup>

During mopping of intraperitoneal blood there is usually traction of the small intestine and traction on mesenteric folds causing epigastric pain and discomfort, feeling of breathlessness, and occasionally sweating.<sup>3</sup> To reduce such pain and discomfort, several intravenous drugs of low doses are being used e.g., 20-25 mg of intravenous diluted pethidine or 10-20 mg of intravenous diluted nalbuphine hydrochloride. Those drugs showed reduction of pain and discomfort during intraperitoneal mopping;

however, they also showed some changes in vital parameters like heart rate, blood pressure, and oxygen saturation (SpO<sub>2</sub>). Anesthesiologists should look at the drugs that may give optimum results in minimizing pain and other symptoms in operative procedures – preoperative, perioperative, and postoperative.<sup>6</sup> Several clinical trials evaluated different analgesic modalities; however, no clear guidelines exist for the management of pain during intraperitoneal mopping in caesarean section operation.<sup>6</sup> Hence, there is a scarcity of literature in this specific area. Considering all those issues, we proposed this study to compare the effects of intravenous pethidine and nalbuphine hydrochloride combating epigastric pain and discomfort during mopping of intraperitoneal blood in lower uterine caesarean section (LUCS) operation.

## Methods

This prospective single blind randomized clinical trial was conducted in the Department of Anaesthesia, Analgesia, Palliative and Intensive Care Medicine of Dhaka Medical College Hospital, Dhaka, Bangladesh, between July 2021 and February 2022.

### *Inclusion Criteria:*

- 1) Adult female patients undergoing caesarean section under subarachnoid block (SAB); and
- 2) Patients who are scheduled for either elective or emergency caesarean section.

### *Exclusion Criteria:*

- 1) Any pregnancy related complication, e.g., preeclampsia, eclampsia, antepartum haemorrhage;
- 2) Patients with previous history of hypersensitivity to pethidine or nalbuphine hydrochloride;
- 3) Patients having coagulopathy; and

#### 4) Patients who declined subarachnoid block (SAB) procedure.

After scrutinizing following all inclusion and exclusion criteria, a total of 120 women scheduled for elective and emergency lower uterine caesarean sections (as done by different qualified obstetric surgeons) were included in this study.

Informed written consents were taken from the patients or legal guardians. Pre-operatively heart rate, blood pressure, and oxygen saturation (SpO<sub>2</sub>) were measured and documented. After giving about 15 ml/kg body weight intravenous Hartmann saline, subarachnoid blocks were given with proper aseptic precaution. For the subarachnoid blocks doses of injection bupivacaine heavy were about 12.5-15 mg considering the height, weight, nutritional status of the patients.<sup>7</sup> All the patients received subarachnoid blocks through the space between lumbar 2 and 3 or 3 and 4-spinous process in sitting or lateral position.<sup>7</sup> After giving subarachnoid block patients were made supine as early as possible. Hemodynamics status (e.g., heart rate, blood pressure, SpO<sub>2</sub>) was measured and documented in every 5 minutes interval. With aseptic precaution and proper draping caesarean sections were started by the surgeons. After delivery of the baby and placenta, and repair of uterus, intraperitoneal blood was cleaned by mopping. During mopping patients usually complained epigastric pain and discomfort, felt breathlessness, and sometimes screamed. To reduce such pain and discomfort, group A (n=60) received intravenous diluted (with normal saline) 20-25 mg of pethidine, while group B (n=60) received intravenous diluted 10-20 mg of nalbuphine hydrochloride. The administration of

those two drugs were randomly assigned. Then epigastric pain of the patient was evaluated by visual analogue scale (VAS).<sup>8</sup>

Data were summarized by routine descriptive statistics as mean±SD for numerical variables and counts and percentages for categorical variables. Numerical data were compared between groups by Student's t-test as data were normally distributed. The Chi-square test was employed for intergroup comparison of categorical variables. P value <0.05 was considered as statistically significant. Statistical analysis was done using Statistical Package for the Social Sciences (SPSS) version 24.0. The study was approved by the Ethical Review Committee of Dhaka Medical College, Dhaka.

## Results

There were 60 adult female patients in each group and variables like age, weight, duration of surgery, were compared between two groups. Mean age of the patients in group A was 29.85±3.51 years, while in group B 29.55±3.19 years. Mean weight was found 61.1±7.55 kg and 60.9±6.44 kg, while mean height was observed 143.6±5.36 cm and 142.7±4.43 cm respectively. Duration of caesarean section operation was 62±8.17 minutes and 61.75±9.77 minutes respectively. However, there were no differences observed in mean age, weight, height, and duration of operation between two groups (P>0.05) (Table-I). Symptomatic relief was observed in 30 patients in group A, while 48 in group B. Visual analogue scale (VAS) revealed that in group A, 30 patients felt no pain (score 0), 16 patients complained of mild pain (score 1-3), 10 patients complained of moderate to severe pain (score 4-6), 4 patients complained of severe

pain (score 7-9), but no patients complained of worst pain possible (score 10). In contrast, in group B, 48 patients felt no pain (score 0), 8 patients complained of mild pain (score 1-3), 4 patients complained of moderate to severe pain (score 4-6), and no patients complained of very severe pain (score 7-9) and worst pain possible (score 10) (Table-II). Hence, in group A, 30 (50%) patients complained pain even after administration of analgesic, while in group B, the number is only 12 (20%). Average pain score was found  $4.133\pm 2.063$  and  $2.1576\pm 1.468$  respectively. The difference between the groups was statistically significant ( $P<0.05$ ) (Table-III). Table-IV shows the changes of different vital parameters (heart rate, blood pressure and  $SpO_2$ ) after administration of drugs in both groups.

**Table-I:** Demographic characteristics of the patients

Variables	Group A (n=60)	Group B (n=60)	P value
Age (in years)	$29.85\pm 3.51$	$29.55\pm 3.19$	$>0.05^{NS}$
Wight (in kg)	$61.1\pm 7.55$	$60.9\pm 6.44$	$>0.05^{NS}$
Height (in cm)	$143.6\pm 5.36$	$142.7\pm 4.43$	$>0.05^{NS}$
Duration of operation (in minutes)	$62\pm 8.17$	$61.75\pm 9.77$	$>0.05^{NS}$

Data was expressed as Mean $\pm$ SD. P value reached from Student's t-test and Chi-square test; NS=not significant

**Table-II:** Pain score using visual analogue scale (VAS) after administration of drugs

Pain Score	Group A (n=60)	Group B (n=60)
No pain (0)	30 (50%)	48 (80%)
Mild pain (1-3)	16 (26.67%)	8 (13.33%)
Moderate to severe pain (4-6)	10 (16.66%)	4 (6.67%)
Very severe pain (7-9)	4 (6.67%)	0
Worst pain possible (10)	0	0

**Table-III:** Pain score using visual analogue scale (VAS) (for patients who complained pain even after administration of drug)

Variables	Group A (n=60)	Group B (n=60)	P value
Number of patients	30 (50%)	12 (20%)	
Average pain score	$4.133\pm 2.063$	$2.1576\pm 1.468$	$<0.05^S$

Data was expressed as Mean $\pm$ SD. P value reached from Chi-square test; S=significant.

**Table-IV:** Changes in different vital parameters due to use of drugs

Variables		Group A (n=60)	Group B (n=60)
Heart Rate	Increased	31 (51.67%)	10 (16.66%)
	Decreased	2 (3.33%)	28 (46.67%)
	No change	27 (45%)	22 (36.67%)
Blood Pressure	Increased	14 (23.33%)	12 (20%)
	Decreased	20 (33.33%)	27 (45%)
	No change	26 (43.34%)	21 (35%)
Oxygen saturation ( $SpO_2$ )	Increased	4 (6.67%)	5 (8.33%)
	Decreased	19 (31.66%)	17 (28.33%)
	No change	37 (61.67%)	38 (63.34%)

## Discussion

Pethidine is the most widely accepted and practiced method of obstetric analgesia in our country.<sup>7</sup> The mixed agonist/antagonist narcotic analgesic like nalbuphine have the place in clinical practice especially in obstetric analgesia over few decades;<sup>9,10</sup> however, its use in obstetric analgesia is not very popular in our country. The purpose of the study was to compare efficacy in pain management between pethidine and nalbuphine during mopping of intraperitoneal blood after delivery of baby and placenta, and repair of uterus in caesarean section operation. Evidence showed that pethidine has a variable analgesic efficacy in obstetric analgesia, as

following its administration, many of the mothers have experienced pain, which is unacceptable or unsatisfactory. Moreover, various side effects associated with pethidine are disadvantageous in the obstetric situations.<sup>9-11</sup> Hence, the search for an alternative analgesic drug continues and analgesic drug with agonist-antagonist properties might be more suitable if the analgesic efficacy is not inferior to that of pethidine. Nalbuphine is an analgesic with agonist and antagonist properties which has been found to have a ceiling ventilatory depressant effect and which, in previous studies, has been found to have fewer side effects than pethidine.<sup>9-11</sup>

Only a limited number of studies have tested the efficacy of nalbuphine in cesarean sections. Research demonstrated that nalbuphine is an effective adjuvant to bupivacaine for subarachnoid blocks, and it provides prolonged analgesia and can be a suitable alternative to pethidine in caesarean sections.<sup>12,13</sup>

Similar results were reported by Brock-Utne *et al.*, as they did random double-blind study and compared nalbuphine and pethidine for postoperative pain relief after orthopaedic surgery<sup>14</sup> and Chestnutt, Clarke & Dundee, as they conducted randomized double-blind placebo-controlled trial to compare nalbuphine, pethidine and placebo as premedication for minor gynaecological surgery.<sup>15</sup> In contrast, Thorniley *et al.*<sup>16</sup>, Wilson *et al.*<sup>17</sup> and Dan *et al.*<sup>18</sup> reported equal efficacy of these two drugs in pain management.

The study has several limitations. Firstly, it was a single-center study with a small sample size. Secondly, patients with comorbidities like preeclampsia, eclampsia, or antepartum haemorrhage were not included. Hence, we

recommend further studies with larger samples, and in multi-centre (including both rural and urban) settings and with high-technical backup.

## Conclusion

Our study revealed that episode and intensity of pain (as measured by using visual analogue scales) was much less in patients who received nalbuphine hydrochloride. It indicates that nalbuphine hydrochloride has a longer duration of action than pethidine. To conclude, intravenous diluted nalbuphine hydrochloride works better than pethidine to minimize epigastric pain and discomfort during mopping of intraperitoneal blood in lower uterine caesarean section (LUCS) operation. Hence, it may be considered as a better option comparing to pethidine, which is frequently used in our country.

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