ORIGINAL ARTICLE

IMPACT OF BUPIVACAINE INFILTRATION OF POSTOPERATIVE WOUND ON PARENTERAL NARCOTIC ANALGESIC REQUIREMENT FOR PAIN

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ABSTRACT

Objective — *To compare the postoperative pain scores and amount of parenteral analgesia (tramadol) used in patients receiving local infiltration of bupivacaine, of surgical wound for caesarean section with patients not receiving local infiltration for the same procedure.*

Study design — *Comparative study.*

Place & Duration of study — *Department of Obstetrics & Gynaecology at Liaquat National Medical College & Hospital, Karachi, from May 2005 to 2006.*

Methodology — *The study included a total of 100 patients undergoing caesarean section. They were divided into two groups of 50 patients each. Study group received local bupivacaine infiltration and in control group no local infiltration was done.*

Results — *There was no significant difference in demographic data, post-operative pain on visual analogue pain scores at rest and with movement between the two groups except for pain score at rest after 12 hours (p 0.020). However, tramadol requirement to produce pain relief was significantly less in patients of study group as compared to control group and on first postoperative day (p 0.070). Cumulative milligrams of tramadol used were 95.0 versus 151.0 at 12 hours, 98.0 versus 225.0 at first postoperative day and 52.0 versus 127.0 at second postoperative day for study and control group respectively (p <0.001).*

Conclusions — *Direct local wound infiltration of bupivacaine provided good pain relief after caesarean section and reduced the requirement of parenteral narcotic analgesia with no major side-effects.*

Key words — *Bupivacaine, Postoperative pain, Narcotic analgesia.*

INTRODUCTION:

Pain is defined as "an un-pleasant sensory and emotional experience associated with actual or potential tissue damage".[1] From this definition it is clear that pain is a multi-modal entity and is the end result of diverse input conditioned by the individual's constitution and prior experience.[2] Postoperative pain remains one of the most prevalent problems in healthcare today and pain control is a topic of current interest.[3]

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The most appropriate method for the treatment of postoperative pain after caesarean delivery remains un-certain.[4] Opioid analgesics continue to be the main stay of treatment despite the side effects.[5] Fear of the opioids addiction, ventilation depression and postoperative vomiting has often lead to under treatment of postoperative pain.[6] The local anaesthetic technique provides postoperative analgesia and additional pain relief can be supplemented with oral analgesics. Wound infiltration with local anaesthetic drug like bupivacaine is an acceptable method for the management of postoperative pain.[7] Continuous infusion of local anaesthesia into the wound appears to be effective in reducing postoperative narcotic requirements.[8]

The rationale of this study was to explore the effects

of wound infiltration with local anaesthetic on postoperative pain scores, postoperative narcotic requirements and postoperative morbidity.

METHODOLOGY:

A comparative study was conducted at Obstetrics & Gynaecology department, Liaquat National Hospital, from May 2005 to 2006. The objective of the study was to compare the postoperative pain scores and narcotic analgesia requirement in patients receiving local infiltration of surgical wounds with bupivacaine, with patients receiving only narcotics (tramadol) for postoperative analgesia. Hundred term pregnant women undergoing caesarean delivery were enrolled in this study. They were randomized to receive either 0.5% bupivacaine infiltration of the wound per-operatively followed by tramadol injection for breakthrough pain on demand (study group) or intermittent tramadol injection on demand (control group) for postoperative pain relief.

Before induction of anaesthesia, 10 to 15 ml per kg lactated Ringer's solution was administered. In all cases 8-10 mg of hyperbaric bupivacaine was injected though a 25 gauge pencil point spinal needle placed at L3-4 interspace. Thereafter, patients were placed in supine position with a 10-15 degree left lateral tilt. A T4 sensory deficit was ensured before the onset of surgery, if failed or inadequate sensory block occurred, general anaesthesia was given and patient excluded from study protocol.

Patients in control group received intravenous tramadol on demand for 48 hours, with a usual dose of 400 mg/24 hours, in 3-4 divided doses, but where the pain was severe, up to 600 mg of tramadol was given. For patients in study group about 20 ml of 0.5% bupivacaine was infiltrated into peritoneum, muscles, subcutaneous tissues and into the skin under direct vision before the closure of abdominal wall. Intravenous tramadol was given to the patients in this group for breakthrough pain whenever requested. Postoperative pain at rest and on movement was measured using a visual analogue scale (0 representing no pain and 10 the most severe pain) within 8 hours on first and 2nd postoperative days. The amount of tramadol used during same period was also recorded in both the groups. Other variables recorded included vital signs, sedation, confusion state, respiratory depression, nausea, vomiting, return of bowel function, time for postoperative ambulation and wound infection.

The data was analyzed on SPSS version 10. The variables were then compared and analyzed using student t- test and Chi- square test. P< 0.05 was deemed to be statistically significant.

RESULTS:

Fifty patients with median age 25 years (range 20-30 years) were randomized to study group and fifty patients of median age 25 years (range 20-32 years) to control group. There was no difference in patients' demographics between the two groups with respect to age, gravidity, parity, and body mass index (table I). Twelve (24%) patients in study group and fourteen (28%) patients in control group had repeat caesarean section. No patient had failed spinal anaesthesia. One patient in study group and two patients in control group had deranged blood sugar level and three patients in control group had raised blood pressure. The mean systolic blood pressures were similar in both groups i.e. study group had 106.32 mmHg versus 106.22 mmHg in control group (p 0.960). There was no difference in diastolic blood pressure between two groups i.e. study group 74.22 mmHg versus 74.06 mmHg in control (p 0.931). The mean pulse rate in study group was 82.86 beats/min and 82.90 beats/min in control group (p 0.931).

The median incision length was similar for both groups i.e. 12 cm (range 9-13 cm) in study versus 12 cm (range 10-14 cm) in control group. Postoperative pain score is shown in table II. There was no statistically significant difference in pain scores between the two groups at rest and with movement, except the pain scores experienced at rest after 12 hours (p 0.020) of surgery and on the first postoperative day (p 0.070). However the amount of tramadol required to effect the same degree of postoperative pain relief was significantly less in the study group than control group at all time intervals. Cumulative milligrams of tramadol used were 95.0 versus 151.0 at 12 hours, 98.0 versus 225.0 at first postoperative day and 52.0 versus 127.0 at second postoperative day for study and control group respectively (p <0.001). (table III).

In either of the groups no patient was unduly sedated or confused or experienced respiratory depression. Nine patients in study group compared with 20 patients in control group experienced vomiting (p 0.027). There was no significant difference in the time to return of bowel movements in both groups. Median time in both study and control groups was 8 hours (range 6-10 hours). The timing of postoperative mobilization was nearly similar in both groups: median time in study and control groups was 13.5 and 13 hours, respectively. Three patients

Table I: Demographic Data

Demographic Data	Study Group (mean±SD)	Control Group (mean±SD)	p value
Age (years)	25.06±2.92	25.04±2.70	0.32
BMI (kg/m²)	30.28±1.75	30.12±1.96	0.67
Parity	1.04±1.14	1.24±1.41	0.43
Gravida	2.04±1.14	2.24±1.41	0.43

Table II: Visual Analogue Scale for Pain at Rest & During Movement

Time	Study group	Control group	p value
At Rest			
After 4 hours.	2.14 ± 1.90	2.36 ± 0.83	0.207
After 8 hours.	2.90 ± 0.79	2.76 ± 0.82	0.387
After 12 hours.	3.48 ± 0.93	3.84 ± 0.55	0.020
At 1st postoperative day	2.06 ± 0.98	2.38 ± 0.75	0.070
At 2nd postoperative day	1.50 ± 1.13	1.58 ± 0.78	0.837
During Movement			
After 4 hours.	3.84± 1.11	3.76 ± 0.92	0.696
After 8 hours	3.92 ± 1.03	3.90 ± 0.76	0.912
After 12 hours.	4.38 ± 0.97	4.66 ± 0.85	0.127
At 1st postoperative day	3.58 ± 1.01	3.66 ± 0.87	0.673
At 2nd postoperative day	2.54 ± 1.13	2.62 ± 0.67	0.667

Table III: Amount of Tramadol Used Postoperatively

Amount of Tramadol	Study Group	Control Group	p value
After 12 hours.	95.00 ± 27.20	151.00 ± 29.43	<0.001
At 1st postoperative day	98.00 ± 26.65	225.00 ± 46.57	<0.001
At 2nd postoperative day	52.00 ± 30.24	127.00 ± 38.08	<0.001

in each group developed wound infection (p 1.00).

DISCUSSION:

As the volume and complexity of surgical procedures continue to grow, anaesthesiologist are being challenged to provide patients with the optimal surgical experience, good operating conditions and rapid recovery time without side effects.[9] Postoperative pain is usually greatest in thoracic, abdominal, head neck and orthopaedic surgeries.[10] The recent trend is to employ balanced, multimodal analgesia that opens up exciting possibilities for pain relief. It is achieved by combining various analgesics that act by different mechanisms resulting in additive or synergistic analgesia due to lower total dose of analgesics and fewer side effects.

The prevailing practice is still to administer opiates, which have a good pain relieving potential but opiates also have a number of side effects. Because of the analgesic properties and lack of opioid-induced adverse effects, local anaesthetic drugs have become increasingly popular in the treatment of surgical pain.[11-14] Bupivacaine is found to be quiet effective in reducing postoperative pain. It has high lipid solubility and protein binding properties, which result in rapid onset of action and prolonged duration of action (6-9 hours). Bupivacaine helps to reduce the dosage of analgesia after operation and contributes significantly to early mobilization and discharge from hospital thus reducing overall cost incurred by the patient.[15]

In our study the effectiveness of postoperative pain relief and pain related complications were compared in patients receiving long acting local anesthetic perfusion of the wound with parenteral opioids for their postoperative pain relief after cesarean delivery.

The use of subcutaneous local anesthetic drug after cesarean delivery would not be expected to have an effect on uterine pain. However it is uncertain what proportion of pain after caesarean delivery is produced by the deeper visceral structures and what is the result of superficial structure manipulation. Thus elimination of some of the superficial component of pain after caesarean delivery could modulate the perception of deeper visceral pain.[7]

Two approaches to local anaesthetics infiltration exist, one is pre-incisional and other is post-incisional. We used the latter (post-incisional) approach in this study. The results of pre-incisional infiltration are discouraging.[16] In one study cesarean delivery performed through a pfannenstiel incision, repeated ropivacaine instillation via an elastometric pump significantly decreased postoperative pain and opioid requirements.[17]

In our study postoperative recovery was comparable between the study group and control group, though frequency of postoperative nausea and vomiting was comparatively higher in control group. The amount of tramadol received by patients in study group was significantly lower than that of control group (P-value <0.001). Less parenteral narcotics means less cost, and benefit to the patients.

CONCLUSIONS:

Direct local wound infiltration of bupivacaine provided good pain relief after caesarean section and reduced the requirement of parenteral narcotic analgesia with no major side effects. It also appears that a substantial amount of pain is superficial in origin.

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