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Original articles

An assessment of the value of rectus sheath block for postlaparoscopic pain in gynecologic surgery

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KEYWORDS:
Rectus sheath block;
Laparoscopy;
Postoperative pain;
Bupivicaine

STUDY OBJECTIVE: To compare the effect of the bilateral rectus sheath block (BRSB) by bupivacaine in decreasing postlaparoscopic pain with the intraperitoneal (IP) and intraincisional (II) use of this drug.

DESIGN: Randomized, double-blind, clinical trial (Canadian Task Force Classification I).

SETTING: University teaching hospital.

PATIENTS: Ninety-one women with unexplained infertility.

MEASUREMENTS AND MAIN RESULTS: Patients were randomly allocated to one of three groups. In group I, BRSB was performed with 25 mg of bupivacaine. For groups II and III, IP and II instillation, respectively, of 25 mg of bupivacaine was performed. Postoperative pain was assessed by visual analog pain score (VAS) 1, 6, 10, and 24 hours postoperatively. The VAS was significantly lower in group I at 6 hours ($p < .001$) and 10 hours ($p < .004$) after laparoscopy.

CONCLUSION: Bilateral rectus sheath block can effectively decrease postlaparoscopic pain at 6 and 10 hours after the operation when compared with IP and II use of bupivacaine.

As in most operations, postoperative pain is a problem encountered with laparoscopic surgery. The aim of this investigation was to compare bilateral rectus sheath block (BRSB) with two other methods of decreasing pain.

Postlaparoscopic pain results from stretching of the intraabdominal cavity,[1] peritoneal inflammation,[2] and phrenic nerve irritation caused by residual gas.[3]

Neck and shoulder pain is reported by 80% of patients at 24 hours, and by as many as 50% of patients at 48 hours.[4] Carbon dioxide (CO_2) insufflation induces more discomfort than nitrous oxide (N_2O) as insufflating gas.[5]

The laparoscope is inserted with the aid of a large-bore trocar, usually through a midline subumbilical incision in order to penetrate the rectus sheath and peritoneum. Successful blockade of the relevant intercostal nerves within the rectus sheath should produce full-thickness anesthesia of the anterior abdominal wall and provide postoperative analgesia.[6]

We compared the effect of BRSB in alleviating postlaparoscopic pain with intraperitoneal (IP) and intraincisional (II) administration of bupivacaine.

Materials and methods

After informed written consent and local ethical committee approval, 91 women scheduled for elective diagnostic gynecologic laparoscopy from March 1, 2002 through September 1, 2002 were studied. Any patient with a contraindication to use of local anesthetics (i.e., a history of anaphylactic reaction) was excluded. In addition, patients with morbid obesity and patients whose plan of surgery was changed to operative laparoscopy were excluded.

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Table 1 Patient data

Demographic	Group I (BRSB) (n=30)	Group II (IP) (n=30)	Group III (II) (n=31)	P Value among groups
Age (yrs)	27.2 ± 5.03	29.1 ± 4.2	27.3 ± 4.03	.86
(95% CI)	(25.3–29.1)	(27.5–30.7)	(25.9–28.8)	
Weight (kg)	63 ± 12.67	63.4 ± 10.38	64.5 ± 10.58	.195
(95% CI)	(58.3–67.8)	(59.5–67.3)	(60.7–68.4)	
Duration of operation (min)	31 ± 3.7	30.5 ± 2.09	30.2 ± 3.2	.563
(95% CI)	(29.7–32.4)	(29.7–31.5)	(29–31.4)	

BRSB = bilateral rectus sheath block; IP = intraperitoneal; II = intraincisional.
Age, weight, and duration of operation were compared by one-way analysis of variance. Values are mean ± SD.

Patients were randomly allocated by card to one of three groups: patients in group I received BRSB with bupivacaine; patients in group II received IP bupivacaine; while those in group III received II bupivacaine.

No premedication was used. Intraoperative monitoring consisted of electrocardiogram, oxygen saturation, end tidal CO_2 ($ETCO_2$), noninvasive blood pressure, and esophageal stethoscope. A standardized anesthetic technique was used. Anesthesia was induced with midazolam 0.03 mg/kg, fentanyl 3 μg/kg intravenously (IV), and sodium thiopental 4 mg/kg IV. Tracheal intubation was facilitated with succinylcholine 1.5 mg/kg IV. For intraoperative muscle relaxation, atracurium 10–15 mg IV was administered. Anesthesia was maintained with 50% nitrous oxide in oxygen and 0.5% halothane. Ventilation was adjusted to keep $ETCO_2$ between 30 and 35 mm Hg. No opioid was administered during the maintenance period. Surgery was conducted in the lithotomy and Trendelenburg position and by the same surgical team. A 10-mm periumbilical and 5-mm suprapubic port were used. The insufflating gas for pneumoperitoneum was CO_2, neither heated nor humidified. The peak gas flow rate was 6 L/min, and the intraabdominal pressure was maintained below 12 mm Hg.

At the end of the operation, BRSB was performed on the patients allocated to group I. The rectus sheath block was induced by two injections, one on each side of the abdomen. A 22-gauge spinal needle was inserted 3–5 cm above the level of the umbilicus at the lateral border of the rectus abdominis. The anterior rectus sheath was identified by the first resistance in advancing the needle. The next resistance felt was detected as the posterior layer of the rectus sheath. After a negative aspiration, 25 mg of bupivacaine (10 mL bupivacaine 0.25%) was injected bilaterally (12.5 mg in each side). Patients in group II under direct vision received 25 mg of bupivacaine (10 mL bupivacaine 0.25% + 10 mL normal saline), instilled in the right subdiaphragmatic area via the sheath of the trocar. Patients in group III received 25 mg of bupivacaine (10 mL bupivacaine 0.25%) in the skin layers of the umbilical and suprapubic incisions.

Carbon dioxide was evacuated as much as possible from the peritoneal cavity at the end of the operation. The surgical wound was closed. Anesthesia was discontinued, and the reversal of the neuromuscular blockade was done with neostigmine 0.06 mg/kg and atropine 0.03 mg/kg at the end of the surgery.

Pain was assessed 1, 6, 10, and 24 hours postoperatively by a visual analog pain score (no pain = 0, severe pain = 10). The recording was performed by an independent observer blind to the patient grouping.

Statistical analysis of pain scores was performed by using nonparametric analysis of variance (Kruskal-Wallis test) and Mann-Whitney test. The analysis of age, weight, and duration of operation was conducted by parametric analysis of one-way ANOVA. A p value below .05 was considered significant.

Results

Ninety-one patients completed the study, and the data were analyzed. Thirty patients received BRSB, and 30 patients

Table 2 Visual analog pain score of each postoperative assessment in three groups

Postoperative assessment period	Group I (BRSB) (n=30) median (range)	Group II (IP) (n=30) median (range)	Group III (II) (n=31) median (range)
1 hour	3 (1–10)	3 (1–10)	5 (1–10)
6 hours	3 (1–8)	7 (2–8)	6 (1–10)
10 hours	2 (1–6)	5 (1–9)	3 (2–8)
24 hours	2 (1–6)	3 (1–5)	2 (1–7)

BRSB = bilateral rectus sheath block; IP = intraperitoneal; II = intraincisional.