

Combined Use of Intraperitoneal and Incisional Bupivacaine Reduces Pain Severity after Diagnostic Laparoscopic in Infertile Women

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Abstract:

Introduction: Diagnostic laparoscopy offers an excellent means through direct visualization to elucidate the hidden pathology in the absence of clinical signs and symptoms suggestive of a cause of infertility. But postoperative pain management remains a major challenge after laparoscopic surgeries. Approximately one half of all surgical procedures, postoperative pain is inadequately treated.

Aim: A randomized, double-blind, placebo-controlled trial was conducted with an objective to evaluate the post-operative analgesic efficacy of intraperitoneal and incisional bupivacaine infiltration at the end of diagnostic laparoscopy in infertile women

Methods: 40 infertile women, enrolled for diagnostic laparoscopy were divided randomly into two groups. Group A received intraperitoneal bupivacaine (0.25%) 10 ml and incisional infiltration of NS 10 ml, Group B received intraperitoneal bupivacaine 10 ml and incisional infiltration of bupivacaine 10 ml. In postoperative period, Visual Analogue Score (VAS) was recorded up to 24 hours. Postoperative analgesic requirements, and side effects were recorded.

Results: The Visual Analogue Score (VAS) during the first postoperative 24 hours was significantly lower in group B compared to group A. Time to first analgesia required was delayed and total analgesic consumption was lower in group B which was statistically significant.

Conclusions: It is concluded that combined intraperitoneal instillation and incision site infiltration of bupivacaine in diagnostic laparoscopy may significantly reduce the postoperative pain and analgesic requirement.

Key Words:

Intra-peritoneal instillation,
Incisional infiltration, Bupivacaine,
Diagnostic Laparoscopy

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Introduction:

Laparoscopy is the standard procedure and an essential step in the investigation and evaluation of infertile females^{1,2}. Diagnostic laparoscopy offers an excellent means through direct visualization to elucidate the hidden pathology in the absence of clinical signs and symptoms suggestive of a cause of infertility. Up to 68% of patients without any risk factors can still possess abnormalities which can be identified by laparoscopy^{3,4}. In contrast to open procedures, laparoscopic

surgeries are less invasive, there are less haemorrhage, better cosmetic results, less postoperative pain, short recovery time, short hospital stay and less expenditure⁵. But postoperative pain management remains a major challenge after laparoscopic surgeries⁶. Approximately one half of all surgical procedures, postoperative pain is inadequately treated⁷. Abdominal pain consists of two components: visceral pain associated with tissue injury and the stretching of nerve endings in the peritoneal cavity; and parietal pain related to the incisional trauma at the port sites. Shoulder pain is referred by diaphragmatic stretching⁸. Therefore, a multimodal approach, using local anesthetic agent may help in improving the quality of analgesia, without producing any side effects.⁷

Aim: A randomized, double-blind, placebo-controlled trial was conducted with an objective to evaluate the post-operative analgesic efficacy of intraperitoneal and incisional bupivacaine infiltration at the end of diagnostic laparoscopy in infertile women.

Patients and methods:

This is a double-blind, randomized and control study. Computer generated randomization was designed. Ethical

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clearance was taken from the local research ethics committee. Informed written consent was taken from all the involved subjects included in this study. This study involved 40 woman with ASA physical status I and II, aged 18-40 years, who were planned for diagnostic laparoscopy for infertility. Women with cardiac diseases, hemodynamic instability, chronic pain and mental disturbance were excluded from this study.

Individual not involved with patients care confirmed patient eligibility and written consent before surgery. Patients were explained regarding use of the VAS (0: no pain, 10: maximum pain)⁹. At the end of laparoscopy just before the deflation of pneumoperitoneum. The patients were randomly allocated 1:1 into two groups:

Group A received intraperitoneal bupivacaine (0.25%) 10 ml and incisional infiltration of NS 10 ml Group B received intraperitoneal bupivacaine 10 ml and incisional infiltration of bupivacain 10 ml.

On arrival in the operating room, standard intraoperative anesthetic, analgesic, and antiemetic were administered in all cases. According to the standard surgical protocol the diagnostic laparoscopy was performed by the same surgical team. The patient was placed in the Trendelenburg position (angled at nearly 30°). Trocar were inserted

through 10 mm port via the supra umbilical incision and two 5 mm ports on the right and left side of the abdomen in all patients. Pneumoperitoneum was created and maintained by insufflation with non-humidified and non-heated CO₂ gas at 15 mmHg of the intra-abdominal pressure. After laparoscopy intraperitoneal installation was done by lateral port. Bupivacaine infiltration was conducted by the same surgeon after closure of the surgical wounds, at the three ports (Umbilical port: 4ml and the two 5 mm lateral ports: 2 ml each).

All surgeries were performed by surgeon, who was not informed about the content of the instilled study drug. After operation, the postoperative pain was assessed using the Visual Analogue Score (VAS) and recorded at 0.5, 1, 4, 8, 12, 16 and 24 hours postoperatively. Patients who had VAS >4 were administered a IV paracetamol injection as rescue analgesia. Time to first postoperative analgesic requirement, total analgesic requirement and occurrence of side effects like nausea and vomiting in the first 24 hours postoperatively were recorded.

All data was expressed as mean, standard deviation, number, and percent. Statistical analysis was performed using SPSS/ version 20 software. For categorized data Chi square test was used while for numerical data t-test was used to compare two groups. P<0.05 was considered as significant.

Result:

Table-I

<i>Comparison between the studied groups regarding demographic variable and PACU stay</i>			
Parameter	Group A(n=20)	Group B(n=20)	P value
Age (year)	22.6±5.0	21.9±4.5	0.644 ^{ns}
Weight (kg)	60.7±5.5	61.4±4.7	0.667 ^{ns}
Height (cm)	155.4±3.9	153.4±3.1	0.080 ^{ns}
Duration of surgery (min)	20.4±10.8	21.6±10.2	0.719 ^{ns}
Duration of PACU stay (min)	37.2±15.3	27.6±10.5	0.026 ^s

s=significant; ns=not significant Data presented as mean ± SD, unpaired t test used

Table-II

<i>Comparison between the studied groups regarding VAS (visual analog score) in different time</i>			
Time (hours)	Group A (n=20)	Group B (n=20)	P Value
At 0.5	4.5± 1.5	3.4±1.4	0.002 ^s
At 1	5.8± 1.6	3.1±0.8	0.001 ^s
At 4	5.9±1.3	3.1±0.5	0.001 ^s
At 8	5.1±1.4	3.3±0.6	0.001 ^s
At 12	4.8± 1.3	2.9±0.9	0.001 ^s
At 16	5.5± 1.1	2.1± 1.1	0.001 ^s
At 24 hours	3.9±1.5	2.9±0.8	0.012 ^s

s=significant Data presented as mean ± SD, unpaired t test used

Table-II

<i>Comparison between the studied groups regarding postoperative analgesia</i>			
Post operative analgesia	Group A (n=20)	Group B (n=20)	P Value
Time for first analgesia request (in min)	167.5±29.2	315.4±35.5	0.001 ^s
Amount of paracetamol needed (gm)	3.5±0.5	1.2±0.9	0.001 ^s

s=significant, Data presented as mean ± SD, unpaired t test used

Table-IV

<i>Complications of the study patients</i>			
Parameter	Group A(n =20)	Group B(n =20)	P value
Nausea/vomiting	5 (25.0%)	2 (10.0%)	0.211 ^{ns}
Pruritis	1 (5.0%)	2 (10.0%)	0.548 ^{ns}
Hypotension	11 (55.0%)	13 (65.0%)	0.518 ^{ns}
Sedation	5 (25.0%)	3 (15.0%)	0.429 ^{ns}
Respiratory depression	0 (0.0%)	0 (0.0%)	-

ns= not significant, Percentages in parenthesis, Chi square & Fisher's test was done

According to demographic variable two study groups were comparable with respect to age, weight, height and duration of surgery, but there was significantly reduced duration of PACU (post-operative care unit) stay (Table I). Laparoscopy was done in all patient under general anesthesia. Regarding postoperative pain assessment, there was statistically significant difference in VAS score at different time interval after laparoscopy. It statistically was less in group A compared to group B (Table II). The need of rescue analgesia was significantly longer in the group A compared to group B. The amount of analgesic needed for rescue analgesia is significantly less in group B (Table III). The incidence of adverse effects were similar between the groups (Table IV).

Discussion :

Following laparoscopy the largest postoperative pain component are the incision sites pain (50%-70%), followed by pain due to pneumoperitoneum (20%-30%) and then visceral pain (10%-20%)⁸. Incisional pain is usually mild to moderate in intensity, maximal immediately postoperatively, subsiding with time, and excessive during the first 24 h after laparoscopy¹⁰.

Among many methods which have been suggested for an optimum pain relief in the postoperative period, intraperitoneal instillation of local anesthetic agents offer theoretical and practical advantages over other methods.¹¹ Intraperitoneal instillation of local anesthetics was first described in early 1990s during laparoscopic

surgery. The local anesthetic agents provide antinociception by affecting nerve membrane associated proteins and by inhibiting the release and action of prostaglandins which stimulates the nociceptors and cause inflammation.^{12,13}

Combined Intraperitoneal and incisional route were chosen in the current study, because it blocks the visceral afferent signals and modifies visceral nociception¹⁴. There was significant reduction in pain scores during the first 24 hours following surgery in in combined intraperitoneal and incisional (group B) group. The incidence of postoperative nausea and vomiting and shoulder pain was similar in both groups in the recent trial.

Current study supported by previous study, where combined usage with incisional ropivacaine (2 mg/ml, 20 ml) and its intraperitoneal infusion (2 mg/kg, 100 ml) ahead of the surgical procedure exerted additive effects on decreasing postoperative pain¹⁵. Similar reported trial observed that the local skin infiltration of bupivacaine and intraperitoneal lidocaine (2%, 10 ml) or bupivacaine (0.5%, 10 ml) after laparoscopic cholecystectomy also were proven to lower the intensity of postoperative pain in a synergistic fashion¹⁶.

Conclusion :

It is concluded that combined intraperitoneal instillation and incision site infiltration of bupivacaine in diagnostic laparoscopy may significantly reduce the postoperative pain and analgesic requirement in the postoperative period

as compared to intraperitoneal installation of bupivacaine only without any side effects.

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