

Does Local Infiltration of Anesthesia Reduce Port-site Pain in Gynecological Laparoscopic Surgeries? A Pilot Study

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Abstract

Objectives: The objectives of this study were to evaluate the visual analog scale (VAS) score in patients receiving port-site bupivacaine infiltration in gynecological laparoscopic surgeries and to compare it with those receiving placebo and to evaluate the additional analgesic requirement in the first 24 h after surgery.

Materials and Methods: A prospective interventional study was conducted on 60 women scheduled for benign gynecological laparoscopic surgeries. Patients were randomized into two groups using an alternative sequential method of allocation. Approval from the Institute's Ethics Committee was sought. Informed written consent was taken from all the patients. All laparoscopic surgeries were performed under general anesthesia. Double-blinding was done. A VAS with a 10 cm vertical score ranging from "no pain" to "worst possible pain" was used to assess the postoperative pain when the patient awakened in the operating room (2 h after surgery), then after 6 and 24 h. The primary outcome measured was pain perception by the patient (as VAS scores), and the secondary outcome was the need for additional analgesia.

Results: Comparison of both groups with the VAS score shows $P > 0.001$, i.e., nonsignificant in all the groups. Additional analgesics were required in 56% of the patients in the intervention group and 60% of the patients in the control group; however, 44% and 40% of the patients from the intervention and control groups, respectively, do not require any additional analgesic in the postoperative period.

Conclusion: The local infiltration of bupivacaine does not significantly reduce the port-site postoperative pain in gynecological laparoscopic surgeries.

Keywords: Bupivacaine, laparoscopic surgeries, local analgesic, postoperative pain, visual analog scale score

INTRODUCTION

Laparoscopy is defined as the telescopic visualization of the abdominopelvic cavity through small incisions on the abdominal wall through various telescopic instruments. Primarily, laparoscopy was used for diagnostic purposes and tubal ligations, but now evolved as a major surgical tool used for a multitude of gynecologic and nongynecologic indications. For many gynecologic procedures, such as removal of ectopic pregnancy, treatment of endometriosis, ovarian cystectomy, and hysterectomy, laparoscopy had become a treatment of choice. Other surgeries like myomectomy, sacrocolpopexy and treatment of

gynaecological cancers, indications of laparoscopy continue to broaden.

The advantages of laparoscopic surgeries include reduced hospital morbidity, shorter hospital stay, reduction in recovery time, less postoperative pain, avoidance of a large incision with the improved cosmetic outcome, decreased blood loss, and early return to normal routine activity. In addition, adhesions are less likely with laparoscopic surgeries.^[1]

Postoperative pain is both distressing and detrimental for the patients. Various types of pain experienced in laparoscopic

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surgeries include trocar wound pain, pain due to peritoneal irritation, and pneumoperitoneum.

Many researchers have suggested that the combination of somatovisceral local anesthetic treatment reduces incision site, intra-abdominal, and shoulder pain which occurs in the laparoscopic gynecological procedures. These local agents stimulate antinociception by acting on nerve membranes. They reversibly decrease the rate of depolarization and repolarization through excitable membranes (like nociceptors).^[2,3]

There are different routes to administrate the local anesthetic agents, such as infiltration at the port site after surgery, preincisional, intraperitoneal infiltration, preoperative administration of anti-inflammatory, intraperitoneal aerosolization of bupivacaine, and heated humidified insufflation gas.^[4,5] Studies have shown that infiltrating local anesthetic agents before incision may have an advantage over anesthesia given at wound closure. It alters the electrophysiological processes in the neurons.^[6] Some researchers have shown that local parietal anesthesia is more effective in controlling postoperative pain.^[7,8] Various studies have shown that infiltrating local anesthetic agents before incision may have an advantage over anesthesia given at wound closure. It alters the electrophysiological processes in the neurons.

The peripheral use of local anesthetics after laparoscopic surgery, especially in the case of procedures that do not involve extensive surgery, for example, tubal ligation, is more likely to provide clinically significant postoperative pain relief in the early postoperative period. There had been the hypothesis in several trials published in the past decade. However, the results from these trials are still inconsistent and are difficult to overview. Therefore, this study is being taken up to evaluate the effect of port-site bupivacaine infiltration in gynecological laparoscopic surgeries.

Objectives

1. To evaluate the visual analog scale (VAS) score in patients receiving port-site bupivacaine infiltration in gynecological laparoscopic surgeries and to compare the VAS score in the above patients with those receiving placebo
2. To evaluate the additional analgesic requirement in the first 24 h after surgery.

MATERIALS AND METHODS

A prospective interventional study was conducted on 60 women scheduled for benign gynecologic laparoscopic surgeries. Patients were randomized into two groups using an alternative sequential method of allocation. Approval from the Institute's Ethics Committee was sought (BREC/19/165).

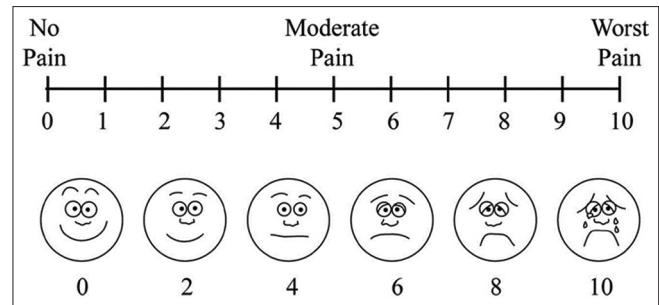


Figure 1: Visual Analogue Scale

Informed written consent was taken from all the patients. All laparoscopic surgeries were performed under general anesthesia. Double-blinding was done.

Group A, constituting of 30 women, received 0.5% of bupivacaine in a dose of 5 ml at 5 mm and 10 ml at 10 mm port site injected in the skin and subcutaneous tissue before placing the incision.

Group B, constituting of 30 women, received an equal amount of normal saline.

Skin closure was by Chromic Catgut 00 Suture in all the cases at the end of the procedure.

Routine postoperative care was given to all women as per hospital protocol. Oral sips were started as soon as bowel sounds appeared, followed by a liquid diet and regular diet; if there was no nausea or vomiting, proceeded to a regular diet. A VAS with a 10 cm vertical score ranging from “no pain” to “worst possible pain” was used to assess the postoperative pain when the patient awoke in the operating room (2 h after surgery), then after 6 and 24 h.

Pain scores were categorized as VAS between 1 and 3 as mild, 4 and 6 as moderate, or >7 as severe [Figure 1].

In both groups, no conventional analgesics were given as routine. In those patients who report severe pain, an additional analgesic like injection paracetamol 1000 mg intravenous infusion was given on demand. The requirement of this additional analgesic required was noted.

RESULTS

Statistical testing was conducted with the Statistical Package for the Social Sciences system version 21.0. Continuous variables were presented as mean ± standard deviation or median if the data are unevenly distributed. Categorical variables were expressed as frequencies and percentages. The nominal categorical data between the groups were compared using the Chi-square test or Fisher's exact test as appropriate.

The mean age of the patients in the study was 33.40 ± 7.661 years, the control group had a mean age of 32.93 ± 7.358 years, and

the intervention group had a mean age of 33.87 ± 8.050 years; the majority of the patients (47%) were of the age group 31–40 years [Figure 2].

In this study, according to the parity, eight females are primipara and 52 females are multipara.

The most common surgery performed was ovarian cystectomy (40%), followed by salpingo-oophorectomy (26%), while myomectomy (6%) was the least performed surgery in this study [Figure 3].

The initial VAS score (i.e., 2 h postoperative) observed was ranging from 3 to 5 in the intervention group with a score of 4 as the median; whereas it ranges between 3 and 5.25 in the control group with a score of 5 as the median value.

The VAS score at 6 h was ranging from 2 to 5 in the intervention group with a score of 4 as the median; whereas it ranges between 2 and 4 in the control group with a score of 3 as the median value.

The VAS score at 24 h was ranging from 2 to 3 in the intervention group with a score of 2 as the median and 2–3 in the control group with a score of 2 as the median value.

The comparison of the intervention group and control group with VAS scoring shows $P > 0.001$ in both groups, i.e., nonsignificant [Table 2].

An additional analgesic was required in 56% of the patients in the intervention group and 60% of the patients in the control group; however, 44% and 40% of the patients from the intervention and control groups, respectively, did not require any additional analgesic in the postoperative period [Table 2].

On comparison of additional analgesic required with relation to parity, a significant $P = 0.007$ was noticed. The requirement of additional analgesics was less in primipara compared with the multipara females.

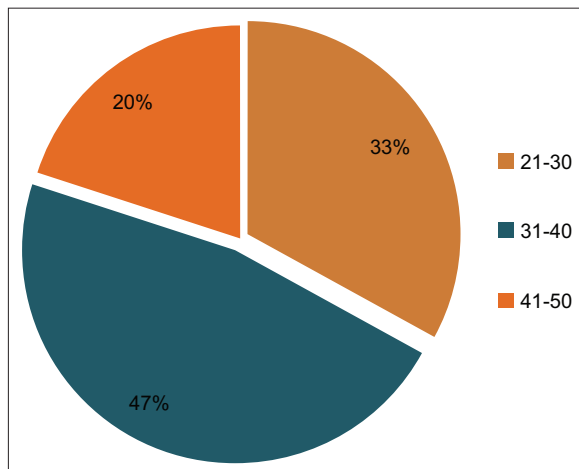


Figure 2: Age distribution of the study population

The VAS score at 2 h, 6 h, and 24 h with additional analgesic required shows a significant $P < 0.01$, i.e., with a progressive decrease in the VAS scoring at two hours [Table 1]. Further at 6 and 24 h postoperatively, the requirement of additional analgesic also decreases.

DISCUSSION

Pain is expected after all surgical procedures; nonetheless, it is undesirable.^[9] Effective management of postsurgical pain is related to earlier mobilization, shortened hospital stay, and overall patient satisfaction. Therefore, the management of postoperative pain should be considered one of the priorities in routine surgical practice.

In the present study, the injection of bupivacaine at the port site does not improve postoperative pain significantly.

Several studies conducted worldwide also show similar results. A study conducted by Sugihara *et al.* on 294 patients shows that the difference in the outcomes of local anesthesia was not significant between the intervention and control groups in all gynecological laparoscopic surgeries in the study.^[10]

Table 1: The visual analog scale score in the postoperative period (n=30)

Postoperative VAS score (median, range)	Intervention group	Control group	P
VAS at initial 2 h	4 (3–5)	5 (3–5.25)	0.450
VAS at 6 h postoperative	4 (2–5)	3 (2–4)	0.341
VAS at 24 h postoperative	2 (2–3)	2 (2–3)	0.259

VAS: Visual analog scale

Table 2: Requirement of additional analgesic

Additional analgesic required	Intervention group, n (%)	Control group, n (%)
No analgesic required	13 (44)	12 (40)
4–6 h analgesic used	8 (26)	8 (26)
6–8 h analgesic used	9 (30)	10 (34)

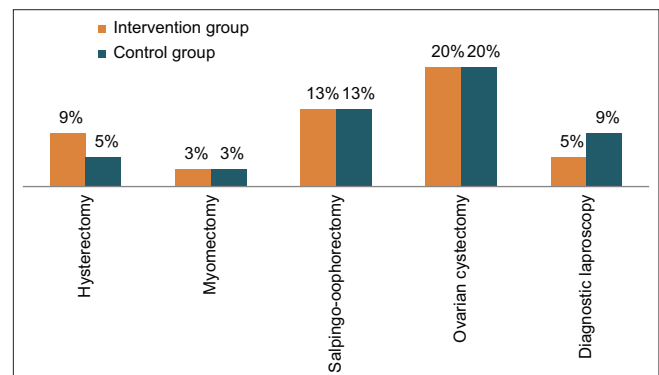


Figure 3: Types of laparoscopic surgeries

Another study shows that the bupivacaine infiltration to the trocar wound after a laparoscopic surgery did not reduce the pain score significantly compared with the nonadministrated group.^[11]

One reason for not finding statistically significant pain relief was that the use of local anesthetics injection into the port site had a limited focus of action at the port site. While this may be important, the factors which induce postoperative pain after laparoscopic surgery are variable. Peripheral and central sensitization, intra-abdominal trauma, residual pneumoperitoneum, and phrenic nerve irritation by residual carbon dioxide can also result in pain, in addition to incisional trauma at the port sites.^[12,13]

Infiltration of the trocar site with a local analgesic probably does not reduce the severity of alternative sources of pain. This could confound the results of the study. Other pain-relieving laparoscopic techniques studied so far included intraperitoneal aerosolization of bupivacaine and heated humidified insufflation gas.^[14,15]

According to some recent randomized trials, multimodal analgesia with combined ropivacaine administration (port-site injection plus intraperitoneal nebulization) may be effective for postoperative pain relief in conventional laparoscopic adnexal surgery.^[16]

A study conducted by Somaini *et al.* concluded that the administration of peritoneal ropivacaine nebulization was effective to reduce postoperative pain.^[17]

The limitations of the study were the small sample size and that it was a single-center study; hence, results need to be verified at multiple centers in different populations.

CONCLUSION

The local infiltration of local anesthesia does not significantly reduce postoperative pain in gynecological laparoscopic surgeries. Future randomized controlled trials are needed to further evaluate the effect of local bupivacaine anesthetic in terms of postoperative pain. Further studies using a wide range of gynecologic surgeons may add generalizability to the study procedure.

New alternative methods of pain reduction are required to be evaluated and studied for the betterment of patients and to reduce surgical comorbidities.

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Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Conflicts of interest

There are no conflicts of interest.

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