Intraperitoneal Instillation of Ropivacaine for Postoperative Pain Relief in Laparoscopic Cholecystectomy in a Comorbid Patient

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ABSTRACT

We report a case of a 55-year-old female diagnosed with multiple gallbladder stones posted for laparoscopic cholecystectomy. Her comorbidities included obesity, diabetes, previous spinal surgery, chronic renal dysfunction with abnormal renal profile. She was also anxious about postoperative pain. The surgery was successfully completed under general anesthesia with intraperitoneal instillation of ropivacaine which was done just before creation of pneumoperitoneum, which also provided excellent postoperative analgesia, good intraoperative conditions with least hemodynamic alterations in a high-risk case where other modalities for postoperative pain relief had their own limitations.

Keywords: Intraperitoneal instillation ropivacaine, Laparoscopic cholecystectomy, Postoperative analgesia.

CASE REPORT

We report a case of a 55-year-old hypertensive morbidly obese female with cholelithiasis posted for laparoscopic cholecystectomy. Her comorbidities included obesity with body mass index (BMI) 42, previous spinal surgery 2 years back, compromised renal profile, and diabetes mellitus. Her physical score was assessed to be ASA-III according to American Society of Anesthesiology Classification.

In view of her surgery, a general anesthesia technique was planned. Anesthetic procedure was explained and written informed consent was taken. Nil per oral hours were confirmed and monitors were connected to the patient.

Patient was preoxygenated with 100% oxygen for 3 to 5 minutes with a close fitting mask. Opioids were avoided due to morbid obesity. Premedication was done with intravenous (IV) glycopyrrolate 0.2 mg/kg of body weight. Intravenous induction done with propofol 2 mg/kg body weight and tracheal intubation facilitated with succinylcholine 1.5 mg/kg body weight, followed by laryngoscopy with appropriate blade and endotracheal tube insertion. Maintenance of anesthesia done with Sevoflurane at minimum Alveolar concentration (MAC) 1% and Oxygen:N₂O (33:66) at 5 L/minute. Controlled ventilation with Bain’s circuit done throughout operation. Muscle relaxation achieved by injection of atracurium IV, up till skin closure according to the need to maintain a fully relaxed patient. Patient was given intraperitoneal 20 mL 0.75% ropivacaine through

NSAIDs provide morphine-sparing effects, they do not appear on their own to provide sufficiently reliable postoperative analgesia for minimally invasive laparoscopic surgery.

Our hypothesis is that the injection of the local anesthetic before the pneumoperitoneum may provide preemptive analgesia by preventing the establishment of central sensitization following noxious stimulus, thereby reducing the demand of postoperative opioids and NSAIDs. In a high-risk patient like ours, this technique can provide excellent intraoperative and postoperative pain relief without having the adverse effects associated with NSAIDs.

INTRODUCTION

Local anesthetic techniques are part of the multimodal approach to postoperative pain management. This involves the use of opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), paracetamol, and local anesthetics. Although laparoscopic cholecystectomy is a minimally invasive procedure, it is associated with intra-abdominal, visceral, and shoulder pain after surgery.

For this type of ambulatory surgery and anesthesia, the main advantage of using local anesthetics is that they do not have the adverse effects of opioids, which may delay recovery and discharge from hospital. Although
a mid-clavicular placed trocar 10 mL each in two subdia-
phragmatic space. Patient was then kept in Trendelenburg
position for 10 minutes. Then further surgical handling
was done. A targeted end-tidal CO₂ concentration of 30
to 40 mm Hg was maintained throughout the surgery
by adjusting the ventilation. Nitrous oxide discontinued
approximately 15 minutes prior to surgical completion.
Intravenous infusion of injection paracetamol 1 gm was
given 20 minutes prior to surgical completion and given
postoperatively as a rescue analgesic as and when the
patient demands. There was smooth emergence with
stable hemodynamic status and good respiratory effort
due to good analgesia. The surgery lasted 2 hours 30
minutes approximately. Visual analog scale (VAS) was
recorded at 2, 4, 6, 8, and 12 hours postoperatively. The
VAS score was <3 at all times postoperatively, which
resulted in very few doses of rescue analgesic (2 times
which was 1 gm paracetamol IV in my case).

**DISCUSSION**

Laparoscopic procedures in surgery allow reduced
hospital stay, quicker postoperative recovery, and faster
return to daily activities and work compared with open
surgery. However, pain is not completely abolished after
minimally invasive procedures, and the management of
post laparoscopy pain remains a major concern.⁷

Preemptive analgesia refers to measures aimed at
preventing sensitization of cells within the spinal cord
dorsal horn before the onset of a noxious stimulus. By
preventing the sensitization of the central nervous
system, the preemptive treatments attenuate the subse-
quent hypersensitivity to future nociceptive input and
the misperception of pain in response to nonnoxious
stimuli.⁸⁻¹⁰ Clinical trials to evaluate the benefits of pre-
injury analgesic administration for surgical patients have
been fueled by repeated and convincing demonstrations
of the potential benefits of preemptive analgesia in animal
studies. Despite these promising experimental find-
ings, the role of preemptive techniques in the pragmatic
clinical setting remains to be elucidated.

Our patient was a case of obesity, chronic renal dys-
function, and diabetes mellitus, therefore, we avoided
giving opioids and NSAIDs for pain relief. Hence, we
needed an alternative technique to control postoperative
pain with minimal hemodynamic alterations along with
the avoidance of polypharmacy. Epidural catheter was
avoided due to prior history of spinal surgery. Therefore,
intraperitoneal instillation of ropivacaine prior to creation
of pneumoperitoneum was used. Rest other analgesic
methods were ruled out in relevance of patient’s profile.
Pain was assessed using VAS which was recorded at 2,
4, 6, 8, and 12 hours postoperatively. It was <3 at all the
times. This resulted in lesser demand of rescue analgesic

postoperatively and thereby resulted in early ambula-
tion and smooth discharge of the patient following
laparoscopic surgery.

One of the main causes of the pain after laparoscopic
surgeries is the peritoneal and visceral irritation caused
by the pneumoperitoneum.¹¹ There are mainly two com-
ponents of pain after laparoscopic surgery. Scapular pain
secondary to peritoneal insufflation, especially when
shoulder holders and exaggerated Trendelenburg position
is used. Second component is visceral pain which has its
maximal intensity during first hours and is exacerbated
by coughing, respiratory movements, and mobilization.
Infiltration of local anesthetics decreases scapular pain
as well as visceral pain. Therefore, injection of the local
anesthetic just before creation of the pneumoperitoneum
may provide preemptive analgesia by preventing the
establishment of central sensitization following noxious
stimulus.

Ropivacaine provided effective analgesia with plasma
concentration below toxic levels.¹²

Hence, there was very positive results regarding post-
operative pain relief in high-risk cases like ours where
demand of rescue analgesia reduced considerably.

**REFERENCES**

1. Michaloliakou C, Chung F, Sharma S. Preoperative multi-
modal analgesia facilitates recovery after ambulatory laparo-
2. Ng A, Parket J, Toogood L, Cotton BR, Smith G. Does the
opioid-sparing effect of rectal diclofenac following total
abdominal hysterectomy benefit the patient. Br J Anaesth
2002 May;88(5):714-715.
3. Montgomery JE, Sutherland CJ, Kestin KG, Sneyd JR. Morphine
consumption in patients receiving rectal paracetamol and
analgic effects of intraperitoneal and incisional bupivacaine
with epinephrine following total abdominal hysterectomy.
5. Labille T, Mazoit JX, Paqueron X, Franco D, Benhamou D. The
clinical efficacy and pharmacokinetics and intraperitoneal
ropivacaine for laparoscopic cholecystectomy. Anesth Analg
2002 Jan;94(1):100-105.
Sep;79(3):369-378.
7. Mouton WG, Bessell JR, Otten KT, Madderm GJ. Pain after
8. Mainiche S, Keht H, Dah JJB. A qualitative and quantitative
systematic review of preemptive analgesia for postoperative
pain relief: the role of timing of analgesia. Anesthesiology
2002 Mar;96(3):725-741.
9. Mainiche S, Jørgensen H, Wetterslev J, Dahl JB. Local anes-
thetic infiltration for postoperative pain relief after laparo-
scopy: a quantitative and qualitative systematic review of
intraperitoneal, port-site infiltration and mesosalpinx block.
