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CASE REPORT

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.

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INTRODUCTION

Local anesthetic techniques are part of the multimodal approach to postoperative pain management.[1] This involves the use of opioids, nonsteroidal anti-inflammatory drugs (NSAIDs),[2] paracetamol,[3] and local anesthetics.[4] Although laparoscopic cholecystectomy is a minimally invasive procedure, it is associated with intra-abdominal, visceral, and shoulder pain after surgery.[5]

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 NSAIDs provide morphine-sparing effects,[2] they do not appear on their own to provide sufficiently reliable postoperative analgesia for minimally invasive laparoscopic surgery.[6]

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.

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 anesthetic 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:N_2O (33:66) at 5 L/minute. Controlled ventilation with Bain's circuit done throughout operation. Muscle relaxation achieved by injection of attracurium 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

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a mid-clavicular placed trocar 10 mL each in two subdiaphragmatic space. Patient was then kept in Trendelenburg position for 10 minutes. Then further surgical handling was done. A targeted end-tidal CO_2 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 subsequent hypersensitivity to future nociceptive input and the misperception of pain in response to nonnoxious stimuli.[8-10] Clinical trials to evaluate the benefits of preinjury 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 findings, the role of preemptive techniques in the pragmatic clinical setting remains to be elucidated.

Our patient was a case of obesity, chronic renal dysfunction, 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 ambulation 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 components 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 postoperative pain relief in high-risk cases like ours where demand of rescue analgesia reduced considerably.

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