Original Research Article

Laparoscopic appendicectomy surgery using spinal anesthesia

Dhaval Patel[1*], H.V. Patel[1]

[1]Consultant, Gayatri Surgical Hospital, Patan, Gujarat, India
*Corresponding author email: dhpatel47@gmail.com

Abstract

Laparoscopic abdominal surgery is conventionally done under general anesthesia. Spinal anesthesia is usually preferred in patients where general anesthesia is contraindicated. We have presented here our experience using spinal anesthesia as the first choice for laparoscopic surgery for over 2 years with the contention that it is a good alternative to general anesthesia.

Key words

Laparoscopic, Appendicectomy, Spinal anesthesia, General anesthesia.

Introduction

Conventionally, general anesthesia (GA) remains the choice for the majority of open abdominal surgical procedures, and regional anesthesia is preferred only for patients who are at high risk while under general anesthesia. We have been doing almost all our open abdominal surgeries, including surgery of the upper abdominal organs like the stomach and hepatobiliary system, with the patient under spinal anesthesia (SA). The advantages of a uniform total muscle relaxation, a conscious patient, and relatively uneventful recovery after spinal anesthesia on the one hand and the protection from potential complications of general anesthesia on the other, were the main reasons for selecting spinal anesthesia as the first choice. It was thus a logical extension that we shifted to spinal anesthesia for all our abdominal and retroperitoneal laparoscopic surgeries after operating few laparoscopic surgeries under general anesthesia. The world literature until about 5 years ago suggested only GA as the anesthetic option for abdominal laparoscopic surgery, and it is only recently that reports of laparoscopic surgery being performed with select patients under spinal or epidural anesthesia have started to appear. This was a retrospective study of patients having laparoscopic surgery while under spinal anesthesia.

Material and methods

All patients undergoing laparoscopic appendicectomy procedures were offered SA as

the first choice. Total 200 consecutive patients had undergone laparoscopic appendicectomy surgery while under SA. Patients who preferred GA or had contraindications for SA, like children less than 10 years of age, patients with clotting disease, spinal deformity, and skin pathology overlying the SA site, were operated on while under GA and kept as controls.

Laparoscopic appendicectomy was done in 200 patients. Out of these patients, 70 had acute appendicitis, 30 had perforated appendix, and 100 had chronic appendicitis.

SA was administered using a 24 FG or 25 FG lumbar puncture needle in L1-L2 inter vertebral space. 5% Xylocaine, 1.6 ml to 1.8 ml (2 mg/kg) or in those patients where surgical time was contemplated as likely to be more than 30 minutes, 3 ml to 5 ml of Sensorcaine (Bupivacaine HCl 5 mg + Sodium chloride 8 mg/ml) was used. Head down tilt 10 to 20 degrees was kept for 5 minutes. The patient was monitored for blood pressure, SpO_2, $SpCO_2$, heart rate and patient anxiety. Patient anxiety was defined as anxiety that resulted in inability to complete the procedure under SA and requiring conversion to GA. In patients complaining of neck pain, shoulder pain, or both, Tramadol 25 mg or Fortwin 15 mg was administered as slow intravenous (IV) or in drip. In patients who still had persistence of pain, Ketamine 25 mg administered as slow IV was used. If the patient was still anxious, conversion to GA was done. The laparoscopic procedures were carried out in the standard fashion with 3 ports without any modifications. The intra peritoneal pressure was kept between 8 to 10 mm Hg.

Results and discussion

Laparoscopic appendicectomy was done in 200 patients. Out of these patients, 70 had acute appendicitis, 30 had perforated appendix, and

100 had chronic appendicitis. One (0.5%) patients required conversion to general anesthesia. That patient had perforated appendix with dense adhesion of bowel to appendix. Average time to discharge was 1-2 days.

Regional anesthesia is seldom used in abdominal laparoscopic surgeries except for diagnostic laparoscopies. The prime indication for using regional anesthesia in therapeutic laparoscopy is still limited to patients unfit for GA, and the preferred type of regional anesthesia is epidural anesthesia. Thus, reports of laparoscopic surgery being done with patients under spinal anesthesia are even scarcer than those of patients under epidural anesthesia [1, 2, 3]. It was thus logical that after performing the initial few laparoscopic surgeries using GA, we shifted to SA as the anesthesia of choice for all our abdominal laparoscopic procedures. The optimal anterior abdominal wall relaxation and the conscious and receptive patient under SA together spurred us to try out SA for all our laparoscopic surgery patients. Another reason for preferring SA was preventing the potential problems of GA. The pneumoperitoneum induced rise in intra abdominal pressure including pressure on the diaphragm and carbon dioxide induced peritoneal irritation were factors to be considered. Initially when we started, we had no clue as to how the conscious patient would respond to these. Initially, we started laparoscopic appendicectomy using SA and then shifted other laparoscopic abdominal surgeries also to SA. Changes in methodology of port-site placement and using nitrous oxide, which is less irritating for the peritoneum compared with carbon dioxide, and maintaining a low intra peritoneal pressure of 8 mm Hg when using SA have all been reported to reduce the discomfort and chances of neck and shoulder pain [1]. We had always been operating at an average pressure of 8 mm of

carbon dioxide, and no changes have been necessary in port placement in SA compared with GA patients. This agrees with a recent report by Tzovaras [3]. Surprisingly, neck pain and shoulder pain had never been a major problem in our patients. They occurred in only 12.29% of patients, none of whom required conversion to GA. Pursnani, et al. [4] noted that shoulder and neck pain occurred in 2 of their 6 patients operated on while under epidural anesthesia, and it was easily managed. On the other hand, in the series of Hamad, et al. [1] and Hyderally H. [5], laparoscopic cholecystectomy (LC) were done with patients under SA, and one patient had to be given GA because of intolerable shoulder pain. Chiu, et al. [6] also noted shoulder pain in 1 of 11 patients of bilateral spermatic varices operated on while under epidural anesthesia. The other notable perioperative problem encountered was discomfort and anxiety seen in 0.21% of our patients. This was easily managed by sedation except in 1 patient where conversion to GA was necessary. The other reasons for conversion in our series were either an incomplete effect of SA or prolongation of surgical time to beyond the effective time of SA. Conversion to GA because of abdominal distension discomfort during epidural anesthesia was reported in 1 of 11 patients in the study of Chiu, et al. [6] while one of 6 patients in the Ciofolo, et al. [2] study required conversion to an open procedure because of uncontrolled movements under epidural anesthesia.

Bernd H [7] reported hypotension in 5.4% of their SA patients. Palachewa [8] had an incidence of 15.7%, Throngnumchai [9] 20.2%, and Hyderally [5] reported 10% to 40% incidence of hypotension. This then conclusively proves that the incidence of hypotension is no different whether laparoscopic surgery or open surgery is being done with SA and that an intra peritoneal pressure of between 8 mm Hg to 10 mm Hg

does not add to the problem of decreased venous return and persistence of hypotension. Although Chui [10] have mentioned that a high SA block of up to T2-T4 may cause myocardial depression and reduction in venous return, this was never substantiated in our series. An added cardiovascular advantage cited has been the decrease in surgical bed oozing because of hypotension, bradycardia, and improved venous drainage associated with SA [11].

GA patients unlike SA patients frequently have an additional problem of stomach inflation as a result of mask ventilation. This often requires Ryle's tube intubation, which amounts to unnecessary intervention in a body cavity.

The main debatable point however seems to be the status of respiratory parameters among the 2 modes of anesthesia during laparoscopic surgery. In this context as a general over view, it can be stated that spontaneous physiological respiration during SA would always be better than an assisted respiration, as in GA. The potentiality of intubation and ventilation-related problems including an increase in mechanical ventilation to achieve an adequate ventilation pressure exists during GA compared with SA [4]. In addition, pulmonary function takes 24 hours to return to normal after laparoscopic surgery performed using GA [12]. However, the observations are not uniform, and conflicting reports of respiratory parameter alterations while patients are under regional and general anesthesia are present. Nishio, et al. [13] documented a greater increase in $PaCo_2$ after CO_2 pneumoperitoneum when the patient was under GA compared with when the patient was breathing spontaneously. Similarly Rademaker, et al. [14] showed greater forced ventilatory capacity during GA. On the other hand, Chiu, et al. [6] reported significant arterial blood gas alterations during epidural anesthesia. Ciofolo, et al. [2] concluded that epidural anesthesia for

laparoscopy does not cause ventilatory depression. Even in our study, none of the patients had any significant variation in PaO2 or PaCO2 during the surgery with SA. Perioperative shoulder pain never persisted in the postoperative period.

Complications like sore throat, relaxant-induced muscle pain, dizziness, and postoperative nausea and vomiting (PONV) often create high morbidity after GA [11].

Another important advantage of SA is that other complications specific to GA, including cardiac, myogenic, and possible cerebral complications, do not occur with SA. Mobilization and ambulation in both SA and GA patients was achievable within 6 hours to 8 hours after surgery. Average time to discharge was 1- 2 days.

Conclusion

Spinal Anesthesia is safe and ideal anesthesia for laparoscopic appendicectomy surgery.

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