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Original Article

Major laparoscopic surgery under regional anesthesia: A prospective feasibility study



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ARTICLE INFO

Article history:

Received 16 June 2014

Accepted 8 December 2014

Available online 11 February 2015

Keywords:

General anesthesia
Laparoscopic cholecystectomy
Laparoscopic assisted vaginal hysterectomy
Total laparoscopic hysterectomy
Combined spinal and epidural anesthesia
Regional anesthesia

ABSTRACT

Background: Laparoscopic surgeries have attained the status of a gold standard for most of the abdominal pathology; we therefore performed this study to assess feasibility and safety of major laparoscopic surgeries like laparoscopic cholecystectomy (LC) and laparoscopic assisted vaginal hysterectomy (LAVH)/total laparoscopic hysterectomy (TLH) under regional anesthesia that is combined spinal epidural anesthesia (CSE) with normal pressure pneumoperitoneum using intrathecal fentanyl with bupivacain.

Methods: In a zonal government hospital, 50 patients were selected prospectively for LC and LAVH/TLH, under normal pressure (12 mmHg) pneumoperitoneum and under CSE over a span of fifteen months. Injection bupivacaine (0.5%) and 20 µg of fentanyl were used for spinal anesthesia. Plain bupivacaine (0.5%) was used for epidural anesthesia.

Results: We successfully performed the operations in 48 patients without major complications. CSE was converted to general anesthesia in two patients due to distressing shoulder tip pain. Age varied between 25 and 70 years. Duration of operation time (skin to skin) was between 50 and 170 min. Five patients had urinary retention and one developed localized pruritis. There was no incidence of respiratory depression, aspiration or headache.

Conclusion: Laparoscopic surgeries with normal pressure CO₂ pneumoperitoneum are feasible and safe under CSE. Incidence of postoperative shoulder pain was minimal due to use of intrathecal fentanyl and complications were less and easily manageable.

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Introduction

The development of laparoscopic surgery has revolutionized surgical procedures and thus has influenced the practice and

techniques of anesthesia. Laparoscopic surgery has reduced postoperative morbidity, pain, and pulmonary complications, shortened hospital stay, moved many procedures into the outpatient arena, and perhaps reduced overall costs.^{1–3} However, laparoscopic surgery has also introduced new

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<http://dx.doi.org/10.1016/j.mjafi.2014.12.010>

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challenges for anesthesiologists due to the effects of pneumoperitoneum on circulation and respiratory function, the risk of venous gas embolism, and the pathophysiologic changes caused by extraperitoneal gas insufflation and extremes of patient positioning.^{4,5} Thus the surgeries which were performed under regional anesthesia traditionally went under the domain of general anesthesia thereby negating some advantages of minimal access surgery as general anesthesia have some disadvantages linked to it. Laparoscopic surgeries are normally performed under general anesthesia with endotracheal intubation to prevent aspiration and respiratory embarrassment secondary to induction of pneumoperitoneum and also to prevent discomfort and shoulder pain due to stretching of the diaphragm in patients who are awake during the procedure. Consequently, the use of regional anesthesia (RA) in laparoscopic surgery has been limited to patients at high risk for GA due to severe coexisting pulmonary, cardiac, or other disease.^{5,8,9,11} Regional anesthesia has also been used for laparoscopy in fit patients in combination with general anesthesia for the pain-free postoperative period. There is no doubt that regional anesthesia has been successfully used for LC in patients unfit for general anesthesia, but surprisingly, has not been tried in fit patients. Recent evidence suggests that regional anesthesia has a significant role in the care of patients undergoing laparoscopy.⁶ There are many published reports of LC and inguinal hernia repair under spinal anesthesia and epidural anesthesia.^{7–10,33–43} Herewith we present a case series of LC and LAVH/TLH in 50 healthy patients performed under CSE.

Methods

After the approval of Institutional Ethical Committee and written informed consent, 50 American Society of Anesthesiologists (ASA) Grade I and II patients underwent either elective LC or LAVH/TLH under CSE. Exclusion criteria included those with the presence of any condition contraindicating elective surgery or spinal anesthesia.

The patients were explained during the preoperative visit by the anesthesiologist that any anxiety, pain, or discomfort occurring during surgery would be dealt with intravenous medications or if required, conversion to general anesthesia. During and after the procedure, the patients were encouraged to report any discomfort, abdominal or shoulder pain, nausea and vomiting. All patients received oral diazepam 05 mg (wt < 50 kg) or 10 mg (wt > 50 kg) on the night prior to surgery. In the operative room an IV line secured and all patients received adequate preloading with 1000 ml of Ringer's lactate solution over 15 min and intravenous Ondansetron 8 mg. All routine monitors namely, non-invasive blood pressure, pulse-oximetry (SpO₂) and electrocardiogram, were attached and baseline values of vital signs were recorded.

The patients were positioned in left lateral position, and the L2-L3 (for LC)/L3-L4 (for LAVH/TLH) space was palpated. Under strict aseptic precautions a single puncture spinal and epidural block was given using CSE set. Using an 18G Touhy needle and loss of resistance technique epidural space was located. 27G pencil point spinal needle was then advanced through epidural needle to determine the subarachnoid space.

Spinal anesthesia was then performed with 3 ml (15 mg) of 0.5% heavy bupivacaine with 20 µg of inj. fentanyl injected into L2–L3/L3-L4 subarachnoid space after free flow of cerebrospinal fluid. After removing spinal needle 10 ml of plain 0.5% bupivacaine was injected into epidural space. The patients were then turned to the supine position and a 10° Trendelenburg tilt, in case of LC, was given to achieve the required level of block, as assessed by pinprick method.

Heart rate, ECG, EtCO₂ and SpO₂ were recorded and blood pressure was recorded every 02 min for the duration of surgery. Once the block was considered adequate (minimum block T4, as assessed by pinprick), surgery was commenced using carbon dioxide (CO₂) insufflation at a maximum pressure limit of 12 mmHg.

Anxiety was treated with IV midazolam 2 mg in divided doses and if required, IV infusion of IV dexmedetomidine was started at 1 µg/kg loading dose over 10 min and then 0.2–0.7 µg/kg/min of maintenance infusion titrated to level of sedation and also heart rate and blood pressure. Patients having hypotension or bradycardia were not given loading dose.

Hypotension was treated with fluids or if required then IV Mephenteramine 6 mg as IV bolus and 3 mg was repeated as and when required during the intraoperative period.

The surgical procedure of LC and LAVH/TLH was carried out according to standard protocol with no modification. Operative time as well as any intraoperative event was recorded. All patients were given IV Paracetamol 1 gm and Diclofenac Sodium 100 mg rectal suppository for post-operative pain relief. In post period they were treated with IV Paracetamol 1 gm eight hourly and IV Diclofenac Sodium 75 mg IM SOS for 24 h and then SOS.

Results

50 patients were taken up for laparoscopic surgery during March 2013 and May 2014. Out of these 42 were LC and 8 were LAVH/TLH. 43 patients were female and 07 were male. Age range was between 09 and 70 years (mean age-41.88 years). However, only one 09 years old male child was operated for cholecystectomy, other patients were in the age range of 25 and 70 years (Table 1).

All 50 surgeries were completed laparoscopically. Two (4%) of the 50 patients had distressing shoulder tip pain so were converted to general anesthesia. Other patients responded well and surgery was accomplished without any pain. Surgery took an average of 98 min (range 50–170 min).

Intraoperative vital parameters including blood pressure, heart rate, oxygen saturation, and respiratory rate and end tidal CO₂ levels were all within baseline values. Five patient required pharmacological intervention for bradycardia. Five

Table 1 – Patient characteristics and outcome indicators.

Age (Yrs)	41.8 (9–70)
Sex Ratio M:F (N)	7:43
Type Of Surgery LC:LAVH/TLH	42:8
Duration Of Surgery (Min)	98 (50–170)

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