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Case Report

Trans-abdominal preperitoneal laparoscopic inguinal hernial repair under spinal anaesthesia: A case report

B M Munasinghe, Nishanthan Subramaniam

District General Hospital, Mannar, Sri Lanka

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Corresponding Author: B M Munasinghe, E-mail:< malakafmp@gmail.com > https://orcid.org/0000-0001-8373-4752
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Introduction

Laparoscopic inguinal hernia repair (LIHR) is superior to open inguinal hernia repair (OIHR) in the aspects of early recovery, reduced post-operative pain [1, 2], early discharge and reduced post-operative complications [3], despite reports of equal or higher risk of recurrence [4]. Totally extraperitoneal surgery (TEP) is preferred over transabdominal preperitoneal (TAPP) repair with a reduced risk of visceral injury and subsequent bowel adhesions [5] and port-site herniae [6].

Central neuraxial blockade provides numerous advantages compared to general anaesthesia (GA) in terms of superior post-operative pain relief, reduced bleeding, diminished metabolic response to surgery and, ultimately, cost.

In the Sri Lankan set-up, spinal anaesthesia (SA) for OIHR and GA for LIHR is the general practice. TEP approach is preferred during LIHR, even though the number of reported cases are few. Even among cases of LIHR performed under SA, a majority could be TEP procedures. Thus, TAPP repair performed under SA is probably rare or even an untried entity in the local set up.

Case Description

A 52-year-old, averagely built male (BMI-24 kgm^{-2}) was scheduled for an elective primary repair of a right-sided, direct inguinal hernia of 10 years' duration with recent onset pain at the hernia site without obstructive features. He was a mild-intermittent wheezer, with no recent exacerbations, who was using MDI salbutamol on demand. He was a non-smoker with good exercise tolerance. Rest of the history, including allergies, was unremarkable. Examination revealed a normal airway, spine and haemodynamics. A few diffuse rhonchi were heard in the right lower lung field in the absence of crepitations and respiratory distress. The hernia was reducible. Ultrasound did not show any features of obstruction or strangulation. Basic investigations, including chest X-ray, were normal.

Peak expiratory flow rate was in the range of 400-600L/min which was acceptable for his body habitus, age and sex. An rritable airway in relation to GA was anticipated. Postponement and optimization were considered but early surgery was requested by the surgeon due to the history of painful episodes related to the hernia.

The procedure and modes of available anaesthesia were explained thoroughly to the patient. Subsequently, a collective decision was made to proceed with the TEP approach under SA. The patient was premedicated including regular nebulization. Standard fasting and infection control protocols were followed.

Reassessment on the day of surgery revealed clear lung fields. Patient was taken to the operating table and intravenous access and monitoring were established. SA was administered in the sitting position at L_4-L_5 level. Complete motor block and sensory block at T_5 level was achieved 15 minutes following administration of 3ml of 0.5% heavy bupivacaine and 15µg of fentanyl.

During surgery, TEP was technically impractical due to difficulty in accessing the extra peritoneal plane due to severe tissue adhesions in the sub-umbilical region. This prompted conversion to OIHR or TAPP. Factors influencing the decision between the two were tolerance of pneumoperitoneum by the patient and avoidance of multiple (and larger) skin incisions.

Following explanation to the patient, a TAPP approach was chosen with reassurance of conversion to GA in the case of severe discomfort or pain. Intravenous midazolam 1.5mg was provided prior to pneumoperitoneum created with low flow (4 L/min) and low pressure (12 mmHg) gas insufflation. Patient was maintained in a 20^{o} Trendelenburg position. Sensory level, haemodynamic and respiratory parameters were continuously monitored. TAPP repair was performed over 30 minutes, within which the mesh was inserted and anchored. Bowel was minimally handled.

The procedure was well tolerated by the patient who was haemodynamically stable throughout. The patient denied any respiratory difficulty, shoulder tip pain or discomfort at any point during the Trendelenburg position with pneumoperitoneum. Peripheral saturation was consistently 99% and above on room air. Perioperative haemodynamics are illustrated in Figure 1.

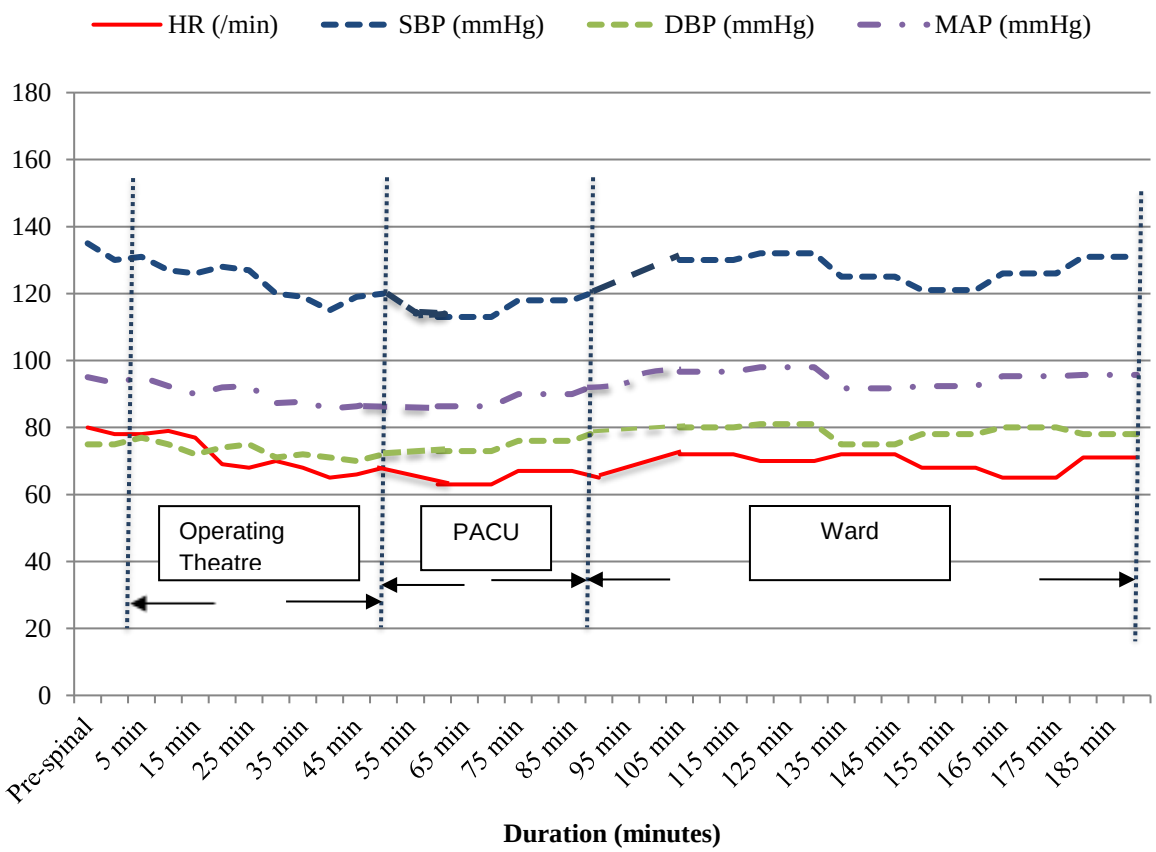

Figure 1: Peri-operative haemodynamic parameters.
HR, Heart rate; SBP, Systolic blood pressure; DBP, Diastolic blood pressure; MAP, Mean arterial pressure; PACU; Post anaesthesia care unit

Pain scores (assessed utilizing a numerical rating scale) at 0, 4, 8 12- and 24-hours' post-surgery were 2, 2, 4, 7 and 3 respectively, managed successfully with oral paracetamol 1g q6h, oral diclofenac Na 50 mg q12h and subcutaneous morphine 6 mg q6h. Patient was mobilized 8 hours after surgery and discharged on the following day. There were no other complaints.

Discussion

The LIHR by TEP approach is known to have a higher rate of conversion to open surgery [6] but still preferred over TAPP owing to safety against intraperitoneal organ injury and paralytic ileus 7]. On the other hand, TAPP is found to have satisfactory short-term and long-term outcomes after surgery [8].

Laparoscopic surgeries under SA are gaining popularity in this era of fast-track surgery with superior and long-lasting analgesia, reduced post-operative nausea and vomiting and early discharge. A study involving nearly 4000 patients who underwent laparoscopic cholecystectomy concluded that, when performed under SA, no change in anaesthetic technique was required and recommended SA as a reliable, effective mode of anaesthesia [9]. Moreover, the authors observed optimal anterior abdominal muscle relaxation with ease of probe placement. In addition, avoidance of nasogastric tube placement compared to the GA group, reduction in surgical bleeding due to hypotension and improvement in

venous drainage from the lower extremity were other merits seen in the SA group [9].

Similar outcomes have been recorded in several studies with regard to TAPP under SA. Sarakatsianou et al., in their interim analysis of a randomized controlled trial, found superior analgesia in the immediate post-operative period (0 and 8 hours) which is comparable with our patient [10]. Reduced pain scores are invariably associated with effective respiratory efforts and early mobilization, which promote reduced incidence of hypostatic pneumonia and deep vein thrombosis. Reduction in postoperative nausea and vomiting is a clearly demonstrated benefit of the SA group. Another interesting observation during TAPP performed under SA is described in a case report by Pillay et al, where the ability of the patient to cough and the resulting intraoperative Valsalva maneuver allowed in situ visualization of the mesh at the neck of the hernial sac, assuring adequate mesh overlap [11. The long-term surgical complications, mainly recurrence following TAPP or TEP under SA were found to correlate with that following GA. In contrast, chronic pain at the surgical site have been in the range of 4.6% in the SA group compared to 11% in the GA group which is a substantial reduction [8]. The theoretical increment of adverse symptomatology due to increased intracranial pressure (severe headache, visual blurring) with pneumoperitoneum in conscious patients was also not found during this study [8].

Indeed, there are obvious drawbacks of SA for TAPP or TEP. A commonly cited one is post-operative urinary retention. Causalities quoted are multiple, including the use of opiates with the local anaesthetic during SA during dissection around the suprapubic region and the fact that elderly males with prostatic hyperplasia represent a considerable proportion of the patients undergoing hernial repair [8]. Diaphragmatic irritation leading to shoulder tip pain has been found to be around 63% in the study by Sarakatsianou et al [10]. They have suggested the use of low pressure pneumoperitoneum (less than 10mmHg), Trendelenburg position and intraoperative intravenous short acting opiates with satisfactory outcomes. We did not encounter any of these adverse effects in our patient.

Bronchial asthma with hyperactive airways poses a variable risk of perioperative bronchospasm of 0.17% up to 20% [10,12]. A closed-claim analysis found a 90% risk of severe brain injury or death following episodes of severe bronchospasm [13]. With regard to the risk of peri-operative bronchospasm, there had been, surprising, a similarity in incidence between SA and GA. However, escalated risk of bronchospasms should be seen in GA due to airway handling during intubation and extubation, use of histamine-releasing muscle relaxants and opiates and creation of auto-PEEP [14]. On the other hand, inadequate analgesia during any form of anaesthesia could lead to bronchospasm. Thus, satisfactory pain relief is a necessity. Considering all the above factors, we opted for SA as the mode of anaesthesia in this patient. Irrespective of conversion to TAPP which was not anticipated prior to surgery, the level of motor and sensory block accommodated the stress of surgery effectively.

Segmental innervation of the parietal peritoneum is at the level of T_6 and below [15] thus, an ideal neuraxial block should cover T_6 or below while maintaining normal haemodynamic parameters in the absence of intercostal paralysis.

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Conclusion

SA is a feasible, safe and cost-effective anaesthetic technique for LIHR in carefully selected, co-operative patients. An adequate level of sensory blockade, gentle surgical approach with short acting sedatives when required and intraoperative monitoring for cardiorespiratory dysfunction are, nevertheless, imperative.

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Consent

The authors certify that informed, written consent for publication was obtained from the patient.

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