

Spinal anaesthesia for a NOTES (Natural Orifice Transluminal Endoscopic Surgery) total hysterectomy in a pre-lung transplant patient : a case report

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Abstract : We describe the first case of a vaginal NOTES total hysterectomy under spinal anesthesia in the head-down position without sedation or additive analgesia in a patient with end-stage COPD. This report adds to the growing evidence that neuraxial techniques are a good alternative for general anesthesia in select cases for laparoscopic surgery.

Keywords : case report ; spinal ; COPD ; Notes.

General anaesthesia with endotracheal intubation is the conventional approach for laparoscopic surgery. However, mechanical ventilation in patients with advanced chronic obstructive pulmonary disease (COPD) can lead to an acute exacerbation of the respiratory symptoms (1). Therefore, laparoscopic procedures such as cholecystectomy are occasionally performed under neuraxial anaesthesia. This case report is the first to describe a NOTES (Natural Orifice Transluminal Endoscopic Surgery) total vaginal hysterectomy under spinal anesthesia in the head-down position without additional intravenous sedation or analgesia in a patient with terminal COPD.

A 53-y-old female (Body Mass Index 27.8, ASA physical status classification 4) presented for elective hysterectomy with bilateral adnexectomy. Her medical history included COPD GOLD stage 4 for which a lung transplant was the only possible management. Pulmonary lung function testing showed a predicted forced expiratory value in one second of 22%, a vital capacity of 51% and a PaO₂ of 71 mmHg at rest. Her medication at home included beclomethasone (Inuvair®) and umeclidinium (Incruse®). Cervical cytology staging as part of the pre-transplantation assessment showed high grade dysplasia. Because a conisation demonstrated tumour-containing edges, pre-transplant removal of the uterus and adnexa was necessary. The patient consented to a NOTES total vaginal hysterectomy for which spinal anaesthesia was considered the patient's best option. The patient was informed

in a multidisciplinary preoperative consult about the different options and consented to the spinal approach and to abort surgery if the spinal would not function properly.

Single shot spinal injection was performed with a Whitacre 27 Gauge needle in the sitting position at the L4-L5 interspace and a mixture of 2,2 mL of hyperbaric prilocaine 2% (44 mg) and 1 µg sufentanil was injected. Sufentanil had been added to the solution with an insulin syringe. A sensorial block as tested with pinprick progressed to T5. Oxygen 1 litre per minute was administered via nasal cannula and hemodynamic parameters and blood gases were monitored via an arterial line. An urinary catheter was placed.

The surgeon accessed the peritoneal cavity ten minutes later by circumcising the cervix and making an anterior and posterior colpotomy. A vNOTES port (GelPOINT vPATH® Advanced Access Platform, Applied Medical, Rancho Santa Margarita, California, US) (Figure 1) was inserted to establish a pneumoperitoneum. The patient was positioned in an 18 degree Trendelenburg position

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Fig. 1. — vNotes port. This port enables the necessary pneumoperitoneum and insertion of several trocars through a single device.

and the uterus was dissected from caudally to cranially using endoscopic instruments with bipolar coagulation. The ureters were identified but not dissected. The Fallopian tubes and ovaries were removed. At the end of surgery, the vNOTES port and the uterus were removed through the vagina.

During surgery that lasted 40 minutes, the patient experienced some minor discomfort in the shoulders and flank. The intraabdominal insufflation pressure was diminished from 10 to 8 mmHg and music was offered through headphones with sufficient relief. No additional analgesia or sedation was administered. The patient remained hemodynamically stable during surgery as did the blood gas analysis. A decrease in oxygen saturation to 94% near the end of surgery was treated by bringing the table back into the horizontal position. Two hours after the spinal injection, she was able to move both legs and the urinary catheter was removed on the ward. She was discharged home 4 hours later with very good satisfaction. Postoperative analgesia included paracetamol and non-steroidal anti-inflammatory drugs. The patient was telephonically contacted 12 and 24 after discharge.

There are currently four approaches to a hysterectomy: abdominal, vaginal, laparoscopic and robotically-assisted. The vaginal NOTES-technique is an innovative approach to hysterectomy that was first described in humans in 2012 and gains increasing popularity (2). The surgeon accesses the peritoneal cavity by circumcising the cervix, opening the anterior and posterior peritoneum and inserting a special port (Figure 1) that enables the necessary pneumoperitoneum and insertion

of several trocars through a single device. The advantages of the technique include faster surgery and postoperative recuperation, lower complication rates, better pain scores and a decreased need for painkillers. Disadvantages include the surgeon's need for a double skill set since both traditional and laparoscopic surgical techniques need to be mastered which affects implementation and learning curve (3).

This patient's terminal pulmonary condition, the effects of mechanical ventilation, the necessary pneumoperitoneum that can cause carbon dioxide resorption, lung volume reduction, atelectasis, decrease in pulmonary compliance, and increase in peak airflow pressure, could possibly lead to acute COPD exacerbation, barotrauma, pneumonia and respiratory failure. General anaesthesia was therefore considered to be contraindicated. Neuraxial anaesthesia has been described as an alternative, mainly for laparoscopic cholecystectomy but also for appendectomy and inguinal hernia repair.^{1,4-6} It is well-tolerated with no airway instrumentation, a lower incidence of respiratory depression and pulmonary complications, and lower pain scores, opioid need and length of stay compared to general anaesthesia (1, 4, 5). Only one case report describes uneventful cholecystectomy in a pre-lung transplant patient with a combined-spinal epidural at the T10 level but without use of the Trendelenburg position (4). Two prospective studies compared general and spinal anaesthesia for laparoscopic surgery in COPD patients (n = 60) and healthy subjects (n = 50) (1, 5). They concluded that spinal anaesthesia was well tolerated without respiratory problems, with no difference in duration of surgery and satisfactory muscle relaxation (1, 5). Spinal anaesthesia was therefore considered to be our patient's safest option. Hyperbaric prilocaine was chosen over lidocaine or mepivacaine because of its predictable intermediate potency and duration of action, and favourable safety profile with low incidence of transient neurological symptoms (7). The possible side effects of using a hyperbaric solution such as cephalad spread was low since the patient was positioned into the Trendelenburg position only during the second part of the surgery.

The discomfort of the pneumoperitoneum and referred shoulder pain that are present in many patients is a limiting factor as has also been demonstrated in this case. The above-mentioned studies and a review of the literature demonstrate that additional intravenous analgetic and sedative agents such as fentanyl, alfentanil, propofol, dexmedetomidine, midazolam and ketamine, whether

or not in combination, are invariably used in combination with the spinal anaesthetic to treat perioperative anxiety, abdominal discomfort and shoulder pain (1, 4-6). Our patient did not receive any additional intravenous sedation or painkiller to avoid respiratory depression. Lowering the intra-abdominal insufflation pressure and music through headphones offered sufficient relief.

Treating an ASA 4 class patient in day case surgery with a unique anesthetic approach is atypical. The extensive experience of the surgeon, anesthesiologist and team with the technique, the scheduled 24h follow-up of the patient, the excellent postoperative analgesia and the complete recuperation of the block upon discharge allowed us to treat this patient in a day case setting.

We describe the first case of a vaginal NOTES total hysterectomy under spinal anaesthesia in the head-down position without sedation or additive analgesia in a patient with end-stage COPD. This report adds to the growing evidence that neuraxial techniques are a good alternative for general anaesthesia in select cases for laparoscopic surgery.

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