

Letter to editor

Gasless laparoscopy in patients with prior ventriculoperitoneal shunt: yet another option!

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Abstract:

Anaesthetic management of patients with ventriculoperitoneal shunt (VPS) undergoing laparoscopic surgeries remains controversial for its safety concerns. At present, no standardized protocol exists for managing these patients during perioperative period. The prime concerns are the rise in intracranial pressure (ICP) and shunt dysfunction due to carbon dioxide insufflation. Anaesthetic considerations in these patients should focus primarily on the intrinsic characteristics and functioning of the VP shunt, the insufflation pressures for pneumoperitoneum creation and techniques to monitor the function of shunt. Gasless laparoscopy may be an option by warding off the complications associated with pneumoperitoneum. In our institution, surgeon improvises the laparoscopic technique to create a gasless condition. We discuss the anaesthetic concerns and considerations in this subset of patients for laparoscopy surgeries.

Keywords: ventriculoperitoneal shunt; laparoscopy; pneumoperitoneum; intracranial pressure; cerebrospinal fluid; insufflation

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Dear Editor,

Developments in surgical techniques and instrumentations have led to increasing acceptance of laparoscopic surgeries in the modern era. Patients with prior ventriculoperitoneal shunt (VPS) are sometimes scheduled for various laparoscopic procedures. In these patients, laparoscopic approach has definite advantages, which include the lesser formation of intra-abdominal adhesions and limited skin-to-shunt contact, leading to minimum risk of shunt infection and shunt revision¹. But there can still be a possibility of acute shunt dysfunction owing to pneumoperitoneum creation such as distal catheter obstruction by soft tissue impaction and failure of a valve system^{2,3}. This eventually causes retrograde insufflation of cerebrospinal fluid (CSF) and carbon dioxide diffusion through the distal end of the catheter, generating a risk of rapid and sustained elevation of intracranial pressure (ICP)²⁻⁴.

Anaesthetic concerns in these patients are the rise in intracranial pressure (ICP) and shunt dysfunction due to the pneumoperitoneum creation². Perioperative strategies mainly focus on the functioning of VPS, the insufflation pressures for pneumoperitoneum creation and intensive monitoring of neurological status of patients. An earnest neurosurgical consultation may be required for perioperative shunt handling such as distal catheter externalization or percutaneous manipulation of shunt flushing reservoir and proximal and distal occluders².

Modern VPS systems are extremely safe as they have a one-way valve and can withstand high intraabdominal pressures^{1, 4}. Laparoscopic procedures were reported safe in patients with VPS and generally requires monitoring limited to clinical observation³. But there can still be a possibility of a shunt failure in certain patients having a prior VPS with unascertained characteristics. Anaesthesia

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care providers should conscientiously observe the insulation pressures (preferably less than 10 mm Hg), the trendelenburg position (preferably not more than 15°) and duration of surgical intervention (preferably not more than 30 minutes)⁴. These precautions discreetly discussed with the operating surgeon prior to the surgical intervention, may avoid the gross variations in cerebral blood flow with resultant increase in ICP and subsequent shunt dysfunction⁴. Perioperative invasive ICP monitoring may be an option but is certainly associated with its inherent complications². Recently, transcranial doppler (TCD) has been introduced as a non invasive technique to evaluate the efficiency of shunt function by detecting the variations in cerebral haemodynamics⁴.

Gasless laparoscopy may be an option in this subset of patients although its standard instruments (Abdominal Wall Retractor- Laparolift™: Origin Medsystems Inc., Menlo. Park, CA and Laparofan™-Origin Medsystems Inc.) are not readily available in many institutes in less privileged countries^{5, 6}. It is advocated preferably in patients with compromised cardio-respiratory status and associated with certain technical limitations in the surgical procedure⁵. In our institute, surgeons recently practice this technique in twelve patients with prior VP shunt in-situ of unknown characteristics, by doing certain improvisations since the standard instruments are not available. They place three trocars in the abdominal cavity, one blindly through sub-umbilical incision for camera port, second under direct vision, below and lateral to xiphisternum on right side and third through the anterior axillary line at the level of umbilicus. Two sutures (1-0 vikryl) are placed through the anterior abdominal wall at a point one inch below

the tip of ninth costal cartilage and one cm above the epigastric trocar for lifting the abdominal wall. The sutures are tied and suspended from abdominal self-retracting modular system (Hari Bhaki® abdominal retractor) for adequate lift (Figure 1).



Figure 1: Arrows indicating sutures placement for lifting anterior abdominal wall.

We believe that gasless laparoscopy, preferably with standard instruments, may possibly ward off the complications associated with pneumoperitoneum creation such as shunt dysfunction and ICP elevation in the patients with prior VP shunt of unknown characteristics. This may also avert the need for intensive intraoperative neurological monitoring and associated limitations such as duration of surgery, insufflations pressures and position of the patient. Though, we strongly feel that more structured clinical trials may be required to endorse its usefulness in aforesaid clinical settings.

Conflict of Interest: No

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