

Case Report

Successful laparoscopic cholecystectomy in a patient with ventriculoperitoneal shunt: a case report

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ABSTRACT

With advances in medical care there is a significant increase in life expectancy of patients with hydrocephalus. Many patients survive and live a meaningful life even after a decade of ventriculoperitoneal (VP) shunt placement. In this scenario, there are all the chances that these patients may need abdominal surgeries for pathologies unrelated to VP shunt. Laparoscopic cholecystectomy is one of the most common abdominal surgeries being performed. In patients with VP shunt *in situ*, before performing laparoscopic cholecystectomy factors such as type of shunt, shunt function, presence of shunt infection and possibility of shunt malfunction needs to be assessed. Laparoscopic cholecystectomy in a patient with previous VP shunt is not a well answered question. Some authors favor this while the others disagree. With proper anesthetic management and monitoring it is safe to perform laparoscopic cholecystectomy in these patients, even though literature gives little information about it. So, this case report is our sincere effort to strengthen the available data and stabilize a ground that can we can safely perform laparoscopic cholecystectomy in patient with VP shunt.

Keywords: VP shunt, Laparoscopy, Cholecystectomy, Hydrocephalus

INTRODUCTION

In today's era, laparoscopic surgeries are the most common surgeries performed all over the world. Because of the decreased morbidity, decrease in length of scar and shorter duration of stay, laparoscopic surgeries have become the major aspect in the world of surgery.¹ One of the important laparoscopic surgeries which surgeons perform in the abdomen is laparoscopic cholecystectomy.

Hydrocephalus and VP shunting are one of the most common management strategies in cases of obstructive hydrocephalus in children as well as in adults. It is not unusual to come across patients posted for various surgeries having VP shunt *in situ*.² In adults, VP shunting is usually done in patients with posterior fossa tumors, hydrocephalus secondary to meningitis and subarachnoid hemorrhage as well as in cases of idiopathic intracranial hypertension.³ Unlike in pediatric age group, the

morbidity and mortality in adults is usually secondary to the primary pathology for which VP shunt was used rather than the complications related to VP shunt itself. With proper monitoring and early detection of infection and malfunction of these shunts and appropriate intervention these shunts there is a significant improvement in quality of life of patients with hydrocephalus.⁴

Since there is an increase in life expectancy of patients with hydrocephalus treated by VP shunts it's not unusual to come across a patient posted for surgery to be having VP shunt *in situ*. It's improper to deny these patients the benefit of laparoscopic surgeries just because they have VP shunt *in situ*. However, in these patients before performing laparoscopic surgeries, factors such as type of shunt, shunt function, presence of shunt infection and possibility of shunt malfunction needs to be assessed.⁵

One of the most common abdominal surgeries which are performed laparoscopically is cholecystectomy. Laparoscopic cholecystectomy in patients who have VP shunt *in situ* needs some special considerations.⁶ First concern is positive pressure created during laparoscopic cholecystectomy may impair drainage of CSF thereby increasing intracranial pressure. Second concern is carbon dioxide which is insufflated during laparoscopic procedures may enter ventricular system through VP shunt thereby further increasing intracranial pressure.⁷ Despite all these concerns with meticulous planning of surgical procedure during surgery laparoscopic interventions can be done in patients with VP shunt *in situ*.⁸

We report here a case of 70-year-old female patients with VP shunt *in situ* who has undergone laparoscopic cholecystectomy successfully without any intraoperative or postoperative complications.

CASE REPORT

A 70-year-old female came to surgery out-patient department (OPD) of our hospital with complaints of on and off pain in upper part of abdomen since last 3 months. For the above complaints, patient was clinically examined and ultrasound of abdomen was advised. Ultrasound abdomen showed presence of multiple mobile calculi in gall bladder lumen, largest measuring 11mm in size along with sludge present within gall bladder lumen. Common bile duct (CBD) was normal in caliber. The past history and available medical reports of the patients were reviewed and it was found that 5 years back patient attended neurosurgery OPD with complaints of gait disturbance and loss of urinary control for 20 days. MRI brain was done which showed dilation of lateral ventricles (right>left) with periventricular oozing suggestive of obstructive hydrocephalus. For that right sided low pressure VP shunt (Chhabra low pressure) placement followed by endoscopic septostomy was done 5 years back.

In view of repeated attacks of upper abdominal pain and intractable episodes of vomiting and presence of multiple calculi in gall bladder patient was advised to undergo laparoscopic cholecystectomy. Pre operative evaluation done and physical fitness was obtained. Preoperative cardiology consultation was done. 2D ECHO was performed which was normal. Routine investigations such as complete blood count, differential count, erythrocyte sedimentation rate, C-reactive protein levels (CRP), HIV and HBsAg was done. Neurosurgery consultation was done. An X-ray Erect Abdomen was done to evaluate the tubing and the tract of VP shunt.

A routine laparoscopic cholecystectomy was performed using 3 ports procedure by an experienced surgeon on Insufflation pressure was maintained at 10 mm Hg instead of normal 11-14 mm Hg during whole procedure to prevent increase in intracranial pressure. Intra-

operatively, gall bladder was distended and were seen present within lumen, dense peri gall bladder adhesions were also seen. Abdominal end of the VP shunt was cordoned off around falciform ligament. Cystic duct, cystic artery, CBD and liver was found to be normal. Patient withstood the procedure very well. Post operative procedure was uneventful and patient was discharged on 3rd postoperative day with no neurological complication and proper follow up advice. Histopathology report was suggestive of chronic cholecystitis with cholelithiasis.

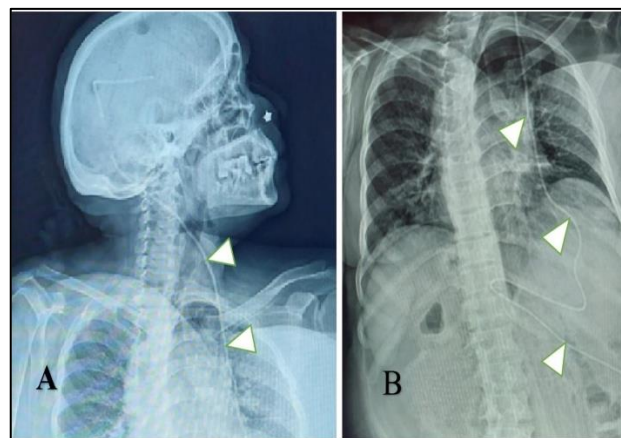


Figure 1 (A and B): Radiograph of the skull and chest with the course of the VP shunt indicated by the arrows; radiograph of the abdomen with the VP shunt (indicated by the arrows) seen on the patient's right side.

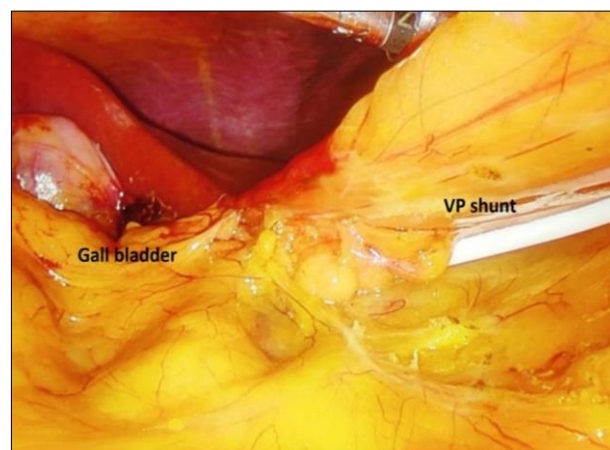


Figure 2: Laparoscopic view showing the VP shunt and gall bladder.

DISCUSSION

Though commonly seen in pediatric age group the incidence of hydrocephalus is also increasing in adults. The common causes of obstructive hydrocephalus in adults include posterior fossa tumors and hydrocephalus secondary to subarachnoid hemorrhage.⁹ Placement of VP shunt is one of the effective and life-saving treatment modalities in pediatrics as well as adult population with

hydrocephalus. In the procedure, proximal end of a silicone tube is placed into lateral ventricles of the brain and the distal end lies within peritoneal cavity via a subcutaneous tunnel passing through neck and chest. The tube drains CSF from ventricles to the peritoneal cavity from where CSF is reabsorbed into blood stream. First VP shunt procedure was done in 1905 by Kausch, a German neurosurgeon.¹⁰ Now this is common practice in neurosurgery. As per literature, this procedure has very low mortality rate, estimated around 0.1%, but shunt related complications are very common. Common complications associated with VP shunt include infections, blockage, under drainage or over drainage, extrusion, migration, peritonitis and bowel perforation. Reported incidence of shunt infection are 3-15% and shunt failure are around 50%.

Laparoscopic cholecystectomy in a patient with VP shunt is supported by only few individual case reports and case series. As per available literature, laparoscopic cholecystectomy is safe in patients with VP shunt if meticulous attention is given to intraoperative hemodynamics and prevention of infection.¹⁴

Theoretically main concern with this situation is inadvertent increase in intracranial pressure because of retrograde pneumocephalus via peritoneal end of VP shunt and carbon dioxide induced cerebral vasodilation while iatrogenic creation of pneumoperitoneum for laparoscopic cholecystectomy. However, in a clinical testing no retrograde failure of shunt valve was seen up to 350 mmHg of pressure. Multiple methods are advised by different authors to reduce risk of retrograde shunt failure which includes temporary clamping of shunt in subcutaneous tunnel or intraperitoneal portion, externalization of distal end or intraoperative intracranial pressure monitoring. Another concern is advertent clipping of the distal end, injury or breakage while inserting the trocar or performing the procedure which is completely avoidable. Few other possible complications are subcutaneous emphysema of shunt tract, lethargy and apnea.

One of the important aspects of performing laparoscopic procedures in patients with VP shunt is prevention of insufflation pressure. Inadvertent rise in insufflation pressure may cause complications such as raised intracranial pressure causing bradycardia and hypertension. We could complete laparoscopic cholecystectomy in this case by maintaining Insufflation pressure at 10 mm Hg instead of normal 11-14 mmHg.

CONCLUSION

Laparoscopic surgery in patients with VP shunt along with proper anesthetic monitoring is safe. A neurosurgery consultation prior to surgery should be done to verify proper functioning of VP shunt. The surgeon should note the path of the catheter within abdominal wall to avoid any damage to the catheter during the procedure. The

surgical team and anesthesiologist should be aware of possible complication, their management as well as location of shunt reservoir so it can be pumped if necessary. And finally, it is important to ensure that the intraperitoneal portion of catheter is not twisted or obstructed prior to decompression of the abdomen.

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