Delayed presentation of iatrogenic ventriculoperitoneal shunt transection following laparoscopic weight loss surgery in a patient with idiopathic intracranial hypertension

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ABSTRACT

Idiopathic intracranial hypertension is strongly associated with central obesity and consequential raised intra-abdominal pressure. If left untreated it poses significant risk to vision and can eventually cause blindness. Owing to its pathophysiology, this condition is managed by both medical and surgical specialities. When medical management fails neurosurgeons commonly treat idiopathic intracranial hypertension by permanent cerebrospinal fluid peritoneal shunting. Weight reduction surgery provides patients who are obese with a multitude of benefits and it is not uncommon for the general surgeon to be presented with a patient with idiopathic intracranial hypertension and a cerebrospinal fluid peritoneal shunt in place. This provides a potential challenging situation in weight-loss surgical procedures. We describe an interesting case where laparoscopic bariatric surgery resulted in transection of the abdominal catheter with a delayed presentation of recurrent symptoms and an abdominal cerebrospinal fluid collection in a patient with idiopathic intracranial hypertension. We discuss how this could be avoided and its management.

KEYWORDS

Idiopathic intracranial hypertension – Intracranial hypertension – Pseudotumor cerebri – Ventriculoperitoneal shunt – Weight reduction surgery

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Introduction

Idiopathic intracranial hypertension (IIH), also known as pseudotumour cerebri or benign intracranial hypertension, usually presents with headache, pulsatile tinnitus and visual deterioration. If left untreated, it can result in permanent blindness. Cerebrospinal fluid (CSF) pressures are found to be elevated without a causative mass or hydrocephalus identified on brain imaging. Obesity is a major risk factor for IIH and is present in approximately 94% of patients with a prevalence of 20/100,000 in young women who are obese.¹ Severe obesity results in elevated intra-abdominal pressure, which causes subsequent venous stasis and high pressure in the intracranial dural venous sinuses. This impairs absorption of CSF by the arachnoid villi and consequently raises intracranial pressure.²

IIH is managed by both medical and surgical means, including commencing patients on acetazolamide, performing optic nerve fenestrations or the insertion of CSF peritoneal shunting. Lifestyle changes and weight loss is

associated with an improvement in symptoms and weight reduction surgery has been shown to successfully treat the condition.³ Global rates of obesity are rapidly rising in tandem with the incidence of shunting for IIH.⁴ With the benefits of weight reduction surgery, patients with IIH and CSF shunting in place are becoming a more common scenario for the bariatric surgeon. This may provide its own surgical challenges and we describe the first case in the literature where transection of the peritoneal catheter occurred during laparoscopic weight-reduction surgery in a patient with IIH. This presented in a delayed manner secondary to a subcutaneous CSF collection and recurrent symptoms requiring emergency surgery. We discuss how this could be avoided and its management.

Case history

A 22-year-old woman with a background of morbid obesity, weighing 129 kg with a body mass index of 47 kg/m², IIH which had failed medical management, a ventriculoperitoneal (VP) shunt, depression and back pain, was originally referred to the department of minimal access surgery for

consideration of weight-reduction surgery. Despite conservative measures, she continued to gain weight and it was decided to proceed with an elective laparoscopic Roux-en-Y gastric bypass, which was performed without reported complications.

Three weeks postoperatively, the patient presented to the emergency department with recurrence of high-pressure symptoms including headache, nausea and vomiting. Clinical examination demonstrated a right upper-quadrant swelling below the scar of a laparoscopic access port. Abdominal radiography showed a discontinuity in the peritoneal catheter with a distal segment in the pelvis and an extraperitoneal component (Fig 1). An abdominal ultrasound scan demonstrated a fluid collection with a transected distal catheter. The patient underwent an emergency joint case procedure with neurosurgery and general surgery, where a pseudomeningocele (abdominal collection of CSF) was found under high pressure. The proximal aspect of the abdominal catheter was identified immediately. The peritoneum was opened and with laparoscopic assistance the transected component of the catheter retrieved and reconnected to the proximal segment with a straight connector and tied with silk. The distal aspect of the catheter was seen to be draining CSF at the end of the procedure and a sample was sent for microscopy culture and sensitivity, which was negative for growth of micro-organisms. Soon after the surgery all symptoms resolved and the patient was discharged without complications.

Discussion

We describe the first case in the literature where an iatrogenic insult to the distal tubing of a VP shunt occurred in a patient undergoing laparoscopic weight-reduction surgery

immediately under the site of an access port. Owing to the sharp nature of the laparoscopic trocar, it is likely that this trocar transected the shunt tubing as it was introduced. Typical insertion points for peritoneal catheters in CSF shunting are found on the right side of the abdomen and include the right upper quadrant just inferior to the costal margin and a paraumbilical location. VP shunt catheters are at risk of trauma along their tract, which starts cranially and terminates at the site of insertion in to the abdomen. In patients with multiple shunt revisions, either the same incision is used with a different entry into the peritoneum or a new incision is created on the skin. This can be anywhere between the costal margin and the paraumbilical region. In rarer circumstances, a shunt is located on the contralateral side.

Being aware of conventional insertion points for shunts can be useful in trying to avoid complications and planning laparoscopic entry points. Although a scar can be used to determine these points, if it is not visible or if the patient has undergone multiple revisions, making it difficult to localise the shunt tubing, we recommend the use of an abdominal radiograph or ultrasound scan. These can be used pre or intraoperatively to help localise and mark the shunt tubing and aid with planning laparoscopic entry points.

At the end of the laparoscopic procedure, it should be routine to visualise the shunt tip, which should show the dripping of CSF. Figure 2 shows an example of what a functioning distal catheter should look like from a laparoscopic view of a CSF peritoneal shunt. An assessment of trocar entry sites from within the abdomen should also occur, as these pose significant risk to the shunt tubing. The use of blunt trocars may be preferable in patients with peritoneal shunts, as there is some evidence to suggest

Figure 1 Laceration of distal shunt tubing following laparoscopic bariatric surgery (left) and after distal shunt tubing retrieval and re-insertion in to the peritoneum (right).

Figure 2 Laparoscopic view of a distal catheter from a cerebrospinal fluid peritoneal shunt.

reduced traumatic complication rates.⁵ It may be useful to consult a neurosurgeon to confirm the workings of the shunt during the intraoperative assessment. Recurrence of symptoms and/or a focal abdominal swelling after abdominal surgeries in patients with peritoneal shunts should alert the clinician to shunt failure. Appropriate investigations in the form of abdominal radiographs or ultrasound scanning should take place with early involvement of a neurosurgeon.

Conclusion

Global rates of obesity are rising, together with the incidence of IIH and subsequent CSF peritoneal shunting. These patients are likely to become more common for the bariatric surgeon planning weight-reduction surgery. It is important to have an idea of entry sites for peritoneal catheters to avoid iatrogenic injury to them during abdominal surgery. The use of previous surgical scars may be difficult, especially if these are multiple or have healed well. We recommend the use of pre- or intraoperative radiograph and/or ultrasound scanning to localise the shunt tubing to help avoid injury to it. During the end of the procedure, an intra-abdominal assessment of the shunt should be undertaken to confirm that it is draining CSF. Involving a neurosurgeon for this procedure may be helpful.

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