Is laparoscopic cholecystectomy safe for acute cholecystitis in the presence of ventriculo-peritoneal shunt?

O. Damrah *, P. Naik, G. Fusai, D. Sharma

University Department of Surgery, Royal Free Hospital and University College School of Medicine, 9th Floor, Royal Free Hospital, Pond Street, London NW3 2QG, UK

A R T I C L E    I N F O

Article history:
Received 29 March 2011
Received in revised form 24 April 2011
Accepted 26 April 2011
Available online 17 May 2011

A B S T R A C T

INTRODUCTION: In patients with ventriculo-peritoneal shunts, laparoscopic procedures were previously contraindicated for the potential risks of elevating intra-cranial pressure resulting from increased intra-abdominal pressure and shunt malfunction/infection.

PRESENTATION OF CASE: Here we present a case of a patient with ventriculo-peritoneal shunt who successfully and uneventfully underwent laparoscopic cholecystectomy for acute cholecystitis without any shunt manipulation or intra-cranial pressure monitoring.

DISCUSSION: Several methods have been suggested to decrease the risks of increased intra-cranial pressure during laparoscopic cholecystectomy in patients with ventriculo-peritoneal shunts, but have not been routinely used.

CONCLUSION: Standard technique laparoscopic cholecystectomy can be safely used to manage patients with VP shunts presenting with acute gall bladder disease.

1. Introduction

Laparoscopic cholecystectomy has become the procedure of choice for managing patients presenting with acute gall bladder pathology, but its safety in the presence of ventriculo-peritoneal shunts is still controversial, due to certain physiologic sequel resulting from insufflation with carbon dioxide (CO₂) and subsequent increased intra-abdominal pressure, potentially leading to elevation in intra-cranial pressure (ICP) and shunt malfunction/infection. In this report, we present a patient with VP shunt who successfully underwent laparoscopic cholecystectomy for acute cholecystitis without any ICP monitoring or shunt manipulation, with fair outcome.

2. Case presentation

A 64 year old male patient presented with 9 h history of right upper quadrant pain radiating to the right shoulder. He was known to have symptomatic cholelithiasis for which he was awaiting elective cholecystectomy. His past medical history included sub-arachnoid haemorrhage (SAH) from anterior communicating artery aneurysm 6 years ago for which he had aneurysmal coils and a VP shunt for subsequent chronic elevated ICP. SAH had left him with residual right hemi paresis and mild cognitive impairment. On examination, he had a temperature of 38.7 °C and was tender in the right upper quadrant. There was no Jaundice. Laboratory data showed normal white blood cell count, liver function test and amylase but elevated C-reactive protein level; 269 mg/L. An ultrasound showed the previously seen gall bladder stones as well as signs of cholecystitis. The patient was started on Augmentin 1.2 g TDS and planned for emergency laparoscopic cholecystectomy.

The surgery was carried out using a standard 4-port technique. The first port access was achieved using Hasson's technique and the other ports were placed by inserting trocars under vision away from the shunt. The abdomen was insufflated with CO₂ to a pressure of 12–15 mmHg. Intra-operative findings included adhesions between the omentum and the gallbladder (but not involving the shunt) and thick gallbladder wall. Routine anaesthetic monitoring took place all through the operation without the need for ICP monitoring or special precautions. The surgery was completed laparoscopically and the shunt was seen lying free and intact at the end of the procedure. No drains were left in situ.

Following an uneventful post-operative recovery the patient was sent home 2 days after the operation. Upon follow-up, 3 months post discharge, the patient was doing well with no neurological deficit or signs of increased ICP.

3. Discussion

Increasingly, more patients with VP shunts are presenting for laparoscopic cholecystectomy, partly due to the fact that laparoscopic cholecystectomy has become the procedure of choice for surgically managing patients with cholecystitis and cholelithiasis, and also shunt placement techniques have improved lately allowing these patients to live longer.
The use of laparoscopy to manage patients with VP shunts presenting with gall bladder disease has always been controversial in view of potential raise in ICP, shunt malfunction or infection and technical difficulties. There is also the question on the need for routine monitoring of ICP intra-operatively.2

Ventriculo-peritoneal shunts are used to relieve increased ICP resulting from hydrocephalus; they consist of a catheter placed in the lateral ventricle, a reservoir, a unidirectional valve and a tube ending with a catheter lying freely in the peritoneal cavity. The unidirectional valve is designed to prevent refluxing of cerebrospinal and intra-abdominal fluids, it can withstand a pressure of up to 300 mgHg, and so a pressure of 12–15 mmHg which is used to insufflate the abdomen during laparoscopic cholecystectomy is very unlikely to produce pneumocephalus.3

Rise in ICP has been credited to rise in vena caval pressure upon insufflation of CO₂ which leads to engorgement of cerebral veins. Also hypercapnia due to the absorption of CO₂ through the peritoneal cavity and the effect of insufflation on ventilation, leads to intracranial arterial dilation and increased cerebral perfusion. Retrograde insufflation of CSF in the presence of an incompetent shunt valve and distal catheter obstruction from soft tissue during creation of pneumoperitoneum can also contribute to the potential increase in ICP.4

Many suggestions have been introduced to prevent increase in ICP; the use of lesser abdominal pressure, intra operative ICP monitoring/ventricular drainage and distal shunt catheter clamping/externalization.5,6 These methods however have not been used routinely, and laparoscopic cholecystectomy was reported to be performed successfully without the need for any modification in intra-abdominal pressure or shunt manipulation.3 Furthermore, the potential serious side effects associated with invasive ICP monitoring, like intracranial haemorrhage, far outweighs the risk of adverse effects. In addition, clamping of the VP shunt could actually exacerbate increases in ICP.

In our case, emergency laparoscopic cholecystectomy was completed successfully and uneventfully without intra-operative ICP monitoring or shunt manipulation, and routine anaesthetic monitoring appears to be safe in these cases. Care should be taken during trocar placement to avoid inadvertent damage to the shunt; this also applies to the peritoneal portion of the catheter during laparoscopy.

4. Conclusion

Standard technique laparoscopic cholecystectomy can be safely used to manage patients with VP shunts presenting with acute gall bladder disease.

Conflict of interest

None.

Funding

None.

Ethical approval

Written informed consent was obtained from the patient for publication of this case report.

Authors’ contribution

Osama Damrah and Prashant Naik contributed to study design, data collections, data analysis, and writing.

Guiseppe Fusai and Dinesh Sharma contributed to critical review.

References

1. Baskin JJ, Vishiteh AG, Wesche DE, Rekate HL, Carrion CA. Ventriculoperitoneal shunt failure as a complication of laparoscopic surgery. J Neurosurg 1998;2(2):177–80.
2. Jackman SV, Weingart JD, Kinsman SL, Docimo SG. Laparoscopic surgery in patients with ventriculoperitoneal shunts: safety and monitoring. J Urol 2000;164(4):1352–4.
3. Collure DW, Bumpers HL, Luchette FA, Weaver WL, Hoover EL. Laparoscopic cholecystectomy in patients with ventriculoperitoneal (VP) shunts. Surg Endosc 1995;9(4):409–10.
4. Al-Mufarrej F, Nolan C, Sookhai S, Broe P. Laparoscopic procedures in adults with ventriculoperitoneal shunts. Surg Laparosc Endosc Percutan Tech 2005;15(1):28–9.
5. Kimura T, Nakajima K, Wada M, Yagi M, Kawahara H, Soh H, et al. Successful laparoscopic fundoplication in children with ventriculoperitoneal shunts. Surg Endosc 2002;16(1):215.