Unexpected outcome (positive or negative) including adverse drug reactions

Acute renal failure following laparoscopic cholecystectomy

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Summary

A 67-year-old man underwent a laparoscopic cholecystectomy, which was complicated by an empyematous gallbladder. Postoperatively, he was found to have acute renal failure (evidenced by abdominal distension and pain, anuria and vomiting). This was thought to be secondary to pneumoperitoneum, an essential part of the laparoscopic procedure.

BACKGROUND

The use of minimally invasive techniques in surgery dates back as long as the 18th century, when light-containing probes were originally used for gynaecological and then urological surgery.¹ Since Moret performed the first laparoscopic cholecystectomy in 1987, minimally invasive approaches have become routine and are often the preferred method of surgery for many procedures.² Indeed, as surgeons developed their skill, they found operating times to be significantly reduced and their conversion rates to open procedures dropped dramatically; in consequence, laparoscopic cholecystectomy could now be performed as a day-case procedure.³ Arguments in favour of this include the potential for faster recovery times (because of the less traumatic approach) and, as a result, it is generally less expensive (largely on account of shorter duration of hospital stays). However, complications can lead to prolonged hospital stay and even, occasionally, result in long-term morbidity for the patient.²⁻⁴ Such complications include bile duct injury, bleeding and bile leak; any of these can result in conversion to open cholecystectomy, which occurs in 5–10% of cases.⁵⁻⁶ Other common complications include wound or systemic infection, and ileus—which can result in prolonged inpatient stay.⁶

CASE PRESENTATION

A previously fit and well 67-year-old man underwent laparoscopic cholecystectomy in September 2011. He had had one previous admission for cholecystitis 6 months previously when an ultrasound scan was performed; this had confirmed acute cholecystitis and cholangitis secondary to gallstones. His preoperative work-up was all normal. The procedure was completed laparoscopically, although it proved to be difficult due to multiple adhesions as well as an empyematous gallbladder. The operating time was 60 min. The patient received 1 litre of Hartmann's solution intraoperatively, and maintained an adequate urine output throughout the procedure. Following this, he was given no further intravenous fluids but took in 300 ml orally. During induction 40 mg of parecoxib was administered and he received no further non-steroidal anti-inflammatory drugs (NSAIDs) during his admission.

On the first postoperative day, the patient was unwell with nausea, abdominal distension and central abdominal pain. He was also anuric. Postoperative bloods revealed that he had gone into acute renal failure (creatinine 264, urea 16 and potassium 5.4). He was fluid resuscitated, and over the next few days his renal failure resolved.

On day 4, he required two units transfusion as his haemoglobin was 7.9. He developed Cullen's and Grey-Turner's sign, but CT of the abdomen ruled out a bleed. It confirmed lung consolidation, however, and he was started on antibiotics.

He was discharged home on day 8 on ferrous sulphate and a week's supply of antibiotics. He had had no further deterioration in renal function.

DISCUSSION

The development of acute renal failure following laparoscopy has been reported previously, both in patients with a history of chronic kidney disease and in patients who have later required renal replacement therapy.⁷⁻⁸ Renal failure is thought to be secondary to the pneumoperitoneum, which is essential to the laparoscopic technique but also has a profound effect on the patient's cardiovascular, respiratory, neuro-endocrine and metabolic systems.⁴⁻⁷⁻⁸ Reduced urinary output intraoperatively has been widely reported, largely owing to reduced renal tissue perfusion secondary to an increased intra-abdominal pressure (IAP) produced by central venous compression.⁴⁻⁸ IAP causes renal vasoconstriction leading to urinary sodium retention and temporary tubular renal dysfunction.⁹⁻¹⁰ These changes in IAP are often well tolerated in healthy patients. However, it has been suggested that increased operative time as well as higher IAP increases the risk of developing cardiovascular complications postoperatively.⁴⁻¹⁰ The cardiovascular risk factors of pneumoperitoneum have been highlighted for those patients with established heart disease, and indeed, an abdominal wall lift 'gasless' system has been developed in order to reduce the risk of complications secondary to pneumoperitoneum.¹⁰⁻¹¹

In the above case, the development of complications was largely unforeseeable; the patient fulfilled the criteria for suitability for day case procedure and had no history of cardiovascular or renovascular disease. Nevertheless, he

experienced increased duration of surgery due to the complexity of the procedure, and his renal failure and subsequent prolonged admission caused him to develop postoperative lung consolidation. The low fluid input intraoperatively may have exacerbated renal failure, although it is unlikely that this was the primary cause since the postoperative oral fluid intake was adequate. Furthermore, the patient received only one dose of NSAIDs which would probably not have been sufficient to cause renal failure. This case demonstrates that, even when there are no other risk factors for postoperative complications, it is important to anticipate transient acute renal failure in patients who have undergone long operative times.

Learning points

- ▶ In the above case, the development of complications was largely unforeseeable; the patient fulfilled the criteria for suitability for day case procedure and had no history of cardiovascular or renovascular disease.
- ▶ Nevertheless, he experienced increased duration of surgery due to the complexity of the procedure, and his renal failure and subsequent prolonged admission caused him to develop postoperative lung consolidation.
- ▶ This case demonstrates that, even when there are no other risk factors for postoperative complications, it is important to anticipate transient acute renal failure in patients who have undergone long operative times.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **McWhinnie D**, Ellams J, Cahill J, *et al*. Day case laparoscopic cholecystectomy. London: British Association of Day Surgery booklet, 2004. <http://www.daysurgeryuk.net/bads/joomla/files/Handbooks/LaparoscopicCholecystectomy.pdf> (accessed 12 Feb 2012).
2. **Rosen M**, Ponsky J. Minimally invasive surgery. *Endoscopy* 2001;**33**:385–66.
3. **Jaffary B**. Minimally invasive surgery. *Arch Dis Child* 2005;**90**:537–43.
4. **Muralidhar V**. Physiology of Pneumoperitoneum and Anaesthesia in Laparoscopic Surgery. *Comprehensive laparoscopic surgery*, 2007. <http://iages.org.in/media/files/chapter6.pdf> (accessed 12 Feb 2012).
5. **Ben-David B**, Croitoru M, Gaitini L. Acute renal failure following laparoscopic cholecystectomy: a case report. *J Clin Anesth* 1999;**11**:486–9.
6. **McLatchie G**, Borley N, Chikwe J. *Oxford handbook of clinical surgery*. 3rd edn. Oxford: Oxford University Press, 2011.
7. **Peters J**, Gibbons G, Innes J, *et al*. Complications of laparoscopic cholecystectomy. *Surgery* 1991;**110**:769–77.
8. **Apostolou T**, Sotsiou F, Dimitriades G, *et al*. Severe acute renal failure in a 19-year-old woman following laparoscopic cholecystectomy. *Clin Nephrol* 2004;**61**:444–7.
9. **Kirsch A**, Hensle T, Chang D, *et al*. Renal effects of CO₂ insufflation: oliguria and acute renal dysfunction in a rat pneumoperitoneum model. *Adult urol* 1994;**4**:453–9.
10. **Cuschieri A**. Technology for Minimal Access Surgery. *BMJ* 1999;**319**:1304.
11. **Koivusalo A**, Kellokumpu I, Lindgren L. Gasless laparoscopic cholecystectomy: comparison of postoperative recovery with conventional technique. *Br J Anaesth* 1996;**77**:576–80.

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