The acute surgical unit as a novel model of care for patients presenting with acute cholecystitis

Abstract

Objective: To determine whether the introduction of an acute surgical unit (ASU) resulted in a greater proportion of patients with acute cholecystitis receiving definitive surgery on index admission with no adverse change in surgical outcomes.

Design, setting and participants: A retrospective study of medical records for patients presenting to Nepean Hospital with acute cholecystitis during the 2 years before and 2 years after introduction of an ASU in November 2006.

Main outcome measures: Time to diagnosis, timing of surgical intervention, surgical outcomes, duration of total admission and complication rates.

Results: A total 271 patients were included in the study (114 pre-ASU, 157 post-ASU). After introduction of the ASU, a higher proportion of patients had surgery on index admission (89.8% v 55.3%; \( P < 0.001 \)) and there were decreases in median time to diagnosis (14.9 h v 10.8 h; \( P = 0.008 \)), median time to definitive procedure (5.6 days v 2.1 days; \( P < 0.001 \)), median duration of total admission (4.9 days v 4.0 days; \( P = 0.002 \)), rate of intraoperative conversion to open surgery (14.9% v 4.5%; \( P = 0.003 \)) and rate of postoperative infection (3.5% v 2.5%; \( P = 0.40 \)).

Conclusion: Introduction of the ASU at Nepean Hospital resulted in significant improvements in care and outcomes for patients with acute cholecystitis.

Methods

A retrospective study of medical records for patients presenting to Nepean Hospital with acute cholecystitis was conducted over a 4-year period (1 November 2004 to 30 October 2008) — the 2 years before and 2 years after introduction of the ASU (Box 1). The study was approved by the Sydney West Area Health Service Ethics Committee.

Patients were included if they presented with a history and clinical signs consistent with a diagnosis of acute cholecystitis, confirmed by ultrasound findings of gallstones and associated ultrasound signs of gallbladder inflammation. Patients with biliary tree obstruction (jaundice, cholangitis or biliary pancreatitis) were not included.

Two linked databases were set up to de-identify the data. Data were collected on age, sex, date and time of presentation to the emergency department, date and time of assessment by the surgical team, date and time of diagnosis, whether surgery was performed on index admission, date of discharge from hospital, whether surgery commenced during daylight hours (defined as 8 am to 5 pm), intraoperative conversion to open surgery, and postoperative complications.
Results

A total of 271 consecutive patients met the inclusion criteria; 114 presented before the ASU was introduced and 157 presented after. The key results are summarised in Box 2. The median age was 44.4 years (range, 14–85 years) in the pre-ASU group and 45.1 years (range, 14–89 years) in the post-ASU group ($P = 0.01$) and there were more females in both groups.

Before the introduction of the ASU, the proportion of patients who had surgery on index admission was significantly lower (55.3% v 89.8%) and the proportion of patients for whom surgery commenced during daylight hours was significantly lower (82.5% v 91.7%).

After the introduction of the ASU, there were significant decreases in the median time to diagnosis (14.9 hours v 10.8 hours), median time to definitive procedure (5.6 days v 2.1 days) and median duration of total admission (4.9 days v 4.0 days). There was also a significant reduction in the rate of intraoperative conversion from laparoscopic to open surgery (14.9% v 4.5%). No significant changes in the rates of postoperative complications were found.

Discussion

Introduction of the ASU model of care at Nepean Hospital meant that most patients who presented with acute cholecystitis had surgery on index admission, compared with just over half of those who presented before the model was introduced.

The ASU model also resulted in more rapid diagnosis and earlier surgery (3 days earlier in the admission on average). Although more patients had definitive surgery on index admission, the overall hospital stay was almost a day shorter. These improved efficiencies are due to the model being consultant-led and having a dedicated team available throughout the day to assess and treat patients. Another improvement in patient care was the increase in the proportion of patients who had surgery during daylight hours. Recent studies have highlighted that operating outside of daylight hours is associated with impairments in speed, accuracy and dexterity that contribute to potentially life-threatening errors.13–15

A significant reduction in the conversion rate from laparoscopic to open surgery was also shown. This is likely to result in patients returning to normal activities more rapidly, although we did not assess this. A possible reason for the reduced conversion rate under the ASU model is that surgery is done on patients who have a less severely inflamed gallbladder. This could be due to surgery being performed sooner during the index admission — before the development of severe inflammation that results in conversion. Furthermore, during the pre-ASU period, patients with less severe inflammation that resolved with non-operative treatment were discharged rather than having surgery performed during the index admission.

Introduction of the ASU at Nepean Hospital resulted in significant improvements in patient outcomes and hospital efficiencies relating to acute cholecystitis. Our results support the development of new models of care for surgical patients and offer significant advantages for patients and the health care system.

Competing interests: No relevant disclosures.

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