The problem with emergency laparotomies

Emergency laparotomies are common operations, performed for a wide variety of emergency general surgical indications. In England alone at least 30 000 are performed annually, and there are in excess of 600 000 unplanned admissions for emergency general surgical conditions (Shapter et al, 2012).

Unfortunately, death after an emergency laparotomy is common: 30-day mortality rates of up to 18% have been reported internationally in mixed cohorts and mortality rates are considerably higher in subpopulations, including older people and those with chronic comorbidity (Vester-Andersen et al, 2014). Up to a third of patients are estimated to suffer a postoperative complication after an emergency laparotomy and both critical care admissions and prolonged hospital stay are common and have significant financial implications (Sorensen et al, 2007; Shapter et al, 2012). Little is currently known about other outcomes including long-term morbidity and quality of life after surgery.

Concerns about the quality of care received by emergency general surgical patients and those undergoing an emergency laparotomy have been highlighted only in the last decade, with several multidisciplinary recommendations and standards of care designed to safeguard the quality of care of all patients undergoing these operations being published (Association of Surgeons of Great Britain and Ireland, 2007, 2009; National Confidential Enquiry into Patient Outcomes and Death, 2007; Royal College of Surgeons of England, 2011; Royal College of Surgeons of England and Department of Health, 2011). Before this, the high mortality rate associated with emergency laparotomies may not have been appreciated, or was accepted because it was perceived to be inevitable. Furthermore, because the clinical pathway is complex in emergency general surgery, requiring input from clinicians across multiple specialties, improvement was limited because coordinated and sustained change was required across different clinical teams.

However, in an audit of the care of almost 2000 emergency laparotomy patients in 2010–11, the Emergency Laparotomy Network demonstrated considerable inter-institutional variation both in processes of care (e.g. consultant involvement and intensive care bed use) and unadjusted short-term mortality after emergency laparotomy (Saunders et al, 2012). These findings suggested that the high mortality rates might be reduced if the care delivered by the best performing institutions could be reproduced at other hospitals.

Organizational factors that may be associated with postoperative patient outcomes, and account for inter-institutional variation, may be classified as either processes of care delivery or a hospital's structural factors that underpin the processes (Donabedian, 1966). Minimum structural provisions and processes of care that hospitals should provide in order to ensure high quality care of emergency general surgical patients are specified in the aforementioned published recommendations and standards.

National Emergency Laparotomy Audit

The National Emergency Laparotomy Audit (NELA), funded by NHS England and commissioned by the Healthcare Quality Improvement Partnership (HQIP) in 2011, has developed rapidly as a consequence of the enthusiastic support of participating NHS staff across England and Wales. During the first year of the patient audit (2013–14) more than 190 hospitals contributed data on over 20 000 patients undergoing an emergency laparotomy.

These data included patient characteristics, delivered care and patient outcomes at an individual patient level. A custom designed webtool questionnaire (https://data.nela.org.uk) was created to collect key data reflecting contemporary standards of care and recommendations, while also minimizing the burden on participating staff.

The first NELA patient audit report, published in June 2015 (NELA Project Team, 2015), demonstrated for the first time that, despite the apparent momentum for improved care of emergency laparotomy patients, there is considerable variation in the delivery of many processes of care when compared to published standards (*Table 1*). Variation in the level of care received by patients was observed between hospitals, depending on whether risk had been documented before surgery, and by time of day of hospital admission or of surgery.

The findings of the patient audit support those of the first NELA organizational audit (NELA Project Team, 2014), which demonstrated substantial variation between hospitals in the provision of facilities required to underpin high quality care. This included 24-hour provision of the following:

1. Fully staffed operating theatres in which emergency laparotomies may be performed
2. Contemporaneous computed tomography reporting
3. On-site interventional radiology and endoscopy teams.

Table 1. Key findings of the first National Emergency Laparotomy Audit (NELA) patient audit

Delivered care did not match published standards at a substantial proportion of hospitals in the following areas:
Early decision-making by senior clinicians
Prompt antibiotic administration for patients admitted with peritonitis
Assessment and appreciation of an individual's risk of death
Consultant-led care
Timeliness of surgery
Postoperative critical care utilization
Consideration of the needs of older people

The key structural provisions against which hospitals were assessed in the organizational audit were identified from the contemporary recommendations and standards of care.

Patient outcomes after emergency laparotomy

In this largest prospective cohort of patients undergoing emergency laparotomies, 30-day inpatient mortality was 11%. This apparent reduction from the 15% mortality typically reported in previous cohorts could reflect improvements in the quality of care in England and Wales over the past 5 years, but this needs to be independently verified using mortality data from the Office for National Statistics that were not available at the time of publication. It is possible that the currently available participant-reported mortality may underestimate the true incidence. What is already clear is that many hospitals in England and Wales currently deliver care to patients undergoing emergency laparotomies that does not meet published standards. However, the fact that each standard is achieved in at least one hospital demonstrates that these goals are achievable within today's NHS.

The future

While the NELA data provide, for the first time, a comprehensive picture of the care of patients undergoing emergency laparotomy, the real value of NELA is as a catalyst for quality improvement. Publication of the findings of the NELA organizational and patient audits continues to drive discussion at local, regional and national level regarding how best to address shortfalls in the delivery of high-quality care to these emergency laparotomy patients.

NELA directly supports and encourages local data reporting and quality improvement work through the provision of graphing functionality of local and national data (available via the NELA webtool).

Large trials of quality improvement initiatives in emergency laparotomy are currently underway (including the Enhanced Peri-Operative Care for High-risk patients (EPOCH) trial) and it is anticipated that the results of these studies will continue to drive the momentum for improving care for emergency laparotomy patients.

Financial incentives for trusts meeting quality targets have been successful in fractured neck of femur surgery and a Commissioning for Quality and Innovation award has been introduced for timely care of patients with sepsis. This approach may be another means of facilitating the provision of high-quality care to all patients undergoing an emergency laparotomy.

Conclusions

Emergency laparotomy surgery is associated with a high incidence of adverse outcomes and substantial variability in the care received by patients. Local quality improvement, driven by NELA's nationally collected benchmark process and outcome data, offers a means of continually improving the quality of care delivered to these patients. The potential impact of focussed targets and incentives and 7-day working is uncertain, but may serve to promote better care and thereby further improve outcomes in this clinically challenging group of patients.

For further information please visit www.nela.org.uk. **BJHM**

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KEY POINTS

- Emergency laparotomies are commonly performed, but associated with high morbidity and mortality.
- Mortality rates may vary up to eight-fold between hospitals in the UK.
- The National Emergency Laparotomy Audit (NELA) has demonstrated substantial variation in fundamental processes of care received by patients.
- Hospitals can access their own NELA data for local quality improvement.
- Financial incentives and targets may help to promote better care and improve patient outcomes.