

Emergency Laparotomy: Achieving better patient outcomes

Catherine Sayer

Auckland City Hospital

Emergency laparotomy may be defined as non-elective, non-trauma related, open (+/- laparoscopic) procedures on the GI tract (excluding appendicectomy, cholecystectomy). It is a common procedure, with approximately 150-200 cases per year at Auckland City Hospital. All anaesthetists who participate in acute work will come across these cases frequently. This is one of the highest risk procedures that we do, with a mortality risk of approximately 15% in all-comers and 24% in over 80s¹. Despite the high risk there are few clear guidelines regarding management, in stark comparison to other high risk areas such as the cardiac patient for non-cardiac surgery.

This presentation will look at quality improvement projects for this group of patients in other countries, risk assessment to aid management, and suggested pathways of care, including goal directed therapy. It will also look at retrospective data from Auckland City Hospital and discuss how we can better capture data for New Zealand as a whole which we may then use to improve care.

QA projects in other countries

In the UK there is an ongoing National Emergency Laparotomy Audit which is an anaesthesia led initiative being carried out by the National Institute of Academic Anaesthesia's Health Services Research Centre on behalf of the Royal College of Anaesthetists². It originated from the Emergency Laparotomy Network which recognised that there were wide variations in management and outcomes within the UK¹. The scale of this project is impressive; all 191 NHS hospitals which carry out acute work are involved, and the audit is planned to run for 3 years in total. The standards of care to be audited are outlined in the organisational report³ and include:

- ▶ The timely review by a senior surgeon following admission
- ▶ A formal assessment of risk of death
- ▶ A pathway of defined peri-operative care
- ▶ The prompt administration of antibiotics
- ▶ The ready availability of diagnostic investigations
- ▶ Prompt access to an operating theatre
- ▶ Surgery performed under the direct care of a consultant surgeon and consultant anaesthetist
- ▶ The admission of high-risk patients to a critical care unit following surgery

In the US, the American College of Surgeons runs the National Surgical Quality Improvement Programme which has a broader focus but also aims to collect data to drive improvements in the quality of care⁴.

Risk assessment

Risk assessment may be used to aid decision making regarding;

- ▶ The most appropriate surgical procedure
- ▶ Possibility of non-operative management
- ▶ Level of monitoring required
- ▶ Patient placement post-op
- ▶ Consent discussions with the patient and their family

Risk Scoring

There are a number of risk scores which may be used to predict surgical risk. In the UK, POSSUM and P POSSUM are widely used^{5,6} and are available in an easy to use web based calculator⁷. These scores are used as part of the data collection for NELA to define a 'high risk' patient (>5% hospital mortality).

NSQIP has developed a multi procedure web based risk calculator based on data collected between 2009 and 2012⁸. This predicts mortality and morbidity in 8 specific fields, including discharge to nursing or rehab facility, and has a results page including graphical illustrations to facilitate communication of risk prediction to the patient⁹.

Individual institutional risk calculators have also been developed which may be more relevant to the practising anaesthetist.

A documented risk score may also help to focus attention on the highest risk patients so that they receive appropriate senior input.

Ageing and Frailty

There is little doubt that with increasing age, perioperative risk also increases. However, we are all aware of the concept of 'physiological age' compared with chronological age, and this is not fully captured in available risk scoring. In recent years there has been increasing interest in the concept of frailty in care of the elderly circles.

Multiple definitions are available but Fried's definition, otherwise known as the Cardiovascular Health Study Index is most widely accepted. This uses the following parameters:-

- ▶ Weight loss (≥ 5 percent of body weight in last year)
- ▶ Exhaustion (positive response to questions regarding effort required for activity);
- ▶ Weakness (decreased grip strength)
- ▶ Slow walking speed (gait speed) (> 6 to 7 seconds to walk 15 feet)
- ▶ Decreased physical activity (Kcals spent per week: males expending < 383 Kcals and females < 270 Kcal).

Frailty is considered predictive of adverse health outcomes in the general population¹⁰. More recently there has been increasing interest in frailty as a prognostic indicator in the surgical literature and the evidence base to support frailty as a predictor of postoperative complications continues to grow^{11,12}. This evidence is mainly focused on elective procedures currently but it would seem reasonable to extrapolate to acute procedures. The REASON study¹³ would lend support to this theory with its finding that hypoalbuminaemia, which is included in some frailty scores, is associated with increased mortality.

Pathways for management

Standardised pathways are likely to improve overall care. Pathways need to be institution specific to take account of local resources, expertise and practice. An example from Nottingham University Hospitals is available on the internet¹⁴ This includes:-

- ▶ Initial risk assessment – history, examination, investigations. Risk scoring and delineating high risk patients
- ▶ Recognise and treat sepsis
- ▶ Explicit timelines for high risk vs low risk patients
- ▶ If predicted mortality $> 10\%$ Consultant anaesthetist and Surgeon involvement mandatory
- ▶ Consider cell salvage
- ▶ Make a postoperative plan
- ▶ Involve critical care
- ▶ Consider antifungal therapy
- ▶ Use goal directed therapy (this is controversial, see below)
- ▶ Anticipate coagulopathy
- ▶ Avoid prolonged surgery in elderly
- ▶ Consider NGT/NJT
- ▶ Postop risk scoring
- ▶ Any laparotomy patient operated on out-of-hours who does not go to critical care should be cared for on a level 1 unit or extended recovery
- ▶ Proforma for documentation with prompts for each step

Fluid management and goal directed therapy

In recent years there has been a move towards restrictive fluid management practices for elective GI surgery. Although widely accepted, the evidence is mixed and the RELIEF trial, led by Paul Myles¹⁵ is underway to examine this issue. (If any other centres are interested in being involved they would be welcomed, please contact Tim Short, tims@adhb.govt.nz).

Cardiac output monitoring and goal directed therapy have been adopted with enthusiasm in some centres, most notably in the UK, in elective patients. Evidence for this is mixed and it remains controversial. There is very little literature about goal directed therapy in emergency laparotomy although theoretically it is attractive in this group of patients. Unfortunately an ideal monitor is yet to emerge.

In terms of type of fluid used, in our institution there has been a resurgence in 4% Albumin use because of the controversy around starches, and Plasmalyte is used in preference to N/Saline, at least in the theatre environment.

Auckland City Hospital data

2 years worth of data for 828 patients coded as having had an emergency laparotomy (using the NELA exclusion criteria) was retrospectively analysed. It is likely that this data is 'dirty' and includes a number of patients who do not truly fit the criteria. Our data show similar patterns to the UK data, with 30 day mortality of 8% in all comers and 19% in patients >80. The primary surgeon was a consultant in 50% and the primary anaesthetist was a consultant in 33%. 21% of patients were admitted to the Department of Critical Care/HDU.

Whilst interesting, these data cannot be used to draw conclusions regarding care as without examining the medical records of the individual patients it is not possible to verify the details.

I plan to undertake a prospective audit of emergency laparotomies performed at ACH to better understand our care pathways and management of this high risk group of patients. In the long run I believe that it would be valuable to set up a NZ-wide audit to collect more data and to encourage collaboration between institutions. I would welcome interest from specialists in other centres who would like to be involved with this. Please contact me at csayer@adhb.govt.nz.

References:

1. Saunders DI, Murray D, Pichel AC, Varley S, Peden CJ. Variations in mortality after emergency laparotomy: the first report of the UK Emergency Laparotomy Network. *BJA* 2012;109(3):368-75
2. www.nela.org.uk
3. NELA Organisational Audit Executive summary and full report available at www.nela.org.uk
4. www.sie.acsnsqip.org
5. Copeland GP, Jones D, Walters M. POSSUM: a scoring system for surgical audit. *Br J Surg* 1991;78:355-60
6. Whitely MS, Prytherch DR, Higgins B, Weaver PC, Prout WG. An evaluation of the POSSUM surgical scoring system. *Br J Surg* 1996;83:812-15
7. www.riskprediction.org.uk
8. Bilimoria KY, Liu Y et al. Development and evaluation of the universal ACS NSQIP surgical risk calculator: a decision aid and informed consent tool for patients and surgeons. *J Am Coll Surg*. 2013 Nov;217(5):833-42
9. www.riskcalculator.facs.org
10. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J, Seeman T, Tracy R, Kop WJ, Burke G, McBurnie MA. Frailty in Older Adults: Evidence for a Phenotype. *Journal of Gerontology* 2001; 56A(3):M146-M156
11. Tan K, Kawamura YJ, Tokomitsu A, Tang T. Assessment for frailty is useful for predicting morbidity in elderly patients undergoing colorectal cancer resection whose comorbidities are already optimized. *Am J Surg* 2012; 204:139-43
12. Robinson TN, Wu DS, Pointer L, Dunn C, Cleveland JC, Moss M. Simple frailty score predicts postoperative complications across surgical specialties. *Am J Surg* 2013;206:544-50
13. Story DA, Leslie K, Myles PS, Fink M, Poustie SJ, Forbes A, Yap S, Beavis V, Kerridge R. Complications and mortality in older surgical patients in Australia and New Zealand (the REASON study): a multicentre, prospective, observational study. *Anaesthesia* 2010;65:1022-30.
14. <https://www.nuh.nhs.uk/handlers/downloads.ashx?id=41117>
15. www.relief.org.au