

Commentary

The Elderly Emergency Laparotomy Patient – More Than Just the Operation

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Abstract

The elderly patient presenting with an acute surgical abdomen or bowel obstruction has become a common and challenging situation. These patients bring comorbidity and frailty that necessitate appropriate risk assessment and comprehensive perioperative management. Robust communication is required between patients, families and health professions. The Australia and New Zealand Emergency Laparotomy Audit-Quality Improvement (ANZELA-QI) study is based on the United Kingdom's National Emergency Laparotomy Audit (NELA) and will gather large scale data, providing hospital-level information to enable clinicians to reduce variation in management. Successful management of the elderly laparotomy patient requires close coordination between surgeons, anaesthetists and physicians. The ANZELA-QI study will help establish the role of collaborative models of care and the need for perioperative care teams.

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Introduction

The emergency laparotomy is an operation of the elderly patient with a rise in mortality as age increases.^{1,2} Half of patients in the United Kingdom (UK) requiring an emergency laparotomy are over 70 years old and of these, 20% will die within 30 days.³ An emergency laparotomy in the elderly is a potentially lifesaving procedure, but patients can suffer major morbidity including respiratory failure,⁴ cardiovascular complications, delirium and functional decline.⁵ In the Singaporean context, chronic disease and cognitive deficits have been shown to correlate with higher rates of patient disability.⁶ Given the high mortality associated with this cohort of patients, the decision to proceed to emergency surgery is a complex one and requires balanced consideration of the patient, their families, medical and surgical factors.

Improving the outcomes of laparotomy patients can be made through timely and appropriate risk assessment, rapid diagnostic computed tomography scanning, early administration of antibiotics and fluids, consultant surgeon and anaesthetist presence and theatre access.⁷

Quality improvement projects have demonstrated improved outcomes^{2,7} including a reduction in length of stay and cost savings.²

ANZELA-QI Study

The Australian and New Zealand Emergency Laparotomy-Quality Improvement (ANZELA-QI) study is a binational, multicentre prospective audit and is modelled on the UK's National Emergency Laparotomy Audit (NELA) and the Emergency Laparotomy Pathway Quality Improvement Care (ELPQuIC) study. Its aim is to capture demographic

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and quality improvement data on emergency laparotomy patients. Collected data will be reported back to participating hospitals on a monthly basis with an intention of improving patient outcomes and resource utilisation.^{2,7} Sixty-two sites commenced data collection in July 2018. The database is co-led by the Royal Australian College of Surgeons and the Australian and New Zealand College of Anaesthetists, with formal collaboration from the Australian and New Zealand Society for Geriatric Medicine, Australian and New Zealand Societies of General Surgery and Anaesthesia, the College of Intensive Care Medicine of Australia and New Zealand, and the College of Accident and Emergency Medicine.

The Acute Abdomen Presentation and Risk Assessment

The American Society of Anesthesiologists' classification remains a stalwart predictor of perioperative mortality but other methods to augment the assessment are being researched. Frailty has been shown to predict outcomes in both the critically unwell⁸ as well as in the surgical setting.⁹ The Clinical Frailty Scale (CFS)¹⁰ is being utilised more frequently. This is a quick and easy visual scale with validation in general surgical⁹ and colorectal surgery¹¹ settings. Australian research has shown it can be used by junior medical staff, providing good correlation with patient functional decline and mortality.¹²

The CFS is helpful in determining which patient will benefit from a comprehensive geriatric assessment (CGA) and may be a useful trigger for geriatrician referral. Models of care based on the CGA have been shown to reduce complications and length of stay.¹³ Geriatrician review may also aid the complex decision regarding suitability for surgery as well as assist in establishing advanced care directives and the coordination of subspecialty, nursing and allied health care staff.

The CFS is being collected as part of the ANZELA-QI study and research to determine its role in the elderly laparotomy patient which may establish the importance of multidisciplinary teams in this setting.

There are a number of surgical risk assessment tools in current use in the emergency laparotomy setting. The Portsmouth-Physiological and Operative Severity Score for the Enumeration of Mortality and Morbidity (P-POSSUM) has been used since the inception of the NELA study. The National Surgical Quality Improvement Program (NSQIP) risk calculator can also be used to inform clinicians and patients of morbidity and mortality associated with elective and emergency surgery. The NELA risk calculator was derived from 43,000 emergency laparotomies carried out in the UK between 2014 to 2016. This has been shown to be more accurate than the P-POSSUM score at predicting mortality.¹⁴ This calculator provides a 30-day mortality

risk assessment and can be used to identify patients who require consultant surgical and anaesthetic attendance in theatre and critical care services postoperatively. The use of risk calculators is invaluable in helping to limit variation.

Resuscitation

The elderly patient is particularly vulnerable to sepsis and requires early recognition and aggressive resuscitation.¹⁵ Sepsis has been shown to be a major contributor to emergency laparotomy mortality.¹⁶ Organ dysfunction can be quantified by the Sequential Organ Failure Assessment (SOFA) score. Sepsis should be suspected with 2 or more of the following criteria: respiratory rate $>22/\text{min}$, altered mentation and a systolic blood pressure ≤ 100 mmHg (in-hospital mortality = 10%).¹⁷

Choice of fluid therapy in sepsis is an area of ongoing research. The last 20 years have produced a number of trials that have not shown clear benefit of one fluid regime over another.^{18,19} Particular attention to the elderly emergency laparotomy patient and fluid resuscitation is another potential area for research.

During the resuscitation period, attention should be focused on rapid assessment and in defining surgical goals. Elderly patients may present with an acute abdomen on a background of end-stage comorbidity and history of progressive functional deterioration. Skilful and timely discussion amongst surgical, anaesthesia and intensive care consultants on the appropriateness of surgery is vital. Geriatricians can help with advanced resuscitation planning but challenges exist in the provision of geriatrician specialists with only a minority of patients in the UK NELA audit receiving geriatrician input.²

Intraoperative Considerations

Intraoperative blood pressure targets,²⁰ avoidance of deep levels of anaesthesia as assessed by a depth of anaesthesia monitor,²¹ the principles of enhanced recovery in emergency surgery,²² opioid minimisation strategies such as the use of lignocaine infusions, ketamine, epidurals, rectus sheath catheters and transverse abdominis plane blocks^{23,24} are all important considerations. Despite restrictive therapy being embedded in many enhanced recovery pathways, a recent large scale randomised control trial assessing liberal versus restrictive fluid regimes in elective abdominal surgery found restrictive fluid regimens lead to higher rates of renal failure and surgical site infections.²⁵ Whilst emergency laparotomy patients were excluded from this study, it is interesting to contemplate the implications for the elderly emergency laparotomy patient given the frequency of sepsis and dehydration seen in this cohort.

Postoperative Care

Despite cardiovascular outcomes being well documented in perioperative medicine, postoperative pulmonary complications (PPCs) including atelectasis and hospital-acquired pneumonia are more common after abdominal surgery.²⁶ A major risk factor for aspiration is the development of an ileus. Techniques to minimise ileus can be found in the implementation of enhanced recovery programmes and would include an opioid-sparing analgesic regime, minimising bowel handling intraoperatively, defunctioning procedures and early mobilisation. Recent Australian research has shown a significant reduction in PPCs after preoperative physiotherapy assessment and training for deep breathing exercises.²⁷

The elderly emergency laparotomy patient is at risk of acute kidney injury (AKI) because of pre-existing renal dysfunction, dehydration, sepsis and polypharmacy. AKI is independently associated with mortality.²⁸ Research into the role of goal-directed fluid resuscitation in emergency laparotomies is currently underway.²⁹ Recent research suggests cessation of angiotensin receptor 2 blockers or angiotensin converting enzyme inhibitors may reduce patient mortality in major non-cardiac surgery.³⁰

Elderly patients are vulnerable to delirium³¹ with significant implications in patient length of stay,³¹ complications³² and mortality.³³ Fast-track or enhanced recovery surgery, regional anaesthetic, bispectral index-guided depth of anaesthesia, melatonin and dexmedetomidine are interventions that show promise but remain unproven. Preoperative psychotropic use to shorten episodes of delirium has been successful but requires further validation.³⁴ Non-pharmacological interventions such as early removal of urinary catheters, drains and cannulas, the presence of family members, adequate pain control and reorientation by ward staff are seen as the mainstays of delirium management. Programmes such as the Hospital Elder Life Program can provide guidance as to a set of interventions to help minimise delirium in the surgical setting.³⁵

Another postoperative syndrome that can affect the elderly emergency laparotomy patient is myocardial injury after non-cardiac surgery (MINS). This is most commonly diagnosed by routinely performing troponin testing after surgery during the first 3 postoperative days. MINS has been shown to be associated with a significant increase in 30-day mortality in non-cardiac surgery.³⁶ Strategies to minimise MINS are currently being investigated and include the use of dabigatran in the context of postoperative myocardial injury.³⁷ Current guidelines have yet to commit to routine postoperative troponin testing.

Elderly patients require comprehensive support to maintain sufficient oral intake in the postoperative setting.³⁸

Prolonged bed rest when critically unwell has been shown to result in significant muscle mass loss.³⁹ Appropriate physiotherapist and nursing support to mobilise patients early is vital in the care of elderly laparotomy patients.

Elderly patients are at risk of hospitalisation-related complications such as pneumonia and urinary tract infections, which have been shown to contribute to prolonged length of stay in the Singaporean context.⁴⁰ Physician and surgical coordination is required to mitigate the risk of such complications.

Conclusion

Emergency laparotomy in the elderly patient is a high-risk operation undertaken in a vulnerable cohort. Careful risk assessment, resuscitation and postoperative care require close coordination between surgeons, anaesthetists and physicians. Care is required to engage patients and families to establish clear goals of care. ANZELA-QI has been established with the aim of improving patient outcomes through college-level collaboration and quality improvement strategies.

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