Knowing the risk? NCEPOD 2011: a wake-up call for perioperative practice

The high-risk surgical population comprises a minority of cases but accounts for the majority of postoperative complications and deaths. The most recent National Confidential Enquiry into Patient Outcome and Death review of these patients found highly variable standards of care and made several recommendations for change.

The high-risk surgical population accounts for a minority of cases but is responsible for the majority of postoperative complications, prolonged hospital admissions and deaths (Pearse et al, 2006). The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) has conducted a review into the care of this high-risk population entitled *Knowing the Risk* (NCEPOD, 2011). Highly variable standards of care were identified. A raft of recommendations are made which have profound implications for junior doctors, consultants and NHS trusts alike.

Complications that occur within 30 days of a surgical procedure are the most important determinant of long-term survival (Khuri et al, 2005). The UK high-risk general surgical population contributes 83.8% of surgical deaths, but accounts for just 12.5% of surgical procedures (Pearse et al, 2006). Under-provision and/or utilization of critical care beds are associated with worse outcomes (Jhanji et al, 2008). In contrast the mortality rate following cardiac surgery is lower. Cardiac surgery patients are subject to detailed preoperative investigation and extended perioperative monitoring. Therefore, the identification and perioperative management of high-risk surgical patients may improve their clinical outcome.

National Confidential Enquiry into Patient Outcome and Death

NCEPOD is an independent company, commissioned by the Academy of Medical Royal Colleges and the Department of Health to produce reports which aim to improve the delivery of UK health care. These reports are produced by a select expert panel and consist of an audit-based review of current practice, commentary and recommendations. Early reports targeted the surgical population and were responsible for such changes as the provision of 24-hour emergency theatres and the delivery of emergency surgical care by consultants. NCEPOD has been renamed on several occasions as its remit has expanded over the past 24 years.

Recent reports have covered a broad range of topics, including the prevention of acute kidney injury in hospital and complications relating to chemotherapy administration. *Knowing the Risk* sees the focus return to surgery and is the first NCEPOD report to gather data prospectively. Whereas previous reports were essentially enquiries into negative outcomes, this approach provides a snapshot of the current standard of perioperative care across the NHS.

Knowing the Risk

Knowing the Risk (NCEPOD, 2011) audited all patients over 16 years of age who were undergoing defined elective and emergency surgery over a 1-week period in August 2010. An organizational data set, via a questionnaire to each hospital, and a prospective data set of patient cases were collected. A total of 36 699 cases were recorded (19 097 study forms were returned). Each patient's anaesthetist was asked to preoperatively define whether the patient was high risk. An expert committee retrospectively reviewed the majority of high-risk cases. Overall care was rated on a categorical scale ranging from 'good' to 'less than satisfactory'. Specific questions, including adequacy of fluid management, were also addressed. The findings are alarming: a raft of recommendations are made, with implications for the entire perioperative community.

Defining the high-risk surgical patient

The absence of objective consensus criteria and the lack of measurement of patient outcomes was a key finding of *Knowing the Risk* and clearly hampers the delivery of effective perioperative care. There was widespread disagreement among all parties as to what constituted the high-risk patient. Anaesthetists classified 20% of their patients as high risk, while the expert panel found this to be an overestimate. The authors supported the development of a robust risk assessment tool which could guide informed consent and estimate individual patient risk. A national data collection system for surgical patients, similar to the Intensive Care National Audit and Research Centre data set and the American College of Surgeons National Surgical

Dr David Cain *is Academic Clinical Fellow and* **Dr Gareth Ackland** *is Clinician Scientist and Consultant, The Wolfson Institute, University College, London WC1E 6BT*

Correspondence to: Dr G Ackland (g.ackland@ucl.ac.uk)

Quality Improvement Programme, would allow UK-wide comparison of patient outcomes and modification of scoring systems to describe local populations. Ongoing studies such as VISION-UK, which is collecting morbidity data as part of the larger international VISION 'Vascular events In noncardiac Surgery patIents cOhort evaluatioN' (clinical trials.gov NCT00512109) study, will deliver important data to help inform these questions.

A wake-up call to the perioperative community

Beyond disagreement over what constitutes higher risk, the expert panel classified care as less than 'good' in over half of examined cases. The high-risk group identified by the expert panel had a mortality rate of 6.9%, and accounted for 79% of all perioperative deaths. One in five non-elective high-risk patients dies within 30 days of admission. Perioperative complications were identified in 213 (26%) of the 829 high-risk patients reviewed by the expert panel. The expert panel felt that these complications affected outcome in 56 (26%) of cases. Urgent surgery accounted for 21% of all operations, and immediate surgery for 2%. The 30-day mortality rate, regardless of preoperative risk classification, was 5.1% in urgent cases and 13.6% in immediate cases. Three principal reasons for substandard care were identified:

Preoperative assessment

Preoperative assessment allows chronic disease to be optimized (McFalls et al, 2004) and facilitates critical care admission planning. It also provides an opportunity for a frank discussion with patients concerning their individual risk and consideration of alternative management strategies to surgery. Anaesthetic and surgical preoperative assessment clinics were not provided by 16% and 17% of hospitals respectively. Consequently 18% of high-risk elective patients did not attend a preassessment clinic. Elective patients not seen within a preassessment clinic had a higher 30-day mortality rate (4.8%) compared with 0.7% for patients who had attended preoperatively. NCEPOD recommends an increase in preassessment clinics to be guided by local assessment of high-risk patient workload, including appropriate assessment for non-elective admissions.

Critical care

Only 22% of high-risk patients were admitted to critical care immediately postoperatively. The expert panel identified that 8.3% of patients who should have attended a critical care facility did not do so. The anaesthetist was asked whether he/she was concerned about the post-recovery discharge location of the patient. In cases of concern the mortality rate was higher (5.0%) than in cases not of concern (1.4%). This suggests that failure to admit to critical care was, in part, the result of bed space availability. In total 79.5% of NHS hospitals had critical care facilities on site, 34% of hospitals did not provide a critical care outreach system, and 12% of hospitals did not operate early warning systems. These systems score derangement of routine physiological parameters such as respiratory rate and temperature. They are nurse led, and upon reaching a threshold level instruct that the patient's doctors are informed or advise critical care referral.

Specific interventions

Various perioperative interventions shown to improve outcomes, including enhanced recovery programmes, are the subject of national recommendations. The provision of 24-hour emergency theatres has been stipulated by several previous NCEPOD reports, yet 27.5% of hospitals surveyed did not provide this service. Shortfalls were also identified in the delivery of deep vein thrombosis prophylaxis.

Both British consensus perioperative fluid guidelines (Powell-Tuck et al, 2009) and those from the National Institute for Health and Clinical Excellence (2011) support the use of minimally invasive flow-guided technology to guide fluid therapy in the intraoperative period. NCEPOD (2011) reported that 30-day mortality was substantially higher in those patients that the expert committee considered to have had inadequate preoperative fluid management (20.5%) compared to those who had received adequate management (4.7%). The report recommends that fluid management for high-risk patients should be performed within higher level care areas. Specifically, this would require a major change in the organization of perioperative care services to facilitate flow-based measurements of cardiac output, which are associated with improved outcomes compared to measuring standard physiological parameters (Hamilton et al, 2011). Consistent with previous reports of variable standards of nutritional care (Stewart et al, 2010), only 6.1% of hospitals had a documented assessment of nutrition.

Conclusions

Current UK perioperative practice is characterized by highly variable practice. At its worst extreme, patients with significant comorbidity requiring urgent surgery (e.g. perforated viscus) are frequently managed by junior surgical, medical and anaesthetic staff without adequate, monitored fluid management. Postoperatively, the absence of, or limited, specialist input exacerbates the pathophysiological sequelae of inadequate pain management, fluid and nutritional therapy and lack of mobilization regimens. Ensuing acute-on-chronic morbidities (e.g. hospital-acquired pneumonia) frequently trigger further physiological deterioration, readmission to critical care and reduced longer-term survival.

The challenge set by NCEPOD (2011) is to readdress this systematic under-provision and implement a pack-

age of perioperative care that embraces the surgical journey as a holistic exercise in risk limitation and therapeutic optimization, yet constantly refined by measuring relevant outcomes in the context of national benchmarks for performance. **BJHM**

Conflict of interest: none.

Hamilton MA, Cecconi M, Rhodes A (2011) A systematic review and meta-analysis on the use of preemptive hemodynamic intervention to improve postoperative outcomes in moderate and high-risk surgical patients. *Anesth Analg* **112**(6): 1392–402

Jhanji S, Thomas B, Ely A, Watson D, Hinds CJ, Pearse RM (2008) Mortality and utilisation of critical care resources amongst high-risk surgical patients in a large NHS trust. *Anaesthesia* **63**(7): 695–700

Khuri SF, Henderson WG, DePalma RG, Mosca C, Healey NA, Kumbhani DJ; Participants in the VA National Surgical Quality Improvement Program (2005) Determinants of long-term survival after major surgery and the adverse effect of postoperative complications. *Ann Surg* **242:** 326–43

McFalls EO, Ward HB, Moritz TE et al (2004) Coronary-artery revascularization before elective major vascular surgery. *N Engl J Med* **351**(27): 2795–804

National Confidential Enquiry into Patient Outcome and Death (2011) Knowing the Risk. A review of the peri-operative care of surgical patients. www.ncepod.org.uk/2011poc.htm (accessed 24 April 2012)

National Institute for Health and Clinical Excellence (2011) CardioQ-ODM oesophageal doppler monitor. http://guidance.nice.org.uk/MTG3/Guidance/pdf/English (accessed 24 April 2012)

Pearse RM, Harrison DA, James P et al (2006) Identification and characterisation of the high-risk surgical population in the United Kingdom. *Crit Care* **10**(3): R81

Powell-Tuck J, Gosling P, Lobo D et al (2009) British Consensus Guidelines on Intravenous Fluid Therapy for Adult Surgical Patients (GIFTASUP). www.bapen.org.uk/pdfs/bapen_pubs/giftasup.pdf (accessed 24 April 2012)

Stewart J, Mason D, Smith N, Mason M (2010) A Mixed Bag - An enquiry into the care of hospital patients receiving parenteral nutrition. www.ncepod.org.uk/2010report1/downloads/PN_report.pdf (accessed 24 April 2012)

KEY POINTS

- Current assessment of the high-risk patient is inadequate.
- The high-risk patient must be defined by objective criteria, requiring the collection of robust outcome data.
- Critical care provision and use must be improved.
- There has been a failure to adopt technologies which may improve outcome.
- Ongoing studies will continue to refine the concept and care of the high-risk patient.