Preoperative assessment for thoracic anaesthesia

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Abstract

Preoperative assessment of patients for thoracic surgery is a multidisciplinary process designed to offer appropriate surgical treatment with acceptable risk. UK guidelines for pulmonary resection associated with malignant disease involved review of available evidence concerning operative risk. Patients displaying cardiopulmonary physiological parameters above previously recommended threshold values remain classified as acceptable risk. However, less certainty exists about the utility of predicted postoperative pulmonary function values and preoperative performance status to confer unacceptable risk. These guidelines suggest a tri-partite risk assessment combining risks of operative mortality, perioperative adverse cardiac events and postoperative dyspnoea, to be discussed by the multidisciplinary team and with the patient.

Keywords BTS guidelines; enhanced recovery; preoperative assessment; thoracic surgery

Royal College of Anaesthetists CPD Matrix: 2A03; 3G00

Learning objectives

After reading this article, you should be able to:

- describe the concept of global risk assessment in patients undergoing thoracic surgery
- understand the principles of cardiovascular risk assessment and the approach to co-existing coronary artery or valve disease
- describe the quantitative approaches to predicting postoperative lung function and the uncertainty of threshold values used to assess operability
- describe how the principles of the Enhanced Recovery Programme can be applied to thoracic surgery and anaesthesia

UK thoracic surgical outcomes are subject to rigorous audit. The latest annual mortality data from the Society for Cardiothoracic Surgery in Great Britain & Ireland (SCTS)[1] 2013–14 – reveal a continued trend in reduction of overall mortality to 1.25% in 2013–14. Just under 27,000 procedures were preformed in that year. Pneumonectomy carries the highest mortality risk at 5.84%, improved from 6.97% in 2011–12. Open lobectomy has a 1.9% mortality rate compared video-assisted thoracic surgery (VATS) lobectomy which carries a mortality rate of 0.7%.

The report shows that the number of lung cancer resections performed continues to increase, with lobectomy being the most common resection. The surgical approach to lobectomies has changed markedly in the last decade, with VATS increasing year on year and now accounting for 30% of lobectomies performed.

The British Thoracic Society and SCTS published 2010 guidelines[2] on risk assessment for pulmonary resection for malignant disease (also relevant to surgery for non-malignant conditions). They suggest a tri-partite risk assessment combining risks of operative mortality, perioperative adverse events and postoperative dyspnoea (Figure 1) – to be discussed by the multidisciplinary team and with the patient. These are less proscriptive than previous guidelines in considering 'cut-off' values for fitness for surgery indicators.

Recent observational data suggest that applying thresholds as 'cut-off' values (e.g. postoperative predictive FEV1<40% or TLCO<40%) might overestimate respiratory dysfunction and deny surgery to patients with potential for acceptable outcomes. This is reflected in both the 2010 guidelines and in the 2013 American College of Chest Physicians (ACCP) guidelines on the diagnosis and management of lung cancer.[3] Patients exhibiting better than these previous cut-off threshold values are classified as low risk. Patients below cut off values should undergo further functional testing such as shuttle walk test, stair climbing or cardiopulmonary function testing (CPET). The guidelines suggest that patients at moderate/high risk of postoperative morbidity might be offered surgery if they understand and accept the risks of dyspnoea and other complications, particularly in malignant disease in which surgery provides potential cure for early stage disease.

Patients presenting for thoracic surgery often have concomitant cardiac disease and smoking related conditions. The anaesthetist should ensure medical therapy is optimized. Any history of previous airway or anaesthetic difficulties (which may influence the choice of lung isolation techniques) or recent intercurrent illness should be elicited.

Risk of operative mortality

The 2010 guidelines[2] recommend using a global risk score to predict operative mortality, suggesting that of those available, the Thoracoscore, developed in France from more than 15,000 patients,[4] is currently the most discriminating. This logistic regression-derived model combines the odds-ratios of nine

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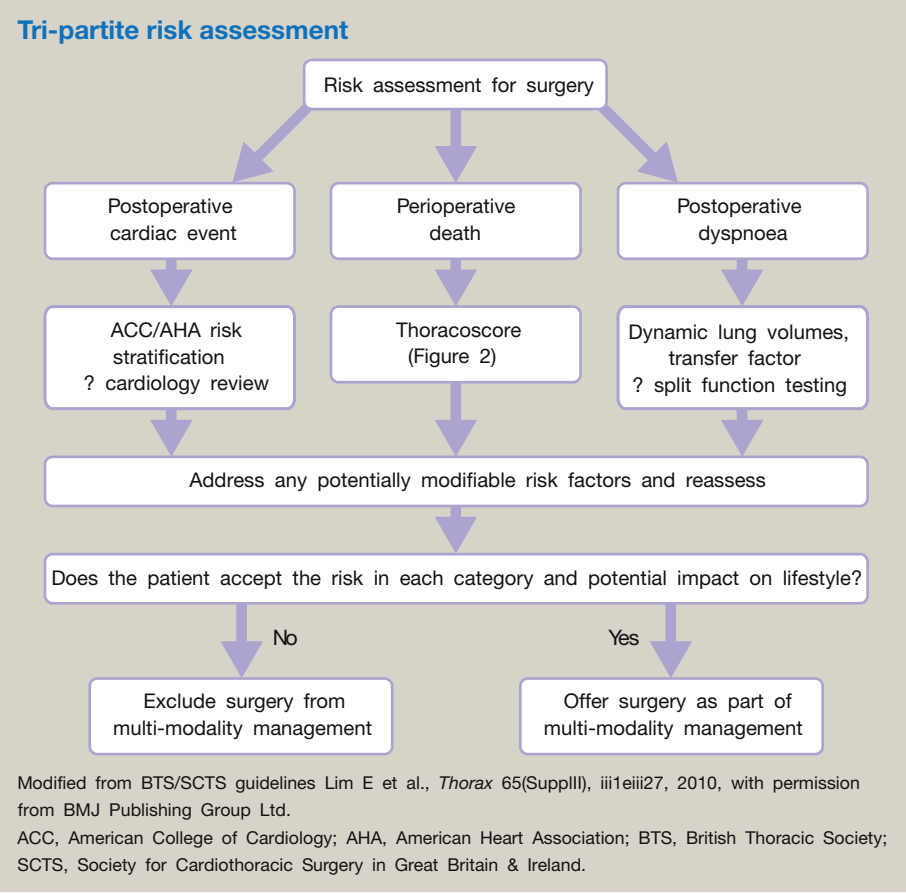

Modified from BTS/SCTS guidelines Lim E et al., *Thorax* 65(SuppIII), iii1eiii27, 2010, with permission from BMJ Publishing Group Ltd.

ACC, American College of Cardiology; AHA, American Heart Association; BTS, British Thoracic Society; SCTS, Society for Cardiothoracic Surgery in Great Britain & Ireland.

Figure 1

variables to allow a quantitative mortality risk assessment. Variables examined independently are not discriminatory - so features such as advanced age that score highly should not preclude surgery if considered in isolation. Other values that score highly are male, American Society of Anaesthesiologists (ASA) score greater than three, performance score more than three, dyspnoea score more than three, urgent/emergency surgery, pneumonectomy, malignant condition, and co-morbidity greater than one. Thoracoscore predicts mortality from below 1% to higher than 60% for worst score. Global risk scoring is now recommended when assessing and consenting patients for lung cancer surgery.

Enhanced Recovery Programme (ERP)

The evidence base supporting elements of a proposed ERP in thoracic surgery for the UK were published in a review in 2012.[5] Since then many centres have adopted such protocols. There is emerging evidence to show that they are of benefit in reducing length of hospital stay and cost, without increase in morbidity or mortality.[6]

Pre-optimization should begin as long before surgery as is practically possible and should address common issues such as anaemia, cessation of smoking, control of co-morbid conditions and preoperative physiotherapy in selected patients.

At the preoperative visit, detailed assessment of co-morbidity, clinical condition and all applicable preoperative investigations should be undertaken by a suitably qualified anaesthetist with a view to facilitating day-of-surgery admission. Patients are often pre-medicated with pregabalin or gabapentin to reduce risk of chronic postsurgical pain. The choice of surgical approach is considered, with VATS being performed if feasible. Some centres are now performing non-intubated video-assisted thoracic surgery (NIVATS) as this has been shown to shorten hospital stay.[7] These procedures are carried out with either regional or local anaesthesia without the need for a general anaesthetic. In some centres these procedures are carried out with patients breathing spontaneously via a supraglottic airway. Importantly there is no lung separation or need for one lung ventilation, which reduces the risk of perioperative lung injury. Currently most centres, where NIVATS is available, will reserve it for high-risk patients, as this is where current evidence of benefit is strongest. However, it may also be deployed in more minor procedures where a general anaesthetic seems a disproportionate tool when balanced against the surgery, e.g. talc pleurodesis.

Special attention is given to effective perioperative analgesia, early mobilization and physiotherapy. There is also a move towards early intercostal chest drain removal, which would otherwise preclude a reduction in length of stay. If patients are pre-optimized, fasting time minimized, thromboembolism prevented, good analgesia provided and early mobilization and chest drain removal achieved, patients should leave hospital

