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Perioperative risk prediction

Predicting outcomes for surgical patients accurately can be challenging preoperatively. Fortunately, there is an array of evidence-based scoring systems which can guide perioperative decision making and discussions of risk with patients.

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Introduction

Clinicians care for patients with an array of potential outcomes, drawing on experience to work out where each one sits on the spectrum of morbidity and mortality. Unfortunately, assessment by clinicians is unreliable. In the METS study (Wijeysundera et al, 2018), clinicians' subjective assessment of patients' functional capacity (and thus potential morbidity) before surgery was significantly worse than that obtained using a well-validated scoring system (the Duke Activity Scale).

Why risk score patients?

Ideally, clinicians would know exactly what is going to happen for every patient. Unfortunately, this is not possible, so validated scoring systems are used to best estimate the outcomes. This helps with the planning and delivery of care by:

- Allowing risk to be communicated so patients can make educated decisions about management options. This enables good shared decision making
- Informing decisions regarding use of resources. One example of this is the perioperative mortality risk calculator used for the National Emergency Laparotomy Audit (NELA Project Team, 2019). Patients with a predicted mortality of >5% should be admitted to critical care postoperatively
- Allowing comparison of population outcomes between providers and specialties.

Commonly used tools

- P-POSSUM (Prytherch et al, 1998). Using 12 variables available preoperatively, and six available at the end of the procedure, it provides an estimation of mortality and morbidity at 30 days. It is well validated (Moonesinghe et al, 2013) but the need to estimate the end of procedure variables can make it difficult to use in the consent process
- American Society of Anesthesiologists physical status classification (American Society of Anesthesiologists, 2014). This tool was originally designed for collection of statistical data regarding anaesthesia (Saklad, 1941). It is commonly used as a method for grouping patients in terms of their physiological status and, therefore, perioperative risk. The current iteration uses six grades and, despite its simplicity, is an effective way of discriminating between mortality risk groups (Moonesinghe et al, 2013)
- Surgical Outcome Risk Tool (SORT) (Protopapa et al, 2014). This was developed by analysing outcome data from a large cohort of surgical patients. It uses the American Society of Anesthesiologists physical status classification system alongside five other variables available preoperatively to predict 30-day mortality. It is easy to use and ideal for discussing risk in the preassessment setting
- Revised Cardiac Risk Index (Lee et al, 1999). This tool focuses on perioperative risk of cardiac events in patients undergoing non-cardiac surgery. Six preoperative variables are input, and a 30-day combined risk of cardiac arrest, myocardial infarction or cardiac death is generated. This has been updated to reflect evidence that the 1999 version was under-predicting mortality (Duceppe et al, 2017).

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Shortcomings

These systems seem like an excellent method to inform decision making. However, 30-day mortality may not be what matters to the patient. Furthermore, these criteria are often developed when studying a particular population and may not always apply to the patient managing.

Conclusions

As ever more risk stratification systems becoming available, it is important to choose the right one for the right situation. With pragmatic application they can enhance the evidence base on which decisions are made in the perioperative period.

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