

Introduction

Risk assessment tools are increasingly being recognised as an essential component of high quality clinical practice. Preoperative appreciation and communication of individual risk supports shared decision making, resource allocation and individualised perioperative care.

Many tools have been developed but few are used routinely outside subspecialty practice, owing to limitations which include the burden of data collection and inconsistent performance across heterogeneous populations.

The Surgical Outcome Risk Tool (SORT) requires six routinely collected data items and was designed for the preoperative estimation of individual risk (likelihood of 30 day mortality) in heterogeneous non-cardiac surgical populations.¹ SORT was internally validated in 5569 adult patients, but has yet to be externally validated.

Methods

1936 consecutive patients who had undergone a variety of elective surgical procedures at University College London Hospital between June 2009 and May 2012 were identified in the Surgical Outcomes Research Centre (SOuRCe) database.

Demographic and perioperative data was prospectively collected for the SOuRCe database and was subject to regular auditing of quality and completeness.

The performance (discrimination and calibration) of SORT was assessed across all 1936 patients and in the subset of patients who had undergone high-risk procedures as defined by SORT. Statistical analyses were performed using STATA version 12 (StataCorp, Texas USA).

Results

The database comprised 1936 patients in total and 1009 patients who had undergone a high-risk procedure. Patient characteristics are presented in **Error! Reference source not found.**

Overall 30 day mortality was 0.3% in the complete database and 0.6% in the high-risk procedure subgroup.

Discrimination: Area under the receiver operator characteristic curve (AUROC) for 30 day mortality in the complete database was 0.85 (95% CI 0.66-1.00) (**Error! Reference source not found.**) and 0.83 (0.64-1.00) in the subset of patients who had undergone a high risk procedure (not presented).

Calibration: Hosmer-Lemeshow analysis demonstrated no significant difference between observed and expected deaths within 30 days of surgery for the complete cohort (HL statistic: 11.6, p=0.2. **Error! Reference source not found.**) or high risk subgroup (HL statistic 5.7, p=0.6).

Discussion

The Surgical Outcome Risk Tool was accurate and well-calibrated in a cohort of almost 2000 patients undergoing elective surgery and performance was maintained in a subgroup of patients who had a high-risk procedure. Discrimination of outcome at 30 days in a mixed cohort was at least as good that of the most commonly used tools in clinical practice.^{1,2}

SORT can be used to generate a preoperative estimate of individual risk using 6 routinely collected data items. The findings of this analysis suggest that performance is generalisable across commonly performed elective procedures.

Future work should include assessment of the performance of SORT in other elective surgical subspecialties, emergency surgery and calibration for postoperative morbidity.

References

1 KL Protopapa, JC Simpson, NCE Smith, SR Moonesinghe. *Development and validation of the Surgical Outcome Risk Tool (SORT)*. *British Journal of Surgery* 2014; 101: 1774-83

2 Moonesinghe SR, Mythen MG, Das P, Rowan KM, Grocott MPW. Risk Stratification Tools for Predicting Morbidity and Mortality in Adult Patients Undergoing Major Surgery Qualitative Systematic Review. *Anesthesiology* 2013; **119**: 959-81

3 Oliver CM, Moonesinghe SR. Simple preoperative risk stratification systems are at least as good as complex systems requiring operative data. Poster presentation, ASA, October 12, 2013.