A Comparative Assessment for Patient Surgical Risk by Surgeons Vs. A Parsimonious Statistical Risk System (SURPAS)

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Introduction:

The literature lacks evidence on accurate preoperative prediction of postoperative surgical outcomes by surgeons. Our goal is to accurately assess the ability of surgeons to predict the 30-day post-operative morbidity and mortality risk in surgical patients. To do this we will compare surgeons' responses to standardized vignettes compared to a statistical risk model.

The Surgical Risk Preoperative Assessment System (SURPAS) is a set pf surgical risk assessment algorithms that provides individual patients with accurate procedure-specific preoperative risk prediction of 30-day postoperative adverse outcomes including:

- Mortality
- Overall morbidity
- Clusters of respiratory, cardiac/bleeding, venous thromboembolic, renal, infectious, and neurological outcomes.

To predict these values, SURPAS uses 8 variables:

- Procedural complexity and procedure-specific risk (both derived from the current procedural terminology code)
- Functional health status
- American Society of Anesthesiologists Physical Status Classification (ASA class)
- Patient age
- Emergency status of the operation
- In-/outpatient procedure
- Surgeon specialty.

These risk algorithms were developed from American College of Surgeons National Surgery Quality Improvement Program (NSQIP) database, which include the independent variables entered into SURPAS & the postoperative adverse outcomes.

Methods:

We compared the accuracy of surgeons' ability to predict overall morbidity & mortality for a variety of surgical procedures within their specialty to the outcomes predicted by SURPAS, and to the known postoperative outcomes. 30 patients' NSQIP data was presented to surgeons in standardized vignette formats, including the procedure performed & each patient's comorbidities. Vignettes of patients in each of ASA class I-V were randomly presented to the participants. Surgeons were asked to predict each patient's likelihood of 30-day postoperative mortality & overall morbidity

Patient Number: 1

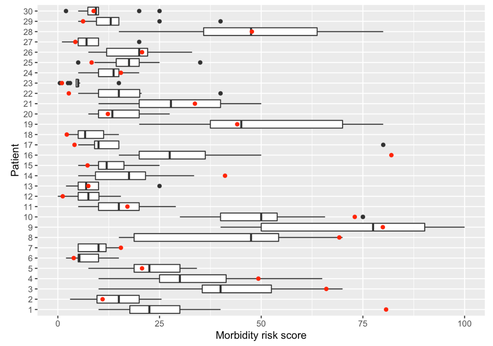
VARIABLE	VARIABLE VALUE
Operation	VATS complete pulmonary decortication and intrapleural pneumonolysis
Gender	Female
Age	65
Race/ethnicity	White, Not of Hispanic Origin
Emergency (Yes, no)	Yes
Inpatient/outpatient setting	Inpatient
Functional health status	Independent
Transfer status	Acute Care Hospital
BMI	28.5
Smoker	No

Pertinent Positive Preoperative Comorbidities: Diabetes managed with oral medication, Sepsis, Hypertension Medication.

Figure 1: These are examples of the survey format that show patients). Each Vignette format shows the comorbidities of each patient as well as the procedure to be performed. ASA class is omitted from the survey to avoid biasing high risk patients to surgeons.

Results:

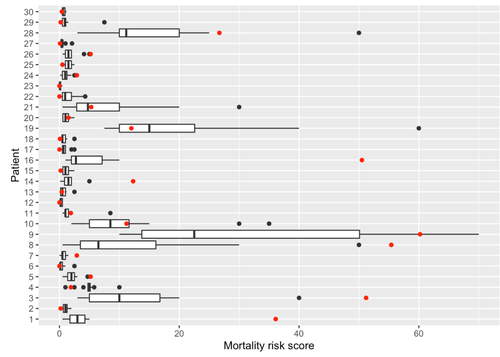
Results show that thoracic surgeons were able to accurately & precisely predict both the morbidity & mortality risk amongst low risk patients (ASA class 1 & 2). In high risk patients (ASA class 3-5) the agreement amongst surgeons on both mortality & morbidity was variable. Surgeons were also less accurate at predicting risk in the high-risk patient pool.



ICC score without SURPAS inclusion:
ICC = 0.65 [0.53, 0.78]
Moderate agreement

ICC score with SURPAS inclusion:
ICC = 0.65 [0.52, 0.78]
Moderate agreement

Figure 2: Shows a graphical comparison between the 30-day post operative morbidity surgeon risk prediction and the risk prediction provided by SURPAS.



ICC score without SURPAS inclusion:
ICC = 0.51 [0.38, 0.66]
Moderate agreement

ICC score with SURPAS inclusion:
ICC = 0.47 [0.34, 0.63]
Poor agreement

Figure 3: Shows a graphical comparison between the surgeons' mortality risk prediction and the SURPAS value.

• Conclusions:

- Thoracic surgeons were more accurate at predicting postoperative risk in patients with lower overall burden of disease (ASA≤3)
- Not as accurate as an automated risk assessment tool (SURPAS)
- Not as accurate for higher risk patients (ASA 4 or 5)
- High degree of variability between surgeon's risk predictions
- Use of an automated risk assessment tool may more accurately predict risk than surgeons
  - May facilitate more informed preoperative risk discussions

References:

Meguid, R., Bronsert, M., Juarez-Colunga, E., Hammermeister, K., & Henderson, W. (2016). Surgical Risk Preoperative Assessment System (SURPAS): II. Parsimonious Risk Models for Postoperative Adverse Outcomes Addressing Need for Laboratory Variables and Surgeon Specialty-specific Models. *Annals of Surgery*, *264*(1), 10–22. https://doi.org/10.1097/SLA.0000000000001677

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