

Is there a place for the Surgical Outcome Risk Tool app in routine clinical practice?

In 2011, the 'Knowing the Risk' report on the perioperative care of high risk surgical patients was published by the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) (Findlay et al, 2011). This found a low incidence of the mortality risk being documented on the consent form for surgery, which lead to recommendations for:

1. A method to rapidly and easily identify high risk patients
2. Critical care resource planning
3. Discussion and preoperative documentation of risk with patients.

There has been increased focus in recent years on shared decision making between the health-care professional and the patient, as well as greater awareness of perioperative medicine. Given the current climate of constraint on NHS resources smarter working is desirable and tools that can help multidisciplinary teams conduct risk assessments, including mortality, are a useful way to support this as part of their overall surgical tool kit.

The SORT paper and web-based tool

The Surgical Outcome Risk Tool (SORT) is a relatively new preoperative tool, having first been described in the *British Journal of Surgery* in November 2014 (Protopapa et al, 2014). It is a simple tool that can easily be implemented into routine clinical practice: in conjunction with the name of the intended surgical procedure, only six solely preoperative, easily obtainable variables are required to calculate the mortality risk of adult patients within 30 days of inpatient surgery. A web-based version followed shortly thereafter. In May 2015, a survey was carried out to see if health-care professionals had heard of or were using the SORT. This also looked at the demographic of clinicians who were using it and what other risk

prediction tools they were using. With responses from over 500 clinicians, it was extremely encouraging to know that the tool was already starting to be used in clinical practice, primarily in pre-assessment clinics, high risk clinics, and surgery and emergency departments. Interestingly, the main user group was consultants.

Key distinguishing features

- SORT is a truly preoperative mortality risk assessment tool which is quick and simple to use. Once the procedure name has been chosen, it takes just a few seconds to obtain the mortality risk
- The mortality risk is displayed as a percentage
- It features all urgency of surgery categories (from elective to immediate) and surgical severity (from minor to complex)
- A pragmatic approach was adopted for the data collection forms in the 'Knowing the Risk' study – the data from which the SORT was derived – and the same pragmatic approach was used for the SORT. If too many variables had been required, this would have prevented rapid and easy data entry, and may have hindered the uptake of the tool in routine clinical practice.

SORT app released

In April 2016, another milestone was reached with the release of the user-friendly SORT app, paving the way for use by a wider group of clinicians including GPs and trainees. It got off to a flying start with 2500 downloads of the app in the first month following its release.

Offline capability ensures that it is self contained on the user's device, rather than housed on a website, so is available even where there is no mobile reception, or if access to external websites is blocked in the hospital. This makes having the app readily available on one's phone or tablet an attractive proposition. It also features a search function with predictive text, providing an alternative route to locating the procedure.

The younger generation is increasingly tech savvy, and it is expected that there will be further uptake of the app version by trainees.

Some commonly used mortality risk assessment tools

Many clinicians use the well-known population-based American Society of Anesthesiologists Physical Status in their risk assessments, despite it having been released over 50 years ago (Saklad, 1941). As most clinicians will be aware, this basic, one variable classification system can be used on a whole range of patients, from a healthy patient to one who is moribund, but has lacked accuracy in some studies (Moonesinghe et al, 2013).

At the other end of the spectrum, the Portsmouth version of the Physiological and Operative Severity Score for the enUmeration of Mortality and morbidity (P-POSSUM) (Whiteley et al, 1996) is another well-known tool, but this needs 18 variables to be collected at various stages preoperatively, intraoperatively and postoperatively, with blood tests and chest radiograph results delaying the risk calculation.

The Surgical Risk Scale (Sutton et al, 2002) used a simpler, preoperative assessment but it has not been widely validated. In the analyses for the SORT, it was found to be less accurate and to over-estimate risk apart from those with the highest risk (Protopapa et al, 2014). The SORT is a tool for general surgery. Some clinicians will prefer to use specialist tools pertaining to their chosen specialty, such as V-POSSUM for vascular surgery, but the SORT could be used in conjunction with these. Equally, others may forego these types of tools, relying on other sources of information such as cardiopulmonary exercise testing in conjunction with their clinical judgement.

Validation of the SORT and accuracy

Further confidence can be found in subsequent validation work. The SORT was originally internally validated,

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demonstrating higher accuracy than the American Society of Anesthesiologists Physical Status and Surgical Risk Scale. It has now been externally validated, with the results placing it in good stead against the tools that are most frequently used (Oliver and Moonesinghe, 2015). The SORT was not more accurate than the Nottingham Hip Fracture Score but the design of the Nottingham Hip Fracture Score differs as it is a specialist tool for predicting postoperative mortality after hip fracture surgery (Marufu et al, 2016).

Large scale, multicentre study

The strength of the SORT is underpinned by the large data set which was used for the development and validation of the tool. Details from over 19 000 patients from 326 NHS and independent sector hospitals in England, Wales, Northern Ireland, and public hospitals in the Isle of Man, Guernsey, and Jersey were used from the NCEPOD study. At the time of publication, it was the largest analysis of risk prediction tools in a UK cohort of patients undergoing inpatient surgery in multiple surgical specialties (Protopapa et al, 2014).

Criticisms of SORT

The SORT is not perfect. Some clinicians have initially found locating a procedure a bit challenging, but have easily overcome this after using the tool a couple of times. The new search function in the app goes some way to addressing this. Surgeons and anaesthetists who regularly have operating lists with similar procedures will soon familiarize themselves with the way that procedures are selected in the SORT. The AXA-PPP procedure categories (<https://online.axapphealthcare.co.uk/SpecialistForms/SpecialistCode.mvc?source=published>) were chosen for use in the SORT as a consistent and recognized method of mapping procedure groups and

subgroups to procedure names and the relevant surgical severity. One caveat was that not all possible procedures are listed, and in the SORT it was suggested that the nearest equivalent could be used instead.

Conclusions

The SORT was designed as a tool for a multidisciplinary team of health-care professionals including anaesthetists, intensivists, surgeons, emergency medicine physicians and nurses. Having a mortality risk assessment readily available can also help open up discussions between trainees and their consultants regarding the treatment pathway and plan for patients. However, it is highlighted in the app that the risk provided is an estimate, providing background information for clinicians to use in conjunction with their clinical judgement and knowledge, and they should not become over-reliant on the mortality risk calculations. Furthermore, it should not be acted on nor relied upon without review.

Bearing this in mind, the tool is well placed to contribute to identifying high risk patients who might benefit from access to high dependency care or other interventions, and thus aid resource planning, as well as preoperative assessments, the consent process and shared decision making. In this way, perhaps the SORT might spearhead the way in terms of preoperative mortality risk assessment tools in routine clinical practice and make a contribution to improving patient outcomes. **BJHM**

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KEY POINTS

- SORT is a truly preoperative mortality risk assessment tool.
- It requires only six easily obtainable variables and the mortality risk is displayed as a percentage.
- The app has offline capability so can be used in any location.
- There is a new search function with predictive text to locate the surgical procedure.
- It might contribute to identifying high risk patients (with a plan for critical care or other interventions), and thus aid resource planning.
- SORT can also be used for preoperative assessments, the consent process and shared decision making.

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