

# Individualised surgical outcomes: please look the other way

S R Moonesinghe<sup>1,2,3</sup>

There has been significant media coverage this year over the decision by the NHS to publish surgeon-specific outcome data in the UK. The example was originally set by the Society of Cardiothoracic Surgeons who have been publishing individualised risk-adjusted outcome data for cardiac surgeons for over a decade. In association with this endeavour, they have seen a significant improvement in outcomes as well as being justifiably applauded by the public and the profession for their transparency.<sup>1</sup> Now, data collected in publicly funded Healthcare Quality Improvement Program National Clinical Audits are being analysed on a surgeon-by-surgeon basis for eight other surgical specialties.

This is an important step in improving transparency of outcomes and hopefully a first step in quality improvement; however, there are a number of limitations to this approach which merit consideration. First, the numbers of cases for each surgeon are not high enough to enable the comparison of outcomes to be sufficiently powered to detect poor performers.<sup>2</sup>

Second, the outcome which is being compared is usually short-term (inpatient, 30-day or 90-day) mortality. In terms of important patient-centred outcomes, short-term mortality is only the tip of the iceberg. Postoperative complications, which are far more prevalent, are also associated with significant longer term sequelae. There is convincing evidence of an independent association between postoperative complications and reduced long-term survival, even after adjusting for premorbid risk factors.<sup>3</sup> Complications are associated with prolonged hospitalisation<sup>4</sup> and delay in return to work, both of which carry an enormous health economic burden. Health-related quality of life is known to be reduced for years in patients who endure a complicated postoperative course compared with those who do not.<sup>5</sup> Increasingly, in perioperative medicine trials there is interest in using longer-term endpoints such as

disability-free survival at 1 year to fully capture the impact of interventions being tested. Some of the UK's National Clinical Audits are reporting surgery-specific complications such as return-to-surgery rates, but data on more generic morbidity after surgery, such as infection or thrombosis rates, are generally lacking.

Third, while it is admirable that surgeons have engaged in this data transparency exercise, it is not fair to assume that they are solely responsible for a patient's surgical outcome. Poor judgement or technical failings will, of course, lead to adverse events, but the quality of a patient's care is dependent on a great deal more than one surgeon's skills or knowledge. Adequate risk assessment and optimisation of comorbidities, adherence to best practice guidance and enhanced recovery protocols are multidisciplinary interventions which are associated with improved outcomes. In particular, the role of the anaesthetist in perioperative physiological management<sup>6</sup> and the critical care unit in postoperative care<sup>7</sup> may be of crucial importance in high-risk major surgery. Patients who develop complications while in hospital after surgery may be more than five times more likely to die in some institutions than others,<sup>8</sup> and indicators of quality related to structure and process, such as staffing models and technology status, have been found to provide some explanation for this variation.<sup>9</sup>

Finally there is the issue of patient-related risk. Not all patients are equal. Most of the surgeon-specific mortality databases use risk or case mix adjustment to control for the variation in outcome which might be attributed to individual patients' comorbidities; however, they also all acknowledge that the risk adjustment techniques which have been used have limitations. A recent systematic review<sup>10</sup> found that two risk stratification tools in particular have been repeatedly found to be accurate predictors of mortality in heterogeneous cohorts of patients—the Surgical Risk Scale and the P-Portsmouth Physiological and Operative Severity Score for enUmeration of Mortality (P-POSSUM). Both of these systems were initially developed for the purposes of risk adjustment so that comparative data could be meaningfully

interpreted. For some specialties—for example, colorectal resection—a number of surgery-specific tools are available for this purpose.<sup>11</sup> In many of the national clinical audits, less robust risk adjusters have been used. This is likely to result from a desire to maintain engagement from clinicians who are asked to voluntarily enter data into these audits, by not burdening them with the requirement to enter the large numbers of variables for each patient which would be required for more accurate adjustment.

Adequate risk adjustment is essential for the credibility of outcome data; however, understanding the reasons why some patients might fare badly after surgery is important for far more wide-reaching reasons. A number of reports from the UK have recently highlighted the need for facilitating truly informed consent to patients undergoing surgery,<sup>12 13</sup> and confidential enquiry has revealed that, even in patients thought to be high-risk by their anaesthetist, there was usually (in >90% of cases) no documentary evidence that a mortality prediction was provided to the patient.<sup>13</sup> My own clinical experience is that, even when the risks of mortality or complications are explained to patients, these are usually presented as population averages rather than individualised estimates of that specific patient's risk.

Improving this situation and moving towards a system of shared decision making must be a priority in perioperative medicine, but is clearly a complex undertaking. An explanation to the patient of the individualised risk of short-term mortality should be a basic preoperative requirement for all surgical procedures.<sup>13</sup> This might involve the use of risk stratification tools or more sophisticated methods such as cardiopulmonary exercise testing.<sup>14</sup> Beyond that, explaining the risk of important complications, prolonged critical care or hospital stay should also be a feature of the informed consent process. At present, in the UK at least, we lack the audit data which might be interrogated to provide these estimates. The USA is some way ahead through the work of the American College of Surgeons' National Surgical Quality Improvement Program (ACS-NSQIP). This was set up in the 1990s by Dr Shukri Khuri and collaborators with the aim of recording and reporting risk-adjusted surgical mortality and morbidity in Veterans' Administration hospitals in the USA. Trained personnel collect multiple data points on a sample of patients undergoing surgery in hundreds of public—and latterly—private hospitals. Between 1991 and 2006, surgical mortality fell by 47%

<sup>1</sup>NIHR UCL/UCLH Surgical Outcomes Research Centre, London, UK; <sup>2</sup>Department of Anaesthesia and Critical Care, University College Hospital, London, UK; <sup>3</sup>University College London, London, UK

**Correspondence to** Dr S R Moonesinghe, NIHR UCL/UCLH Surgical Outcomes Research Centre, London NW1 2BU, UK; rmoonesinghe@googlemail.com

and morbidity by 43% in hospitals that contributed data to this programme.<sup>15</sup> There were also improvements in hospital length of stay and patient satisfaction. Now, over 20 years after this programme began, the ACS-NSQIP has recently produced an online calculator for use by clinicians and patients in the preoperative assessment process (<http://www.riskcalculator.facs.org>). The calculator is based on regression models which have been generated using prospectively collected data from hundreds of thousands of patient episodes. After entering a modest dataset of patient and operative variables, an individualised percentage prediction of mortality and of seven different complications is provided with the click of a few buttons on a computer keyboard. The tool also provides a comparison between the patient's predicted outcome and the average outcomes for that type of surgery. Clearly, clinical judgement is also required in determining a patient's perioperative risk, but it seems likely that this would be best incorporated into a protocolised algorithmic process which involves using validated risk prediction tools. From there, the role of the perioperative team should include discussing this risk with patients and taking a collaborative approach to planning individually tailored perioperative care in those who are deemed to be at high risk.

One might assume that taking such an approach should lead to improved outcomes for patients. Unfortunately, there is almost no evidence to support this assumption: impact studies examining the effect of risk stratification and subsequent management on patient outcome are sadly lacking in the perioperative field. With over 230 million operations per year worldwide and an inpatient mortality of up to 4% even in resource-rich environments such as the European Union,<sup>16</sup> this is clearly a public health issue which needs greater attention.

The Salzburg statement summarises an expert panel's considerations of how patients can and should be involved in decisions about their healthcare.<sup>17</sup> As surgical and anaesthetic techniques evolve and improve, treatment options are becoming available to patients with far greater comorbidities and at the extremes of age and fitness. If fully informed of the

potential risks, some patients may choose to avoid surgery and the risk of a protracted critical illness, and instead return to their families and live out their lives in the community, potentially with the input of palliative care teams if necessary. Again, outcome data are sadly lacking for patients who have technically operable disease but choose not to have surgery on the basis of chronic ill health. Data which provide a better understanding of what happens to such patients would be a valuable addition to national audit data.

In summary, should we not be looking the other way at individualised surgical outcome data and focusing not on individual surgeons but on individual patients? The importance of transparency of outcome reporting and the rationale for publishing surgeon-specific outcome data is clear, but perhaps more focus should be placed on improving preoperative pathways and the informed consent process. There is a pressing need for cluster randomised controlled trials, evaluating the impact of preoperative risk stratification, shared decision making and highly protocolised but individualised perioperative pathways on patient outcomes, healthcare resource utilisation and staff satisfaction. Systematic risk-adjusted data collection on a far wider range of outcomes than just short-term mortality would be an important first step towards achieving this goal.

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