**PERIOPERATIVE MORTALITY- TIME FRAME, GUIDELINES**

The United Nations, World Health Organization (WHO), and Ministries of Health prepare to deﬁne global health priorities under the umbrella of universal health coverage. Global health metrics are usually summarized using health indices. Such as life expectancy and infant and MMR, are often used as proxy measures for overall health status. These health indicators provide necessary data and guidance for evaluating overall health of the population under surveillance at different levels.

Similarly speciﬁc goals for access to and safety of surgery and anaesthesia are to be explored.

In this article we describe how a key indicator of Surgical safety—the Peri operative mortality rate (POMR)—may be used to improve the quality of care received by patients. It is recommended that the POMR should be recognized as a health indicator of the quality and safety of surgery and anaesthesia

Surgical diseases affect both genders and people of all decades of life. Therefore, a health index applicable to surgery has been challenging to deﬁne, even more so because surgery covers a diverse range of conditions and diseases. However, a ‘‘surgical’’ health index is necessary for the evaluation and ultimate improvement of surgical and anaesthetic interventions directed at the burden of surgical disease.

**Definition:**

The POMR is deﬁned as death following surgery and anaesthesia within two time periods:

On the day of surgery (including death in the operating theatre) and before discharge from hospital or within 30 days of surgery, whichever is sooner.

**How do we measure POMR**

It is measured as a ratio between the numbers of deaths divided by the total number operative procedures. Some patients will have more than one procedure during a hospital admission so the total number of procedures will exceed the total number of patients.

**Importance of Risk stratification**

Surgical complications occur in 3-17% of patient in the general population, surgical mortality is approximately 0.5%, but in elderly patients undergoing emergency surgery mortality rate is can go higher than 12%.

Accurate risk stratiﬁcation would facilitate informed patient consent and identify those individuals who may beneﬁt from speciﬁc perioperative interventions.

The ideal risk prediction model would be one that is simple, reproducible, accurate, objective, and available to all patients.

Risk stratification systems

Classified into

* Those estimating population risk - American Society of Anaesthesiologists Physical Status score **(ASA-PS)**
* Those estimating individual risk. – Further sub divided into –
	+ - Those systems designed to predict cardiac morbidity and mortality such as the Lee Revised Cardiac Risk Index **(RCRI)**
		- These include scores which use solely preoperative risk factors -**Charlson Index**
		- Those looking at a combination of preoperative, intraoperative, and postoperative factors - Physiological and Operative Severity Score for the enumeration of Morbidity and Mortality **(POSSUM).**

**Risk factors**

 •Urgency

•Age

•Pre operative Risk scoring (Comorbidities)

•Condition/Surgical Procedure

• Gender

•Nature of infrastructure available

Older adults (≥ 65 yr) are the fastest growing population and are presenting in increasing numbers for acute surgical care. Emergency surgery is frequently life threatening for older patients. The 48 h and 30 day incidence of postoperative mortality was 0.57% and 2.1%, respectively². Higher American Society of Anesthesiologists physical status scores, extremes of age, emergencies, In-hospital mortality went up to 12%. Mortality was associated with patients who had higher American Society of Anesthesiologists (ASA) class. Mortality rates for these patients are significantly higher and more variable across hospitals when compared to younger patientsⁱ

Thirty-day mortality reported by condition or procedure from developed nations ranges from 1.2% for elective hip and knee arthroplasty and extends upto 9.8% for emergency hip fracture surgery and colorectal surgery.

Higher failure to rescue rates in the elderly may signify their diminished physiological reserve for surviving critical illness. It also highlights the importance of systems aimed at the early recognition and effective management of major complications in this vulnerable population³

Mortality in emergency major GI surgical patients remains high. Failure to allocate patients to the appropriate level of care immediately after surgery may contribute to the high postoperative mortality⁶

**Minimizing perioperative adverse events**

Elderly patients still have the highest postoperative mortality and morbidity rate in the adult surgical population. Preoperative clinical assessment to detect patients at high risk of postoperative events, and specific intraoperative and postoperative anaesthesia management are important to minimize postoperative adverse events in the elderly.

Greater numbers of patients are presenting for surgery with ageing‐related, pre‐existing conditions that place them at greater risk of an adverse outcome, such as cardiac or pulmonary disease or diabetes mellitus. Pre‐existing cardiac disease predisposes substantial perioperative risk.

Perioperative anaesthetic management varies according to the needs of the patient and of the surgical procedure.

* Preoperative assessment for identifying high risk patients
* Careful history
* Physical examination
* Twelve‐lead ECG
* Functional status assessment
* Nutrition assessment
* Preoperative preparation
* Effective control of co‐existing disease
* Stopped smoking for 8 weeks
* Training in cough and lung expansion techniques
* Chest physiotherapy for elderly at risk of postoperative pulmonary complications
* Correct of malnutrition
* Routine precautions for major surgery
* Temperature monitor and control
* Ripple mattress
* DVT prophylaxis
* Intra‐arterial pressure monitoring
* Ensure Haemodynamic stability
* Combination of anaesthetic and vasopressor, beta‐blockers or vasodilators
* Avoid fluid overload
* Quick recovery from anaesthesia
* Use short‐acting anaesthetic agents
* Combine epidural anaesthesia and GA for major abdominal and thoracic surgery
* Antagonize neuromuscular blocking drugs
* Prevent hypoxaemia - Supplemental oxygen, reversal of neuromuscular blocking drugs
* Prevent hypothermia - Keep warm perioperatively
* Effective postoperative pain control- Multimodal analgesia

Summary:

There is an opportunity for developed nations and referral hospitals in developing countries to take a lead in reporting perioperative mortality. This may not involve signiﬁcant resources as the information is already being collected in some form in most hospitals. Ministries of Health will need to mandate that all hospitals report this information. Collecting and reporting POMR will impact only surgical and anaesthesia outcomes when reporting is mandatory and benchmarking is put into place for measuring the impact of interventions made within a surgical system.

Eventually, of course, the POMR analysis will not result in improvements in the standards of anaesthesia and surgery unless review of individual cases takes place and changes adopted in their area of practice.

Safe surgery and anaesthesia are not unaffordable luxuries reserved only for the health systems of high-income countries. They should be seen as an essential component within the Sustainable Development Goal of Universal Health Coverage. Everyone deserves them and their lack represents a signiﬁcant cost in terms of life and disability to the communities that cannot access them.

References:

1. Perioperative mortality rate, A global indicator of access to safe surgery and anaesthesia; World Journal of Surgery, 2638-4, 2014

2. Ther Clin Risk Manag. 2008 Aug; 4(4): 681–688.

Postoperative mortality after inpatient surgery: Incidence and risk factors; Karamarie Fecho, Anne T Lunney, Philip G Boysen, Peter Rock, and Edward A Norfleet

3. Ann Surg. 2013 Oct; 258(4): 614–618.

Improving Mortality Following Emergency Surgery in Older Patients Requires Focus on Complication Rescue; Kyle H. Sheetz, Seth A. Waits, Robert W. Krell, Darrell A. Campbell, Jr., Michael J. Englesbe, and Amir A. Ghaferi

4. Can J Surg. 2015 Oct;58(5):312-7.

Perioperative factors predicting poor outcome in elderly patients following emergency general surgery: a multivariate regression analysis. Lees, Merani , Tauh , Khadaroo

5. Clinical risk scores to guide perioperative management; Sarah Barnett, Suneetha Ramani Moonesinghe; Postgrad Med J 2011;87:535e541. doi:10.1136/pgmj.2010.107169

6. British Journal of Anaesthesia Page 1 of 11 doi:10.1093/bja/aet487;2013; Mortality and postoperative care pathways after emergency gastrointestinal surgery in 2904 patients: a population-based cohort study; M. Vester-Andersen, L. H. Lundstrom, M. H. Møller, T. Waldau, J. Rosenberg, A. M. Møller