LIFE AT THE SHARP END: SURGICAL MORTALITY RI

John Lefebre, MD, FRCPC
Chief Regional Medical Director
RGA International Corporation
Toronto, Canada
jlefebre@rgare.com

Yunus Piperdy, BSc, FCII
Underwriting Research and Development Manager
RGA UK Services
London, United Kingdom
ypiperdy@rgare.com

Executive Summary Life underwriters and medical directors are likely to see an increase in the number of cases involving surgical mortality risk. This is a natural consequence of an ageing population, continuous medical advancements and better access to surgical treatments. Therefore it is becoming ever more important to understand the key factors in surgical mortality risk. We focus on a few common types of elective surgery likely to be seen by life underwriters.

Postponement is not always the right answer

For many operative procedures it is not always necessary for life underwriters to postpone acceptance of the risk. M oj

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Physical Status Classi Þcation System (Version 2, 1980)	
Class	
1	Normal healthy patient
2	Mild systemic disease
3	Severe systemic disease
4	Severe systemic disease that is a constant threat to life
5	Not expected to survive without the operation

Table 2: American Society of Anesthesiologists [1]

Figure 1 - Surgical mortality by age (adapted from Turrentine et al, 2006)

relation to increasing age. Although other risk factors such as high levels of co-morbidity and the higher proportion of emergency procedures were important causes of death at older ages, they concluded that increasing age itself was an independent risk factor for postoperative mortality.

The importance of co-morbid conditions in older patients is also illustrated in a small study of 50 patients aged 70 to 95[5]. The patients had undergone major orthopaedic procedures for osteoarthritis of the femoral head or femoral neck fractures. Thirty days after discharge from hospital, 8 of 50 patients (16%) were reported dead. The cause of death in the majority of cases was directly related to their previous medical history.

Old age is undoubtedly an adverse risk factor in surgical mortality risk. Nevertheless, acceptance for a surgical procedure could be an indication of a favourable risk at older ages. An elderly applicant deemed healthy enough to undergo elective surgery could be an attractive underwriting case. In practice the degree of mortality risk will depend largely on the type of surgical treatment, underlying disease process, and the nature and number of co-morbid conditions.

Common elective operations

Mortality data for four common elective operative procedures are listed in Table 3 below.

We analysed in-patient mortality data using the Hospital Episode Statistics (HES) database for England. Our overall Þndings are basically consistent with published mortality rates. However, it is essential to analyse Þndings from each study individually. Direct comparison of mortality rates between studies may be misleading as differences could be due to deÞnition of operative mortality, or exclusion of certain types of operations or age groups.

While Noordzij et al reported high mortality rates for open cholecystectomy, the data from the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) conÞrms a much lower mortality rate for laparoscopic cholecystectomy. The HES data is largely based on laparoscopic procedures, and the mortality rate is equally low.

It is also important to note the above data are for all operations including emergency procedures. The difference between elective and emergency procedures is clearly illustrated in another study by Nilsson et al who studied mortality after groin hernia surgery based on more than 100,000 operations recorded by the Swedish Hernia Register between 1992 and 2005[10]. They found that while there was an increased mortality risk for hernia repair, this was due to excess mortality following emergency operations. They reported the 30-day standardised mortality ratio (SMR)

Operation type	Mortality rate / 1000				
	HES [1]	NJR [2]	Veterans NSQIP [3]	Noordzij et al [1]	ACS NSQIP [4]
Cholecystectomy	2.6	n/a	n/a	13.8 (O)	2.7 (L) 28.2 (O)
Hernia (not hiatus)	2.4	n/a	n/a	2.4	n/a
Hip replacement	3.2	2.7	7.2	8.0	n/a
Knee replacement	1.7	2.2	6.2	1.2	n/a

Table 3: Mortality rate for common elective operations
L = Laparoscopic, O = Open, n/a = not applicable

does not exceed that of the general population after elective operations for femoral or inguinal hernia.

One limitation of the HES database we looked at is a possible underestimate of mortality rates, as it only records in-hospital mortality, while other data sources include mortality up to 30 days after the operation.

Nevertheless, HES is a valuable source of data as it allows drill-down analysis of postoperative mortality rate by age as shown in Table 4.

The HES data confirms mortality risk increases with age. As discussed above, much of this increase is likely due to a higher rate of co-morbid conditions and emergency procedures at older ages, and the increased severity of the underlying disease process.

HES data also allow detailed analysis of mortality risk during the in-patient period and how it decreases with time. The data confirm the highest risk is in the immediate postoperative period. Figure 2 compares mortality rates for hip and knee replacements for lives at all ages. Most mortality occurs during the first week, and nearly all of the excess mortality is within the first 30 days.

Sharp end doesn't always mean a sharp exit

Surgical mortality risk is low for most elective operations, particularly if the applicant is otherwise healthy. Old age remains an adverse factor for surgical mortality risk, although it's difficult to determine how much this risk is increased due to the higher rate 4.7ete80 TD -.0003ons1 Tf .es at older ages, and the