



FOCUS ON RESEARCH

Identification and characterisation of the high risk surgical population in Scotland.

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Aim: To study long-term outcomes after surgery in Scotland, and identify patient, surgical and organisation factors associated with improved survival.

Project Outline/Methodology: All adult patients undergoing inpatient general surgical procedures in Scotland between 01 Jan 2005 and 31 Dec 2007 were included. Data on demographics, comorbidity, surgical procedure, ICU admission and outcome were collected. Patients were stratified into high, intermediate and low risk groups according to operative mortality.

Key Results: 572,598 patients remained in the final study cohort. 30-day surgical mortality was low (4806 deaths, 0.8%) rising to 47693 (8.3%) at 3 years. Within the high-risk population there were 2589 (9.3%) deaths rising to 10378 (36.9%) at 3 years. Age, comorbidity, deprivation, major and emergency surgery were all strongly associated with mortality at 30 days, 1 year and 3 years. Direct ICU admission was low in all operative risk groups (standard 0.3%; intermediate 1.4%, high 8.9%) Significant variation in elective (direct) ICU admission was observed between health boards in the high operative risk group and mortality was the highest in patients who were admitted to ICU following a period of standard care on the wards. At 3 months, cumulative incidence of patients experiencing emergency hospital readmission was 7.0% (95%CI 6.9% to 7.1%), increasing to 15.4% (95%CI 15.3% to 15.5%) at one year and 29.5% (95%CI 29.4% to 29.6%) at 3 years. The strongest independent predictors of cause-specific hazard of emergency readmission were age, comorbidity and emergency status.

Conclusions: A high-risk population accounts for 5% of the cohort but 53% of deaths at

30 days. Age, comorbidity, deprivation, major and emergency surgery were all strongly associated with mortality at 30 days, 1 year and 3 years, hospital readmission and resource use. Only a small proportion of these patients are routinely admitted to the ICU.

What does this study add to the field? This study reports whole-nation short and long term mortality and resource use after surgery. It demonstrates that age, comorbidity, nature of surgery and deprivation are associated with worse outcomes after surgery. The high-risk surgical population may be better defined using these patient and surgical level factors. These factors were also associated with resource use and emergency readmission following surgery. Rate of ICU admission is low overall and the highest mortality is observed in the group admitted to ICU after a period of care on a standard ward.

Implications for Practice or Policy: This study is the first detailed national review of mortality for these patients groups over a three-year time horizon. This data identifies patient surgical and organisational factors associated with short and long term mortality following surgery. In particular it identifies differences in resource use following certain types of surgery.

Where to next? Studies examining hospital volume, ICU availability and rurality on outcome after surgery.

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