Hip Fracture Time To Surgery And In-Hospital Mortality Between 27 Hospitals In Six Countries.

Rasmussen, Sten; Gammall, Dany; Stevenson, Mark; Liew, Susan; Nordsletten, Lars; Talsnes, Ove; Gordon, Andrew

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

Link to publication from Aalborg University

Citation for published version (APA):
Background
With the increased healthcare burden from the aging population, there is intense interest in the streamlining of care. This has led to the implementation of strategies designed to shorten the time from admission to surgery for hip fracture for reducing costs and length of stay. Randomized controlled trials are best to assess an early surgical strategy, but evidence based data to decide on the ideal time for surgery is limited. Comparison of data from different countries may help to improve care.

Study Design & Methods
A case-control hospital admission data from the period 2008 to 2014 for University Hospitals from Australia, Belgium, Denmark, UK, and USA. We included records for patients 70 years of age or older with a primary hip fracture. Primary outcome was any in-hospital death. We included data from 60,219 patients among 27 hospitals (Table 1). The mean age of the study population was 80.9 (10.3) years. The mean time to surgery was 1.3 (2.2) days. The number of in-hospital deaths was 2,500 (4.1 %) (Table 2).

Table 1. Characteristics of patients. In brackets, means and SD

Table 2. Time to surgery and mortality.

Logistic regression used country as independent variable with Australia random chosen as reference category, in hospital death as outcome and adjusted for age, sex, time to surgery and Elixhauser co-morbidity. We received all outcomes in the model and calculated the odds ratios (OR) with a 95% CI. Interaction terms was included in the model and backward removal of interactions were checked. Interaction terms were present when the interaction term was significant, age and sex were adjusted for.

Results
In the logistic regression model using in-hospital deaths as the outcome, when adjusted for age, sex, co-morbidity and year there was a difference in time to surgery varied from 0.35 (0.40) days to 0.28 (1.16) days between countries (Table 3).


In-hospital mortality varied from 2.06 % to 7.1%. The odds ratios for in-hospital death relative to the reference category, for each time to surgery per country in Belgium and Denmark varied from 0.49 (0.39) to 0.54 (0.42) between USA and Denmark. USA, Norway and Denmark had the highest post-operative length of stay and the longest difference in reporting of complications (Table 4). There are a difference between countries in in-hospital mortality following hip fracture surgery. Median time to surgery in the Global Comparators international benchmarking collaborative was 0.76 (0.89) days. We have not found a difference in surgical outcome between countries.

Discussion
The reduction in mortality over time, differences in practice between country, and the importance of Elixhauser score together with the reported lack of change in age and co-morbidity over several decades, indicates that care programs should be reviewed. Differences in outcome may be explained by the degree of resources put into co-morbidities. We may need to focus on improving the medical condition of the patient within that, however, we have no data whatsoever that improving medical condition in patients with multiple co-morbidities improve outcome. Based on recent studies (3) and this study is growing evidence that time to surgery and co-morbidities are common mortality risk factors across international borders.

Conclusions
The analysis of hospital administrative data demonstrated differences in time to surgery and in-hospital mortality between hospitals. A large number of factors affecting mortality for hip fractured patients are identified. These patients are vulnerable; they suffer marginal reserve capacity and are in need for advanced medical attention at admission. Our aim was to explore factors which may affect early surgery. Age, sex, co-morbidities, type of hospital and country are common mortality risk factors across international borders, most important, these factors are modifiable through optimisation of these care processes and reduction of time to surgery when this does not compromise care.

Figure 1. Percentage in-hospital death for hip fracture related to time to surgery and country.

The Elixhauser score in our population ranged from 43 to 122. Figure 2 shows the crude mortality according to the Elixhauser score. The odds ratio of the highest scoring tertile to the lowest scoring tertile was 1.95 (1.44 – 2.63).

Figure 2. Hip fracture crude mortality rate in percentagé by Elixhauser score.

The crude mortality of 0.4% for increasing age group was 3.22 (3.24-3.35). This was followed by female sex (OR = 0.49 (0.38-0.63) and year (OR = 1.26 (1.20-1.31)), whereas time to surgery of three or more day and hospital (OR = 1.15 (1.06-1.25)), whereas time to surgery of three or more day and hospital (OR = 1.95 (1.44-2.63)) at 3.22 (3.24-3.35). This was followed by female sex (OR = 0.49 (0.38-0.63) and year (OR = 1.26 (1.20-1.31))