Fracture of the Proximal Femur in the Elderly: Effect of Delayed Surgery on Patients' Mortality and Length of Hospital Stay

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One of the clinical guidelines for the management of proximal femoral facture is early surgery (within 24 to 36 hours), following medical assessment and appropriate stabilisation of a patient's condition[1]. Delay of more than 48 hours to surgery may be associated with increased morbidity and mortality[1]. This study uses the 2007/2008 Queensland Hospital Admitted Patient Data Collection (QHAPDC) to investigate the relationship between time to surgery for patients admitted with a proximal femoral fracture and mortality and length of stay.

Table 1. Risk due to surgery delayed more than two days from admission to hospital for fracture of the proximal femur, Queensland 2007/08

		Delay Effect		
Outcome Variable	Num Obs	Odds Ratio	Upper 95% CL	Lower 95% CL
30 Day Mortality	2,445	2.15	1.64	2.83
In-hospital Mortality	1,978	1.25	0.85	1.85
LOS*	2,460	1.20	0.90	1.60

*Length of Stay in hospital, following surgery

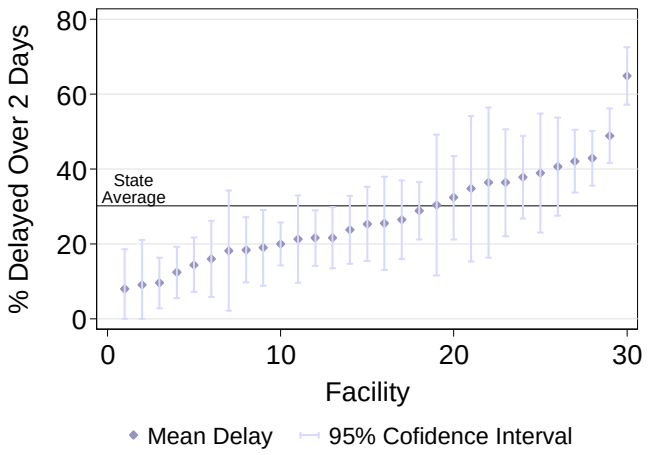
The study data consisted of patients who were admitted for an acute episode of care at a Queensland hospital offering orthopaedic services, were aged 60 years or more, and had at least one diagnosis indicating fracture of the proximal femur on admission to hospital. Episodes of care with a referral source code indicating an in-patient transfer from another facility or a change of care type were excluded. Only those episodes with a procedure code indicating that surgical repair of the proximal femur or, in the case of the mortality analyses, in-hospital death occurred within ten days of the admission date were included. The purpose of this protocol was to make the patient population in the study data as homogenous as possible. As Vidal *et al*[2] found that the gap from admission to surgery may be used as a surrogate measure of the time from fracture to surgery, this study has defined delayed surgery as greater than two calendar days from admission date.

The effect of time to surgery after adjusting for patient factors on in-hospital mortality, 30 day mortality, and length of stay after surgery dichotomised at the 90th percentile was estimated by fitting multivariable logistic regression models to the data. The patient risk factors adjusted for in the mortality models were sex, age, ischaemic heart disease, dysrhythmias, heart failure, acute lower respiratory tract infection and influenza, and renal failure. Those in the length of stay model were age, anaemia, ischaemic heart disease, dysrhythmias, ulcer of lower limb or decubitus ulcer, and renal disease. These risk factors are those from models used to calculate VLADs for hip fracture indicators[3].

The mortality results given in Table 1 show that, after adjusting for age, sex, and morbidity, patients with fracture of the proximal femur were at approximately twice the risk of mortality within 30 days of admission if surgery was delayed more than two days, but, at the 95% confidence level, there was no significant increased risk of in-hospital mortality. Such contrasting results indicate poor correlation between the in-hospital and 30 day mortality outcomes following fracture of the proximal femur. The results for length of stay, following surgery, suggest that, at the 95% confidence level, long stays following surgery are not associated with delayed surgery.

The 30 day deaths, which were obtained from data linked to Death Registry records, should identify patient outcomes better than the in-hospital mortality indicator. It is noteworthy that a US study using Veterans Health Administration data also reported low correlation between 30 day and in-hospital mortality following hip fracture[4]. The authors of that study concluded that 30 day mortality had better "face validity".

Figure 1. Proportion of separations with surgery delayed more than two days in hospitals that undertook surgery for facture of the proximal femur, Queensland, 2007/08.



The chart in Figure 1 gives the estimated proportion of patients whose surgery for fracture of the proximal femur was delayed for more than two days after admission for each of 30 public or private facilities offering orthopaedic surgery. The 95% confidence intervals indicate the facilities for which the rate of delay is significantly different from the state average. The purpose of Figure 1 is to illustrate the between-hospital variation in the delay to surgery rates. It is possible that some of the variation is because of differences in casemix rather than clinical practices. We have attempted to minimise the effect of this by risk adjusting when evaluating the association between delay to surgery and outcomes. However, it is possible that some confounding could remain. While there were some hospitals where both the delayed surgery and adjusted 30 day mortality rates were above the state average, in other hospitals delay to surgery rates were above the state average but standardised 30 day mortality rates were below the state average suggesting that care is needed in interpreting these results. Nonetheless, it is possible that time to surgery is a clinical process indicator that could be used in conjunction with an outcome, such as mortality, to monitor the surgical process.

This study found a statistically significant association between surgery delayed for more than two days and 30 day mortality, but none between in-hospital mortality or post surgical length of stay for patients admitted with facture to the proximal femur. Statistically significant variation in delay to surgery was observed across Queensland facilities. Further investigation and clinical consultation would be necessary to establish if such an indicator could be used to monitor clinical processes.

Acknowledgment

We would like to acknowledge Dr Scott Crawford, Orthopaedic Services, The Prince Charles Hospital, for his advice and assistance in preparation of this StatBite.

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