The association between length of time to urgent surgery and length of postoperative hospital stay

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Introduction

In the Canadian healthcare system, limited surgical resources are typically shared between all surgical services at a given site. Consequently, it is often the case that emergency cases booked to be done within 24 hours are not actually performed within this window of time. A longer wait for such cases to be completed might increase the length of post-operative stay, and overall cost per patient.
To date, this has not yet been demonstrated conclusively; if it were, it might bring with it significant budgetary implications for the Canadian healthcare system.

Research Question:

Does pre-operative, in-hospital time-to-surgery correlate with the length of post-operative in-hospital stay after adjusting for confounders?

Methods:

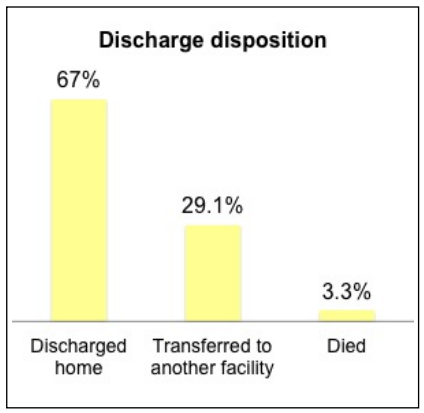
We undertook a retrospective cohort study of patients age >17 who underwent emergency surgery with a booking priority of "E24" (to be done within 24 hours) between 2008 and 2013 at University of Alberta Hospital, Edmonton, Canada.

Data was obtained from combining the surgical database and the admissions database. Variables considered were: age, sex, length of time between booking and surgery, length of time between surgery and discharge, discharge disposition, surgical specialty, procedure type, and ASA class.
Linear and logistic regression analysis were performed, with the dependent variable being time from surgery to discharge. Subgroup analysis for neurosurgical cases was also performed.

We considered time of booking rather than time of admission to account for surgery being intentionally delayed because of patient factors such as anticoagulant reversal.
Surgery delayed by six days or longer was unusual; these cases were grouped into a single category.

Results

There were 18,926 cases performed, 11,176 (59%) of cases were male. Mean age was 52.8 years. Mean length of waiting for surgery is 1.5 days. Mean length of stay after surgery was 12.5 days.



In the initial model including all patients, the time from booking to surgery did not affect the time from surgery to discharge in general, except in the group of patients who transferred to another facility. In this group (n=5,507), surgery not done within 24 hours of booking was associated with a longer post-operative stay. Male gender, increased age, and a higher ASA score were associated with a longer post-operative stay ($p<0.001$).

Neurosurgical cases model:

In this group (n= 1367), the time from booking to surgery did not affect the time from surgery to discharge. Male gender, increased age, and a higher ASA score were associated with a longer post-operative stay ($p<0.001$).

Subgroup analysis: thoracolumbar spinal fracture fixation in neurotically intact patients:

	Early Treated (less than 3 days)		Late Treated (3 days or more)		
	Mean	SD	Mean	SD	P value
Preop stay	2.34	o.62	5.67	1.47	0.0001
Postop stay	4.11	1.80	6.67	6.52	0.0072
Total hospital stay	6.46	1.94	12.35	6.96	<0.001

Conclusions and Limitations

Limitations:

This is a retrospective study with associated concerns about completeness and accuracy of the data.

Conclusions:

On average, patients booked for surgery within 24 hours waited longer than this period of time to have their procedure completed. There is a significant increase in postoperative stays in the group of patients who were discharged to another facility in over all analysis.
However, time to being ready for discharge is an important variable to include, and that could precisely determine the actual postoperative length of stay needed.

There is no significant correlation between time waiting for surgery and postoperative stay after adjusting for all confounders in the neurosurgical cases, which might be explained by variability in patient illness and urgency.

Higher ASA class and increase age were significantly associated with longer postoperative stays n both models.

Late treated group of patient who had thoracolumbar fracture fixation have a longer post op hospital stay.

References:

Kerwin AJ, Frykberg ER, Schinco MA, et al. The effect of early spine ?xation on non-neurologic outcome.J Trauma 2005;58:15–21.
Chipman JG, Deuser WE, Beilman GJ. Early surgery for thoracolumbar spine injuries decreases complications.J Trauma 2004;56:52–7.