Postoperative Outcome after Hip Fracture Surgery

The impact of after-hours surgery

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Background and goal of study: Hip fractures are the most common osteoporotic fractures in Sweden and are associated with high mortality and morbidity. The poor outcome is not fully understood and may be related to other factors than the surgery itself. After-hours surgery is a much-debated subject and is often considered a risk factor. However, literature regarding the impact of after-hours surgery is equivocal. The primary aim of this study is to investigate the effect of after-hours surgery on short- and mid-term mortalities (30 and 365 days) in Östergötland County Council. Secondary aims of the study are to analyze the impact of logistical changes at Linköping University Hospital, and compare outcomes between the two hospitals in the county.

Methods: A retrospective, registry-based cohort study including all adult (≥ 18 years) patients undergoing acute hip fracture surgery in Östergötland County Council from 1 Jan 2014-31 Dec 2015. Outcome measures were all cause 30- and 365-day mortality. To analyze the impact of after-hours surgery and potential differences between hospitals we used COX-regression analysis along with Kaplan-Meier survival plots.

Results and discussion: A total of 1192 patients were included. No significant differences in mortality were found when comparing different times of surgery after risk adjustment. Thirty day-mortality was 9.5 % and 365-day mortality was 26.8 %. The logistical changes at Linköping University Hospital affected waiting time for surgery and length of stay at post-anesthesia care units, but were not associated with any significant differences in mortality. Non-university hospital status was associated with significantly higher mortality: adjusted 30-day mortality was 11.2 % and 7.8 % respectively ($p=0.040$) and 365-day mortality was 31.5 % and 22.6 % respectively ($p<0.001$). Age, ASA-PS class and male gender were also associated with adverse outcomes.

Conclusion: Time of surgery did not affect 30- nor 365-day mortality. Increasing age, higher ASA-PS class, surgery at a non-university hospital and male gender were associated with increased 30- and 365-day mortalities.

Time of day	30d-mortality (95 % C.I.)	p-value	365d-mortality (95 % C.I.)	p-value
Daytime	8.9 % (6-11)	0.56	27.4 % (22-33)	0.74
Other*	11.3 % (8-15)		26.4 % (23-30)	
Evening	11.0 % (6-16)	0.38	24.3 % (18-31)	0.72
Other*	9.4 % (7-12)		27.4 % (24-31)	
Nighttime	11.8 % (5-19)	0.47	33.3 % (24-43)	0.86
Other*	9.4 % (7-12)		25.8 % (23-29)	
Weekend	9.0 % (6-12)	0.66	27.1 % (23-31)	0.88
Weekdays	9.7 % (8-12)		26.7 % (24-30)	

Table 1. Crude 30 and 365 day-mortality in Östergötland County Council, sorted by time of surgery along with univariate analysis of impact on mortality.

* "Other" equals all other patients in our study cohort.

Figure 1. Kaplan Meier-survival plot for 365 day-mortality at Vrinnevi Hospital (ViN) and Linköping University Hospital (US).

	Adj. Hazard Ratio	95% Confidence Interval		p-value
Age	1.05	1.04	1.07	<0.001
Male Gender	1.45	1.08	1.95	0.01
ASA-PS-Class	2.59	2.07	3.24	<0.001
University Hospital	0.58	0.43	0.77	<0.001
Elective surgery	0.13	0.02	0.97	0.05
Time in theatre	0.99	0.99	1.00	0.05
Time to surgery	1.00	1.00	1.00	0.46

Table 2. Multivariable analysis of 365-day mortality.