Effect of Night Surgery on Postoperative Complications and Healthcare Utilization: A Prospective Analysis from New England Hospitals

K. J. Ruscic¹, P. Rostin^{1,2}, C. Lukannek^{1,2}, S. Grabitz¹, M. Eikermann²

¹Massachusetts General Hospital, Department of Anesthesia, Critical Care and Pain Medicine - Boston (United States),
²Beth Israel Deaconess Medical Center, Department of Anesthesia, Critical Care and Pain Medicine - Boston (United States)

Background

- Some surgeries are performed late in the day in order to maximize utilization of the hospital operating rooms and available staff
- There is conflicting data on whether surgery at night increases patient harm

Methods

- Study design:** Hospital based registry study
- Study cohort:** 153,460 adults, non-cardiac surgical cases with endotracheal intubation at Massachusetts General Hospital and two affiliated hospitals between 2007 and 2015.
- Exposure:** Nighttime surgery (anesthesia start time between 5pm and 7am)
- Primary objective**
To evaluate the association between night surgery and readmission rates
- Exploratory objective**
To evaluate other intermediate and long term consequences of night surgery such as adverse discharge (in-hospital mortality, or discharge to a nursing facility), 30-day mortality, and postoperative complications (respiratory, cardiovascular, acute kidney injury, and stroke)
- Statistical analysis:** Propensity matched logistic regression analysis
- Matched variables:** Gender, age, BMI, ASA class, SPORC [1], CCI [2], admission type, urgent or emergent surgery, surgical service, duration of surgery, surgery year, work RVU, vasopressors, hypotension, opioids, NMBAs, neostigmine, fluids, PRBCs, dose of volatile agents, nitrous oxide, propofol, neuraxial anesthesia, and S/F ratio.

References

[1] Brueckmann et al., The Journal of the American Society of Anesthesiologists, 2013.

[2] Charlson et al., Journal of chronic diseases. 1987

Table 1. Characteristics of matched study population (Excerpt)

Characteristics	Surgery at daytime (7am-5pm) (n=8281)	Surgery at nighttime (5pm-7am) (n=8281)
Gender, female	3995 (48.2%)	3991 (48.2%)
Age, years	52.13 ± 18.33	51.33 ± 18.38
Body mass index, kg/m ² , median(IQR)	26.708 (23.46, 30.84)	26.70 (23.43, 31.05)
ASA		
1	1092 (13.2%)	1281 (15.5%)
2	3694 (44.6%)	3616 (43.7%)
3	3117 (37.6%)	2996 (36.2%)
4	373 (4.5%)	375 (4.5%)
5	5 (0.1%)	13 (0.2%)
CCI [2], median(IQR)	2.00 (0.00, 4.00)	1.00 (0.00, 4.00)
Admission type		
Inpatient	564 (6.8%)	573 (6.9%)
Same day	1032 (12.5%)	1050 (12.7%)
Ambulatory	6685 (80.7%)	6658 (80.4%)
Emergency surgery	4321 (52.2%)	4359 (52.6%)
Duration of procedure, minutes	145.52 ± 90.86	141.25 ± 95.66
Vasopressor dose, median (IQR)	0.02 (0.00, 0.20)	0.02 (0.00, 0.17)
Mean SaO ₂ /FiO ₂ , median (IQR)	181.82 (156.25, 230.59)	183.02 (158.98, 232.56)

Results

8,281 surgeries at nighttime
13.7% overall 30-day readmission rate

- Primary analysis**
No association of night surgery with higher readmission rates (OR, 1.07, 95% CI 0.98-1.18, p=0.15)
- Exploratory analyses**
Adverse discharge, thirty-day mortality and composite morbidity did not significantly differ.
Night surgery was associated with significantly higher odds of respiratory complications and acute kidney injury (1.20, 95% CI 1.08-1.33, p=0.001) and (1.30, 95% CI 1.12-1.51, p=0.001)

Conclusion

- We did not find that night surgery increases readmission.
- Though surgery at night cannot always be avoided, it is associated with increased pulmonary complications and acute kidney injury. This warrants further study and begs consideration when cases are booked to start during nighttime hours.