

The Effect of Weekend and After-Hours Surgery on Morbidity and Mortality Rates in Pediatric Neurosurgery Virendra Rajendrakumar Desai MD; Andrew Jea MD; David D. Gonda MD; Sandi Lam MD MBA; Thomas G. Luerssen BS,

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Introduction

"Weekend effect" is an increased 30-day morbidity and mortality risk among pediatric and adult patients who are admitted on the weekends.

Learning Objectives

1. To understand the effect of operating during after-hours or during weekends on patients' outcomes.

2. To identify complication rates between cases performed during regular hours versus after hours.

TABLE 1. Case characteristi			
	After Hours (n=276)	M-F Daytime Hours (n=434)	P-value
Age (median years with interquartile range)	6 (2-12)	8 (4-14)	<0.001
Level			< 0.001
Urgent	201	371	
Emergency	75	63	
OR time (minutes)	155.1 ± 85 (133.5)	186.9 ± 125.6 (147)	<0.001
M&M	35 (12.7%)	38 (8.8%)	0.100
CSF Diversion Procedure	176 (63.8%)	285 (65.7%)	0.629
ASA			0.22
1	6 (2.2)	3 (0.7)	
2	29 (10.5)	50 (11.5)	
3	195 (70.6)	327 (75.3)	
4	43 (15.6)	53 (12.2)	
5	3 (1.1)	1 (0.2)	

Methods

Analyzed 710 urgent (within 30 minutes) or emergent (within 12 hours) neurosurgical procedures between December 1, 2011 and August 20, 2014 at Texas Children's Hospital in children < 18 years old.

Split into regular-hours and after-hours groups. Cross-referenced these procedures with our morbidity and mortality database to examine the impact of the day and time on complication incidence.

	Odds Ratio (95% CI)	P-value
ge (continuous variable)	1.075 (1.033-1.119)	0.0003
Level (urgent, emergent)	0.709 (0.409-1.282)	0.2586
After Hours (Sat., Sun., or 7 p.m.–7 a.m.)	1.513 (0.927-2.463)	0.0949
Weekend (Sat., Sun.)	1.327 (0.735-2.298)	0.3275
Night (7 p.m.– 7 a.m.)	1.306 (0.748–2.208)	0.3318
Procedure type (CSF diversion versus other)	1.487 (0.881-2.604)	0.1490
ASA (>3)	1.037 (0.535-2.215)	0.9203

TABLE 3. Multivariate odds ratio for M&M occurrence*

	Odds Ratio (95% CI)	P-value
Age (continuous variable)	1.083 (1.040-1.128)	0.0001
After Hours (Sat., Sun., or 7 p.m7 a.m.)	1.790 (1.083-2.961)	0.0227
Procedure type (CSF diversion versus other)	1.521 (0.894-2.684)	0.1328

Conclusions

Weekday after-hours and weekend emergent pediatric neurosurgical procedures are associated with significantly increased 30-day morbidity and mortality risk compared to procedures performed during weekday regular hours.

	After Hours (n=276)	M-F Daytime Hours (n=434)	
Complications n (%)			P-value
Infection	10 (3.6)	9 (2.1)	0.238
CSF leak	6 (2.2)	11 (2.5)	1
Early Return to OR	13 (4.7)	14 (3.2)	0.321
Post-operative hemorrhage	4 (1.5)	3 (0.7)	0.44
Other	7 (2.5)	6 (1.4)	0.268
Death	3 (1.1)	0 (0)	0.058

References

1.Arias Y, Taylor DS, Marcin JP: Association between evening admissions and higher mortality rates in the pediatric intensive care unit. Pediatrics 113:e530-534, 2004

2.Buckley D, Bulger D: Trends and weekly and seasonal cycles in the rate of errors in the clinical management of hospitalized patients. Chronobiol Int 29:947-954, 2012

3.Concha OP, Gallego B, Hillman K, Delaney GP, Coiera E: Do variations in hospital mortality patterns after weekend admission reflect reduced quality of care or different patient cohorts? A population-based study. BMJ Qual Saf 23:215-222, 2014 4.Crowley RW, Yeoh HK, Stukenborg GJ, Ionescu AA, Kassell NF, Dumont AS: Influence of weekend versus weekday hospital admission on mortality following subarachnoid hemorrhage. Clinical article. J Neurosurg 111:60-66, 2009 5.Drake JM, Riva-Cambrin J, Jea A, Auguste K, Tamber M, Lamberti-Pasculli M: Prospective surveillance of complications in a pediatric neurosurgery unit 1 Neurosurg Pediatr 5:544-548, 2010

pediatric neurosurgery unit. J Neurosurg Pediatr 5:544-548, 2010 6.Goldstein SD, Papandria DJ, Aboagye J, Salazar JH, Van Arendonk K, Al-Omar K, et al: The "weekend effect" in pediatric surgery - increased mortality for children undergoing urgent surgery during the weekend. J Pediatr Surg 49:1087-1091, 2014 7.Hixson ED, Davis S, Morris S, Harrison AM: Do weekends or evenings matter in a pediatric intensive care unit? Pediatr Crit Care Med 6:523-530, 2005