The Impact of Trainees on Efficiency and Patient Outcomes for Pediatric Circumcisions: Residents vs. Fellows

Izabela C. Leahy, MS, RN, BSN, Kelly K. Barry, BS, Amanda W. Baier, MPH, Steven J. Staffa, MS, Robert M. Brustowicz, MD

Boston Children's Hospital Department of Anesthesiology, Critical Care and Pain Medicine, Harvard Medical School

Introduction

Teaching hospitals face competing priorities of training and educating residents and fellows while maintaining efficient, quality, cost-effective care.[1,2] Their level of experience has an impact on such measures.[3] The goal of this study is to elucidate the effect of residents and fellows on efficiency measures and patient outcomes in a teaching hospital and outpatient setting.

Methods

After IRB approval, all circumcisions performed at Boston Children's Hospital and its Waltham, MA campus from 2016 to June of 2017 (n=476) were queried. Patients with ASA status >II, those undergoing multiple concurrent procedures and those with missing pain scores were excluded.

Variables compared between cases with residents (n=102), fellows (n=40) or no trainee (n=334):

- Total Length of Stay (LOS)
- Wheels In to Incision (WII)
- Surgical duration
- Surgical End to Transport (SET) time
- PACU duration
- Pain score

The Wilcoxon rank sum test was used to compare the outcomes between groups. Significance was set at p<0.05.

Figure 1. Perioperative experience by presence of anesthesia trainees.

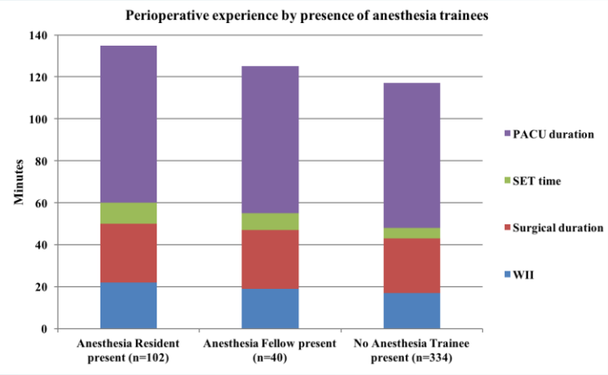

Table 1. Univariate analysis of outcomes by presence of anesthesia trainees.

Outcome	Anesthesia Resident present (n=102)	Anesthesia Fellow present (n=40)	No Anesthesia Trainee present (n=334)	P (Residents vs. No Trainee)	P (Fellows vs. No Trainee)	P (Residents vs. Fellows)
LOS (minutes)	256 (226-300)	238 (200-273)	214 (179-263)	**<0.001**	0.064	**0.024**
WII (minutes)	22 (19-27)	19 (16-23)	17 (15-19)	**<0.001**	0.061	**<0.001**
Surgical Duration (minutes)	28 (23-34)	28 (22-35)	26 (22-32)	**0.019**	0.347	0.666
SET time (minutes)	10 (7-13)	8 (6-12)	5 (4-8)	**<0.001**	**<0.001**	0.055
PACU Duration (minutes)	75 (62-92)	70 (52-95)	69 (53-87)	**0.006**	0.701	0.231
Pain score	0 (0-2)	0 (0-5)	0 (0-0)	**<0.001**	**0.002**	0.430

Median (IQR) presented for all variables

P values were obtained using the Wilcoxon rank sum test

Table 2. Multivariable analysis of outcomes.

	Anesthesia Resident present vs. No Trainees			Anesthesia Fellow present vs. No Trainees			Anesthesia Resident present vs. Fellow present		
Outcome	Coefficient	95 % CI	P	Coefficient	95 % CI	P	Coefficient	95 % CI	P
LOS (minutes)	44.8	(31, 59)	**<0.001**	28.8	(8, 50)	**0.006**	16	(-7, 39)	0.168
WII (minutes)	4.4	(3.1, 5.6)	**<0.001**	1.8	(-0.1, 3.6)	0.063	2.6	(0.6, 4.7)	**0.011**
Surgical Duration (minutes)	3	(1, 5)	**0.004**	2	(-1, 5)	0.194	1	(-2, 4)	0.555
SET time (minutes)	5	(4, 6)	**<0.001**	3	(1.5, 4.5)	**<0.001**	2	(0.4, 3.6)	**0.017**
PACU Duration (minutes)	9.2	(2.7, 15.7)	**0.005**	4	(-6, 14)	0.414	4.2	(6.4, 14.8)	0.436
Pain score	0.6	(0.1, 1.1)	**0.019**	1.4	(0.6, 2.2)	**<0.001**	-0.8	(-1.6, 0.1)	0.063

Adjusted coefficients, 95% Confidence intervals, and P values obtained from multivariable quantile regression on the median due to skewedness outcomes. Results are adjusted for age at surgery and ASA Classification.

Results

Anesthesia Resident vs. No Anesthesia Trainee*

- Longer LOS, WII, Surgical Duration, SET time, PACU duration
- Higher pain scores

Anesthesia Resident vs. Anesthesia Fellow*

- Longer WII

Anesthesia Fellow vs. No Anesthesia Trainee*

- Longer SET Time
- Higher pain scores

See Table 1 for summary of the univariate results and P values. Multivariable analysis was used to adjust for age and ASA Classification (Table 2).

* Results reflect variables with significant P values for both univariate and multivariable analysis

Discussion

When examining the efficiency parameters and patient outcomes, resident trainees demonstrated the greatest difference when compared to no anesthesia trainees. When comparing fellows to no anesthesia trainees, the differences were smaller, reflecting the fellows' greater degree of experience.

While an earlier cited study[3] limited their comparisons to specific intraoperative events, the data presented here demonstrates that the entire perioperative experience is affected by the presence of trainees.

This analysis was limited by its retrospective nature. Future analyses will quantify the fiscal impact of trainees on hospital costs.

References

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