First Pass Success Rates of Out-Of-Hospital Advanced Airway Management in Adults and Children

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Introduction

Prehospital advanced airway management (AAM, including endotracheal intubation (ETI) and supraglottic airway insertion (SGA)) of children is difficult. Multiple AAM attempts are associated with increased adverse events. We sought to compare AAM first-pass success (FPS) rates between adults and children in a national cohort of EMS agencies.

Methods

We used 2017 clinical data from ESO, a national electronic health record system encompassing over 2,000 EMS agencies. We included all patients receiving any AAM attempts. FPS success was self-reported. Using multivariable logistic regression, we compared the odds of ETI FPS between adults (age >=14 years) and children (age <14 years), adjusting for gender, ethnicity, primary impression, and drug facilitation. We repeated the analysis for SGA FPS. Statistics were performed using R. Approval was waived by the Baylor Scott & White IRB.
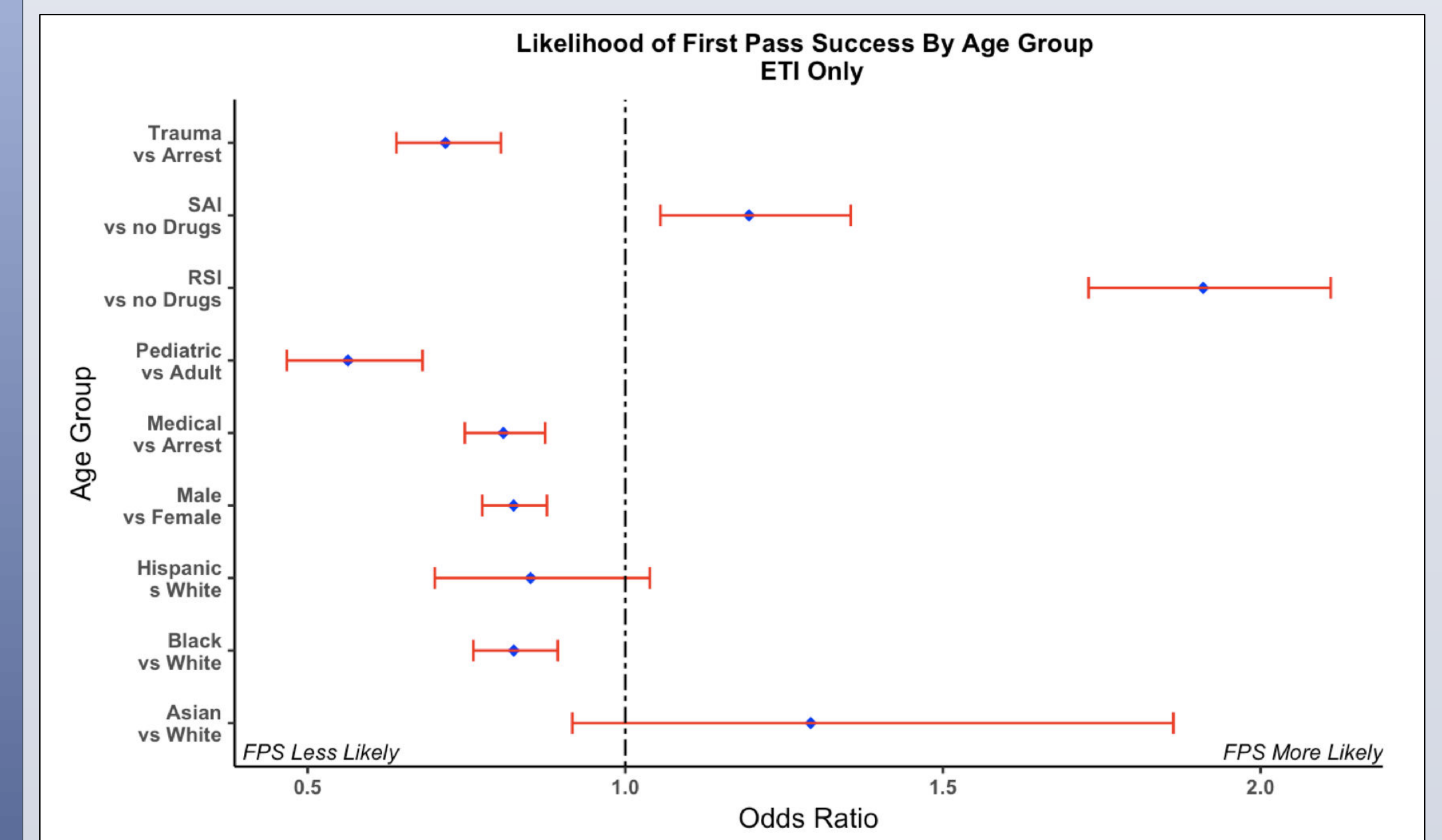
Results

During the one year period, 731 EMS agencies attempted AAM on 29,369 patients (median 18 per agency [IQR 6, 43]).

Conclusions

ETI FPS is lower in children than adults. SGA FPS does not differ between children and adults. It may be reasonable to adopt an SGA first approach in pediatric patients.

Characteristics of Data Set by Adult versus Pediatric

		Adult	Pedi
n		28846	523
Age (median [IQR])		65.06 [51.66, 76.38]	2.22 [1.19, 6.74]
Identity (%)	Asian	231 (0.8)	6 (1.1)
	Black	5091 (17.6)	119 (22.8)
	Hispanic	610 (2.1)	23 (4.4)
	Native Am	80 (0.3)	5 (1.0)
	Not Known	4090 (14.2)	96 (18.4)
	White	18744 (65.0)	274 (52.4)
Gender (%)	Female	11209 (38.9)	217 (41.5)
	Male	17464 (60.5)	305 (58.3)
	Not Reported	173 (0.6)	1 (0.2)
Primary Imp. (%)	Cardiac Arrest	19406 (67.3)	354 (67.7)
	Medical	7297 (25.3)	100 (19.1)
	Trauma	2143 (7.4)	69 (13.2)
Airway Method (%)	ETI	22049 (76.4)	471 (90.1)
	SGA	6797 (23.6)	52 (9.9)
Drug Assisted (%)	Not a DAI	23136 (80.2)	456 (87.2)
	RSI	4063 (14.1)	50 (9.6)
	SAI	1647 (5.7)	17 (3.3)
Run Type (%)	911 Response	28,562 (99.0)	513 (98.3)
	Interfacility Transfer	201 (0.7)	9 (1.7)
	Mutual Aid	74 (0.3)	0 (0.0)
	Other	9 (0.0)	0 (0.0)

Adult and Pediatric FPS with ETI and SGA

	ETI (n)	ETI FPS Rate (%)	Adjusted OR (95%CI)	SGA (n)	SGA FPS Rate (%)	Adjusted OR (95%CI)
Adult (referent)	22,049	72.7%		6,797	89.8%	
Pedi	471	58.5%	0.6 (0.5 to 0.7) $p < 0.001$	52	84.6%	0.6 (0.3 to 1.4) $p = 0.24$
Age Groups						
<1	78	52.6%	0.44 (0.2 to 0.7)	6	66.7%	0.2 (0.04 to 1.7)
1 to <6	274	55.8%	0.5 (0.4 to 0.6)	20	100%	-
6 to <10	52	63.5%	0.7 (0.4 to 1.3)	7	57.1%	0.2 (0.04 to 0.9)
10 to <14	103	69.9%	0.9 (0.6 to 1.4)	23	78.3%	0.4 (0.2 to 1.2)
=>14 (referent)	22,013	72.7%	$p < 0.001$	6,793	89.9%	$p = 0.44$

Likelihood of First Pass Success By Age Group ETI Only

Acknowledgements