

ASSESSING TIDAL VOLUMES DELIVERED BY AN ADULT AND PEDIATRIC BVMS WHEN USING CHEST RISE AS AN END-POINT

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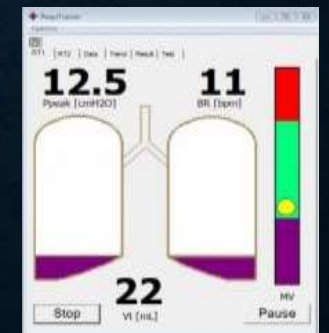
BACKGROUND / HYPOTHESIS

- Lung-protective ventilation reduces morbidity and mortality in adult patients requiring positive-pressure ventilation.
- In a previous study, EMS professionals delivered median tidal volumes of greater than 800 ml with the adult-sized BVM and over 600 mL with the pediatric-sized BVM when allowed to ventilate without restriction for 1 minute sessions.
- **Primary Hypothesis:** What were the volumes delivered by the adult and pediatric BVM when the provider was instructed to use chest rise as an end-point?
- **Secondary Hypothesis:** How likely were the adult- and pediatric-sized BVMs able to provide appropriate lung-protective ventilation on an adult-sized ventilation simulator?

METHODS / PARTICIPANTS

- Conveniently recruited at Abbott Ambulance in St. Louis, MO.
- Utilize the Respitainer Advance from Ingmar Medical.
- Instructions for Participants:
 - Flip a coin to determine start with adult vs pediatric BVM.
 - Stop squeezing when chest rest initiated on simulator.
 - Ventilate for 1 minute.

Characteristic	Value
Sex, number (%)	
Male	39 (78)
Female	11 (22)
Provider levels, number (%)	
EMT	37 (74)
Paramedics	13 (26)
Median age (range)	28 (18 to 64)
Median years of experience (range)	4 (1 to 41)



RESULTS

- Reduction in median tidal volumes was statistically significant ($p < 0.05$).

BVM size	Tidal volume (ml)	
	Median	95% CI
Adult BVM	614	607.5 – 633.5
Pediatric BVM	476	475.5 – 486.0

- The difference in lung protective tidal volume percents delivered between adult and pediatric BVMs was statistically significant ($p < 0.05$).

Tidal volume range (ml)	Breaths delivered, count (%)	
	Adult BVM	Pediatric BVM
< 420	7 (2.1)	60 (19.0)
420 - 560	114 (34.9)	219 (69.3)
> 560	206 (63.0)	37 (11.7)
Total	327	316

CONCLUSIONS

- We feel that the pediatric-sized BVM provides safer tidal volumes to a patient in the era of lung-protective ventilation.
- Even when being told to stop squeezing the BVM at chest rise, EMS providers are still delivering excessive tidal volumes with the adult BVM as compared to the lung-protective ventilation strategy.