FANSHAWE COLLEGE PARAMEDIC PROGRAMS
Paramedic – Evidence Based Medicine
Paramedic Critically Appraised Topic

Title: Endotracheal intubation following the bag valve mask (BVM) when assisting ventilations for a pediatric patient.

Reported by: Martha Helmers

2nd Party appraiser:

Clinical Scenario: Two medics were dispatched to a baseball diamond for a ten-year-old female patient who had been struck on the back of the head with a baseball. The patient was reported to not be breathing. Upon arrival the paramedics found the young patient apneic with a strong carotid pulse. The ALS paramedic immediately preformed endotracheal intubation (ETI) on the young patient and the BLS paramedic followed this and performed assisted ventilations with the bag valve mask (BVM). The patient was transported to a nearby hospital. The young patient was discharged from the hospital within the month. Had this patient not been treated with ETI, but BVM only, would she have had the same outcome?

P-I-C-O (Population – Intervention – Comparison- Outcome) Question:
In pediatric patients, does addition of endotracheal intubation following the BVM when assisting ventilations provide superior care in the pre-hospital setting compared to using BVM alone?

Search Strategy:
(Child OR Children OR kids OR kid OR paediatric OR paediatrics OR pediatric OR pediatrics OR youth OR adolescents OR teens) AND (BVM OR bag valve mask OR pocket mask OR bagging) AND (ETI OR endotracheal intubation OR Endotracheal tube OR Endotracheal OR Intubation)
Reproducible search strategy found at the end

Search outcomes:
81 Results were found and reviewed; however, only 3 articles were deemed relevant on completion of reviewing the titles and the abstract of the articles found from Medline and Cinahl

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Relevant Papers:

Author & Date	Population: Sample characteristics	Design	Outcomes	Results	Strengths / Weaknesses
Gausche et al (2000)	830 patients age 12 years or younger Weighing less than 40kg Requiring airway management	Controlled Clinical Trial	Survival and neurological outcomes at hospital discharge	No significant differences between the two methods were found ETI &BVM group: 110/416 (26% survival) BVM group: 123/404 (30% survival) ETI & BVM group 85/416 (20% good neurological outcome) BVM group 92/404 (23% good neurological outcomes)	<u>Strengths:</u> -Total number of patients for the population size was large enough to conduct an effective study -Training was completed specific to the study; therefore all paramedics were conducting the procedures in very similar manners. <u>Weaknesses:</u> -the study was restricted to only two counties -The study was conducted in only urban areas where long transport times were not taken into account for survival rates. -For the procedural training for this study, only mannequins where used. -This could create a flaw in how well paramedics practiced ETI or creating a proper and affective mask seal on the patients.

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Ehrlich et al (2004)	2,907 trauma patients Ages 19 and younger	Retrospective study	Effectiveness of field ETI in rural pediatric trauma patients	105 out of 2,907 patients met study criteria 155 ETI's attempted on 105 children (1 to 6 per patient) 57% were attempted in the field. 22% attempted in transfer to hospital. 21% attempts in Trauma Center. Successful intubation in the field 67% Successful intubation in the hospital 69% Subsequent failures 50% in the field 0% in the hospitals -Airway complications/multiple ETI lead to transport delay lower GCS longer hospital stay -Multiple ETI attempts (complications) limited advantage over the BVM -possibly affect the outcome	<u>Strengths:</u> -large population size -Study was conducted in Rural West Virginia. This gives insight into ETI and its affectedness in a rural trauma transport in pediatric patients. -observations on the pediatric airway anatomy -Study was conducted over a long period of time to identify patients that fit criteria <u>Weaknesses</u>: -Not limited to paramedics/pre-hospital preforming of endotracheal intubation -Flight RN's, ED physicians and anesthesiologist -Multiple failed attempts at ETI were recorded associated with longer transport time. -There was no specification on how the patient was being transported.
Stockinger and	5,773 trauma patients	Retrospective study	The survival benefit of	5,773 patients enrolled in the study	<u>Strengths:</u> -Population size is high

McSwain (2004)	transported to the trauma center who had received ETI or BVM		preforming pre-hospital endotracheal intubation on trauma patients	of these patients 533 would receive ETI or BVM Age range included 2-97 years Receiving ETI - 316(5.5%) Receiving BVM – 217(3.8%) Found that ETI patients experienced an increase in the transport time (22.0 vs 20.1 minutes $p = 0.0241$)	-Study was conducted through a long period of time creating an advantage for accurate results -The study looked at several outcomes that could provide information based on the superiority of ETI -Focused on the Mortality and Mechanism of injury as well as pre-hospital time <u>Weaknesses:</u> -The groups for either receiving BVM and ETI could have been possibly different population groups -The ETI group could have been made upon a selection bias because of the more significant trauma associated with this population.

Comments:
Consideration should be made towards the fact that while this PICO question is based on pediatric patients only, the final article does not focus on pediatric patients but on all trauma patients. Furthermore, there was not much to be found in regards to pediatrics and ETI; but overall, the main study conclusions were that there should be a consideration that ETI causes more harm than good as well as increased scene time.

Consider: Why would you not change practice based on this article?
Considering that there are not many studies done on the topic of ETI in pediatric patients, further research is required before a definitive conclusion can be made. For the moment, there is therefore not enough evidence to change current practices in pre-hospital airway management.

Clinical Bottom Line:
Because of the minimal amount of research on ETI and the pediatric population, further studies should be conducted in order to get a concrete decision on whether ETI is a superior method over use of the bag valve mask on its own.

References:

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Ehrlich, P. F., Seidman, P. S., Atallah, O., Haque, A., & Helmkamp, J. (2004) Endotracheal intubations in rural pediatric trauma patients. *Journal of Pediatric surgery 39* (9) DOI: 10.1016/j.jpedsurg.2004.05.010

Gausche, M., Lewis, R. J., Stratton, S. J., Haynes, B. E., Gunter, C. S., Poore, P. D., … Seidel, J. S. (2000). Effect of out-of-hospital pediatric endotracheal intubation on survival and neurological outcome. *Caring for the Critically Ill Patient, 283*(6). DOI: 0.1001/jama.283.6.783

Stockinger, Z. & T., McSwain, N. E. (2004). Prehospital endotracheal intubation for trauma does not improve survival over bag-valve-mask ventilation. *The Journal of Trauma, Injury, Infection, and Critical Care, 56* (3). DOI: 10.1097/01.TA.0000111755.94642.29

Reproducible search strategy:

Searching: **MEDLINE, CINAHL**

Search ID#	Search Terms	Actions
S23	S11 AND S16 AND S22	View Results (81)
S22	S17 OR S18 OR S19 OR S20 OR S21	View Results (87,145)
S21	intubation	View Results (78,071)
S20	endotracheal	View Results (24,125)
S19	endotracheal tube	View Results (10,668)
S18	endotracheal intubation	View Results (15,886)
S17	ETI	View Results (1,244)
S16	S12 OR S13 OR S14 OR S15	View Results (1,307)
S15	bagging	View Results (541)
S14	pocket mask	View Results (82)
S13	bag valve mask	View Results (553)
S12		View Results (258)

	BVM	
S11	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10	View Results (2,945,292)
S10	adolescents	View Results (208,616)
S9	youth	View Results (81,268)
S8	pediatrics	View Results (753,837)
S7	pediatric	View Results (753,837)
S6	peadiatrics	View Results (65)
S5	peadiatric	View Results (158)
S4	kid	View Results (13,522)
S3	kids	View Results (12,208)
S2	children	View Results (1,447,614)
S1	child	View Results (2,257,292)