Quality Assurance Of Pre-hospital Endotracheal Intubation Performed By Advanced Care Paramedics (ACPs) In Ottawa, Canada

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Background

- ETI as "gold standard" of airway care in unconscious patients
- Provide secured airway during transport
- Optimize oxygenation and ventilation
- Pulmonary toileting
- Route of drugs administration

Success & outcome

Study	Success Rate	Arrest/ coma	NT/OT	Comp	Pediatrics
Stewart	90.9	Yes	ОТ	9.5	NA
O'Brian	71.3	No	NT	13.0	NA
Jacobs	96.6	Mainly	ОТ	NA	NA
Pointer	88.9	Yes	ОТ	7.4	All
Losek	76.5	No	ОТ	NA	All
Delec	90.6	NA	ОТ	5.1	Yes
Pointer	93.5	Yes	ОТ	31.3	No
Aijan	64.0	Yes	ОТ	7.0	All
Krisanda	75.0	Ν	NT/OT	7.0	Yes

Current Controversy

- Modify patient outcome
 - Beneficial vs harmful
- Mode of training
- Skill retention
- Drug-assisted intubation
- Alternative airways

Objectives

- Primary Objective:
 - Ottawa's pre-hospital ETI success rate
- Secondary Objective:
 - To identify potential barriers and complications

Methods

- Retrospective review of Ambulance Call Reports (ACRs) involving invasive airway management by ACPs
- Study period: July 1st 2003 July 31st 2005

Definitions

Age:

- Adults: >=8 yrs old
- Children: < 8 yrs old</p>
 - AHA ACLS 2000

Definitions

ETI attempt

 ETT beyond oropharynx

ETI success

 ETT position confirmed clinically and be able to ventilate through it

Study target

- Advanced Care Paramedics (ACPs)
 - 150 ACPs in Ottawa region
 - Scope of practice
 - ACLS
 - Symptoms relief intervention
 - Perform pre-hospital endotracheal intubation (ETI) as clinically indicated
 - Non DAI

Data source

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- Ambulance Call Reports
 - Mandatory reports
 (>95%)



Inclusion criteria

 All patients attended during the study period by Ottawa ACPs

Exclusion criteria

- ETI not performed by ACPs
- Inter-provincial transfer
- Inter-facilities transfer
- Physicians on scene

Method (Data collection)

- 3 independent chart extractors
- Reviewed all eligible ACRs, and transcribed onto a predetermined data entry form
- Conflicting of interpretation was resolved by agreement between the two principle investigators

Statistical analysis

- Descriptive statistical analysis
- Univariate analysis on demographics data
- Logistic regression to determine environmental barriers and complications

Study enrollment flowchart



Patient demographics

	Total	Non- transported	Transported
Total ACRs	1029	514	515
Sex (M)	640	343	297
Adults	1013	510	503
Pediatrics	9	0	9

Patient demographics

- Age:
 - Median 69, range (0-97)

Nature of EMS calls



Overall successful attempts

	Overall success rate	Success rate in non-transported	Success rate in Transported
Overall ACRs	82.1%	86.4%	77.6%
VSA	86.3%	86.7%	85.7%
Medical Pts	82.4%	86.7%	78.4%
Trauma Pts	69.8%	75.0%	69.1%
Adults	82.1%	86.3%	77.7%
Children	77.8%	NA	77.8%

Success in first attempts

	Overall ACRs success Rate	Non-transported success rate	Transported success rate
Overall	63.6%	66.5%	62.7%
VSA	67.0%	66.5%	67.8%
Medical Pts	65.3%	67.3%	63.4%
Trauma Pts	53.5%	0%	54.8%
Adults	65.0%	66.3%	63.6%
Children	22.2%	NA	22.2%

VSA patients on 1st ETI attempts



Route of ETI on 1st attempts



Success: oral vs nasal route on 1st attempts

	Overall	Non- transported	Transported
Nasal route	54.7%	NA	54.97%
Oral route	66.1%	66.54%	65.84%

Success rates in sequential attempts and cumulative attempts









Success in 1st attempts

Descriptive data	p values
Age	0.055
Gender	0.0280
Nature EMS calls	0.182
Pre-intubated GCS (3 vs >3)	0.080

Factors influencing overall success

Descriptive data	p valves
Pre-intubation GCS (3 vs >3)	0.003
VSA	<0.001



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- Our ETI success rate of 82.1% is consistent with rates reported in the literature
- There is no significant improvement in success rates after the 2nd attempt

- Positive predicting variables of success
 - VSA
 - Pre-intubation GSC=3

- Negative predicting variables of success
 - Combative, alert patients
 - Unable to visualize vocal cords

- Complication rate was 3.2%, excluding equipment issues
- Equipment failure and vomiting were common complications

Conclusion

- Ongoing QA of pre-hospital ETI is critical to ensure successful airway management
- Patient and environmental barriers to ETI success can be identified
- Protocols and training for pre-hospital ETI must consider a risk stratification approach

Limitations

- Retrospective chart review on ACRs; quality of the chart documentation varied
- Lack of independent field validation on ETI confirmation
- No hospital data on transported patients
- Outcome measurement limited to documented intubation success

Future

- National standardized ETI data collection
- Multi-centers collaboration on children

References

- ¹Krisanda TJ, Eitel DR, et al: An analysis of invasive airway management in a suburban emergency medical services system. *Prehosp Disaster Med.* 1992; 7(2): 121-6.
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Acknowledgements

- Grant support from the Department of Emergency Medicine Academic Funds for 2005 Special Projects, University of Ottawa, Ontario
- Ottawa Paramedic Service
- Ottawa Base Hospital Program

Study partners







L'Université canadienne Canada's university CHALMERS RESEARCH GROUP



Nov 2006