Intubation difficile non prévue en situation prehospitaliere

Dr VINCLAIR, Pôle anesthésie-réanimation

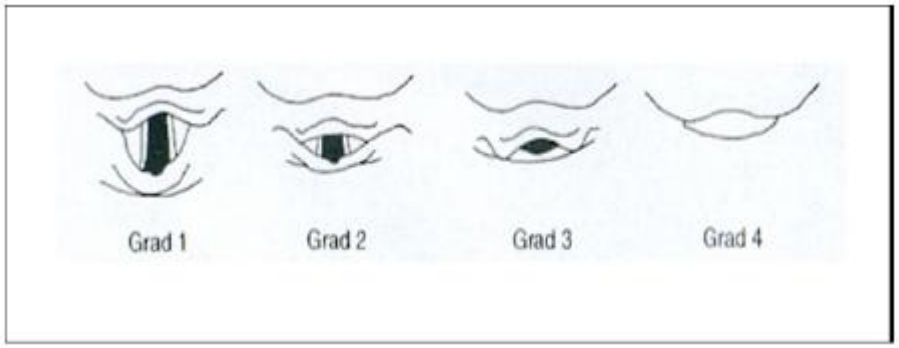
CHU
GRENOBLE

Quelle gestion des voies aériennes pour ce patient en préhospitalier ?

- IOT standard (ISR)
- IOT en VS
- IOT au glottiscope
- IOT rétrograde
- IOT au fibro
- ML, combitube

Définition IOT difficile

- ASA : échec 3 laryngoscopies ou procédure > 10’
- grades de cormack-lehane



Difficult tracheal intubation in obstetrics
R. S. CORMACK and J. LEHANE
Anaesthesia November 1984

The Intubation Difficulty Scale (IDS)

Proposal and Evaluation of a New Score Characterizing the Complexity of Endotracheal Intubation

Anesthesiology, V 87, No 6, Dec 1997

Frédéric Adnet, M.D., Ph.D. Stephen W. Borron, M.D., M.S.,† Stéphane X. Racine, M.D.,‡ Jean-Luc Clemessy, M.D.,§ Jean-Luc Fournier, M.D.,‡ Patrick Plaisance, M.D.,‖ Claude Lapandry, M.D.‡*

IDS Score	Degree of Difficulty
0	Easy
0 < IDS ≤5	Slight Difficulty
5 < IDS	Moderate to Major Difficulty
IDS = ∞	Impossible intubation

Rules for Calculating IDS Score:

N_1	Every additional attempt adds 1 pt.
N_2	Each additional operator adds 1 pt.
N_3	Each alternative technique adds 1 point. Repositioning of the patient, change of materials (blade, ET tube, addition of a stylette), change in approache (nasotracheal/orotracheal) or use of another technique (fibroscopy, intubation through a laryngeal mask).
N_4	Apply Cormack grade for 1st oral attempt. For successful blind intubation $N_4 = 0$.
N_5	Sellick's maneuver adds no points.
Impossible intubation:	IDS takes the value attained before abandonment of intubation attempts.

Intubation Difficulty Scale

Parameter	Score
Number of Attempts >1	N_1
Number of Operators >1	N_2
Number of Alternative Techniques	N_3
Cormack Grade - 1	N_4
Lifting Force Required	
Normal	$N_5=0$
Increased	$N_5=1$
Laryngeal Pressure	
Not applied	$N_6=0$
Applied	$N_6=1$
Vocal Cord Mobility	
Abduction	$N_7=0$
Adduction	$N_7=1$
TOTAL: IDS = SUM OF SCORES	N_1-N_7

PREEMBULE

Algorithme de bloc opératoire non transposable au préhospitalier :

- Opérateurs différents
- Réveil quasi impossible
- Estomac plein
  - ➔ ISR ➔ pas de VS ➔ pas de fibro
  - ➔ risque hypoxique majeur
- Conditions de confort très différentes

Clinical paper

Expertise in prehospital endotracheal intubation by emergency medicine physicians—Comparing 'proficient performers' and 'experts'☆

Jan Breckwoldt[a,*], Sebastian Klemstein[a], Bergit Brunne[a], Luise Schnitzer[b],

Resuscitation 83 (2012) 434–439

Influence de la formation initiale et des pratiques quotidiennes

Comparison of ETI conditions in respect to expertise stages ('proficient performers', 'experts').

	Expertise group		Statistical difference
	Proficient performers	Experts	
Best visualisation of laryngeal level			
CL[a] grade 1	43.1% (56/130)	61.6% (95/146)	$p<0.01$
CL[a] grade 2	40.0% (52/130)	25.3% (37/146)	$p<0.01$
CL[a] grade 3	14.6% (19/130)	8.9% (13/146)	$p=0.1$
CL[a] grade 4	2.3% (3/130)	0.7% (1/146)	$p=0.3$
Number of ETI attempts			
$n=1$	84.6% (110/130)	89.0% (130/146)	$p=0.3$
$n=2$	10.8% (14/130)	8.9% (13/146)	$p=0.7$
$n=3$	2.3% (3/130)	2.1% (3/146)	$p=0.8$
$n>3$	2.3% (3/130)	0	$p=0.2$
Success rate	96.7% (126/130)	100.0% (146/146)	$p=0.1$
Incidence of difficult ETI	17.7% (23/130)	8.9% (13/146)	$p=0.05$
Technical/pharmacological facilitation			
Optimized head positioning	9.2% (12/130)	42.4% (62/146)	$p<0.01$
Extra-laryngeal manipulation[b]	10.7% (14/130)	23.2% (34/146)	$p<0.01$

	Proficient performers ($n=130$)		Experts ($n=146$)	
	Non-difficult	Difficult	Non-difficult	Difficult
Predicted conditions				
Non-difficult	68.5%[a] ($n=89$)	6.2%[b] ($n=8$)	83.6%[a] ($n=122$)	2.1%[b] ($n=3$)

meilleur prédiction IOT diff, utilisation technique facilitante

Difficult prehospital endotracheal intubation – predisposing factors in a physician based EMS☆

J. Breckwoldt et al. / Resuscitation 82 (2011) 1519–1524

Descriptif 276 IOT prehosp, 13 % IOT difficile, 1.4 % IOT impossible

Comparison of underlying conditions between non-difficult and difficult ETI.

	All ETI (n = 276)	Non-difficult ETI (n = 240)		Difficult ETI (n = 36)		p-Value
	n	n	%	n	%	
Physical conditions of patient						
Long neck	24	19	7.9%	5	13.9%	0.18
Short neck	69	49	20.4%	20	55.6%	0.003
Goitre	2	1	0.4%	1	2.7%	0.24
Trauma of neck/face cricoid trauma	14	8	3.3%	6	16.7%	0.004
Poor dental status, hypognathy	38	28	11.7%	10	27.8%	0.004
Mouth opening < 3 cm	12	4	1.7%	8	22.2%	0.001
Hypopharyngeal vomitus, bleeding, secretions, food bolus	47	40	16.6%	7	19.4%	0.63
Laryngeal oedema	10	6	2.5%	4	11.1%	0.02
Protective reflexes, combativeness	8	5	2.1%	3	8.3%	0.07
Obesity (BMI > 30)	33	22	9.2%	11	30.6%	0.003
History of ENT tumor/surgery	0	0		0		
Ankylosing spondylitis	5	1	0.4%	4	11.1%	0.002
Gravidity	0	0		0		
Situational conditions						
Limited space on scene	80	60	25.0%	20	55.6%	0.004
Cervical spine immobilisation	23	20	8.3%	3	8.3%	0.6
ETI on the floor	190	166	69.2%	24	66.7%	0.9
Entrapped patient	0	0		0		

Statistically significant difference.

The Association Between Obesity and Difficult Prehospital Tracheal Intubation

Timothy J. Holmberg, MD,* Stephen M. Bowman, PhD,† Keir J. Warner, BS,† Monica S. Vavilala, MD,

(Anesth Analg 2011;112:1132–8)

Table 3. Logistic Regression Analysis for Difficult Tracheal Intubation

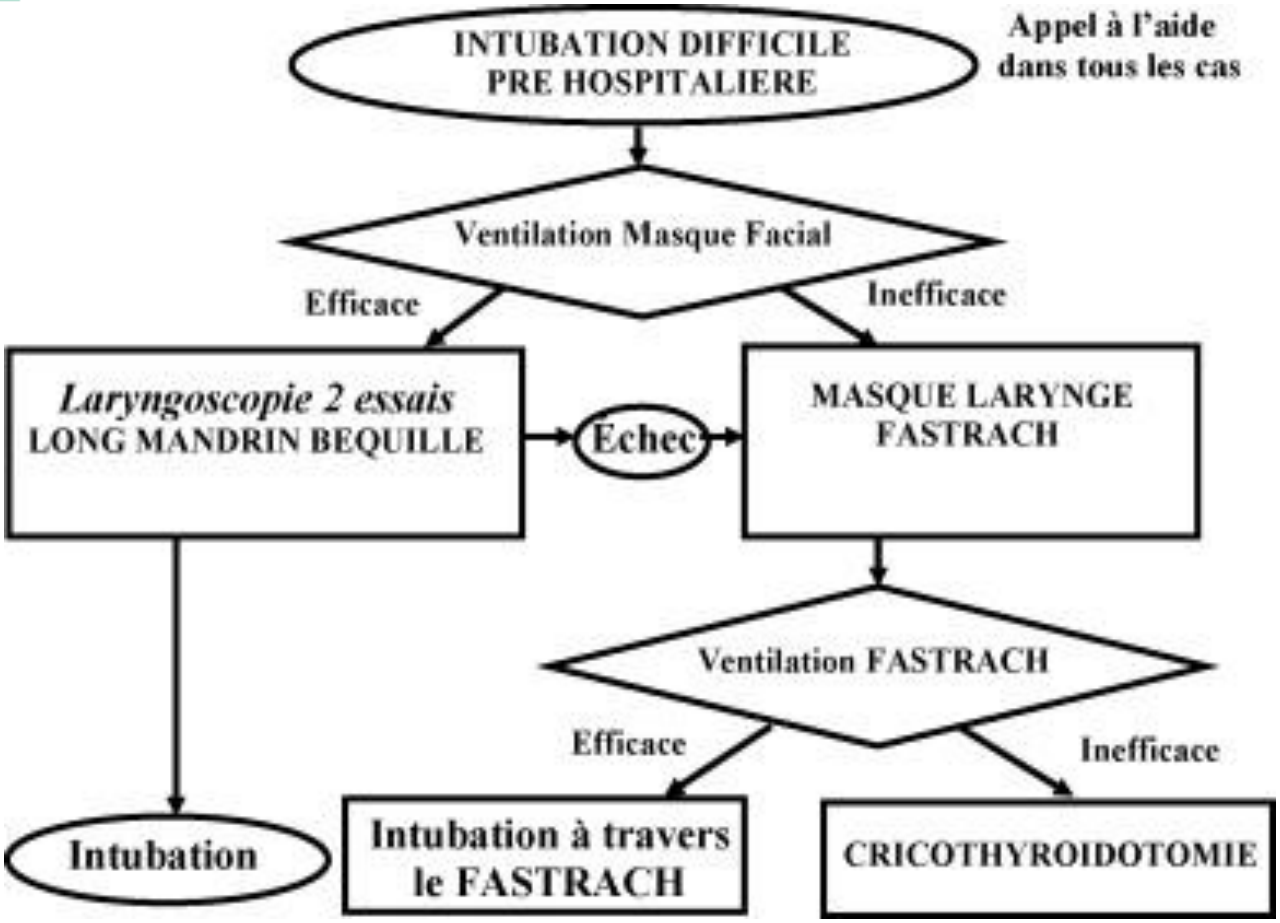
Variable	Odds ratio	*P* > |z|	95% confidence interval
Gender			
Male	1.0 (reference)		
Female	1.25	0.45	0.70–2.26
Incident type			
Medical/other	1.0 (reference)		
Trauma	0.92	0.82	0.46–1.86
Age			
<55 years	1.0 (reference)		
55–74 years	1.25	0.50	0.66–2.39
>75 years	1.51	0.32	0.68–3.37
Body mass index			
<30 kg/m^2	1.0 (reference)		
30–39 kg/m^2	0.98	0.96	0.46–2.07
>40 kg/m^2	3.68	0.02	1.27–10.59

Intubation difficile

Texte court

2006

Conférence d'experts

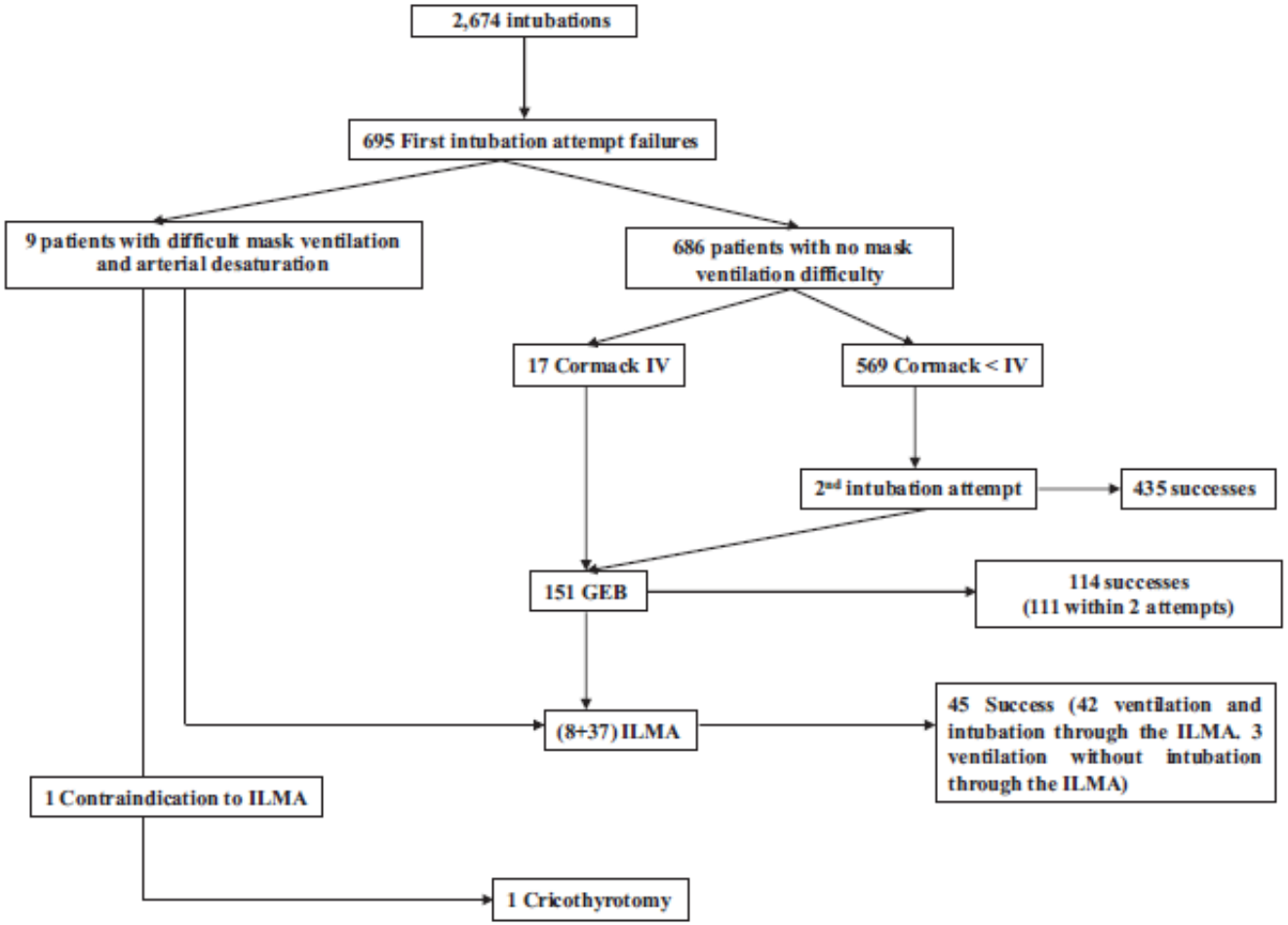


Unanticipated Difficult Airway Management in the Prehospital Emergency Setting

Prospective Validation of an Algorithm

Anesthesiology, V 114 • No 1 105 January 2011

Xavier Combes, M.D.,* Patricia Jabre, M.D., Ph.D.,† Alain Margenet, M.D.,* Jean Claude Merle, M.D.,* Bertrand Leroux, M.D.,* Michel Dru, M.D.,* Eric Lecarpentier, M.D.,‡ Gilles Dhonneur, M.D., Ph.D.§

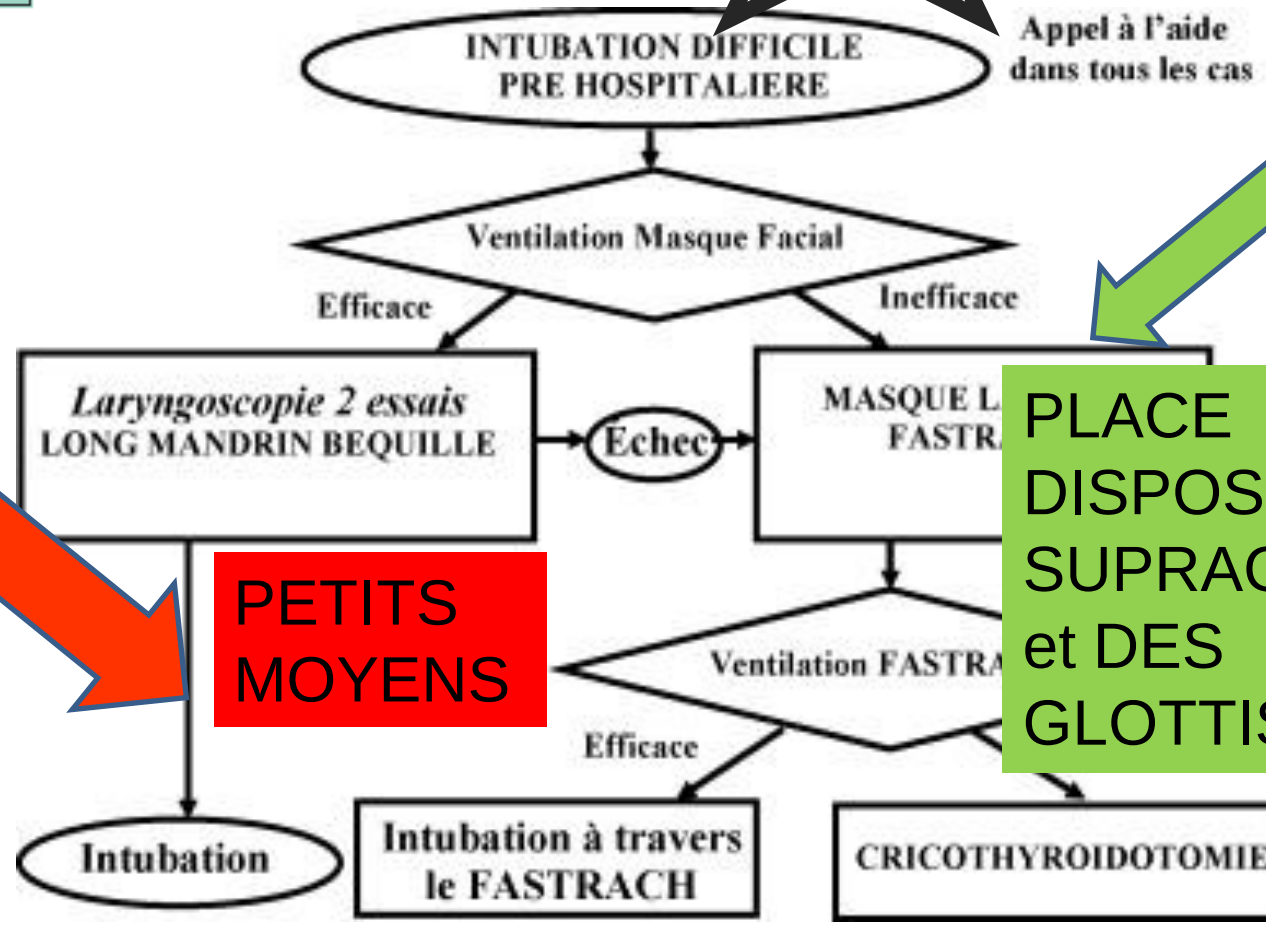


Intubation difficile

Texte court

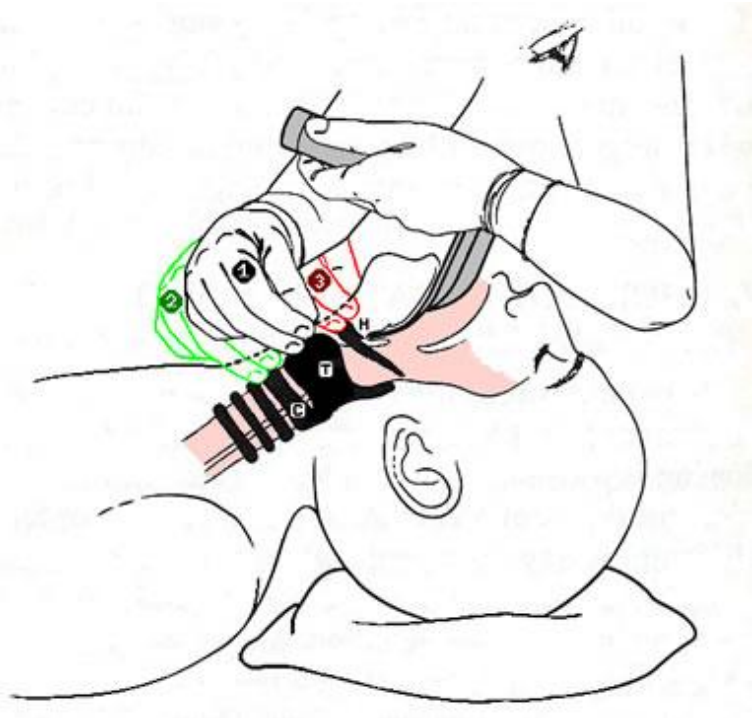
2006

Conférence d'experts



PETITS MOYENS

PLACE DES DISPOSITIFS SUPRAGLOTTIQUES et DES GLOTTISCOPES ?



BURP : Backward, Upward, Rightward Pressure

Knill, CJA 1993

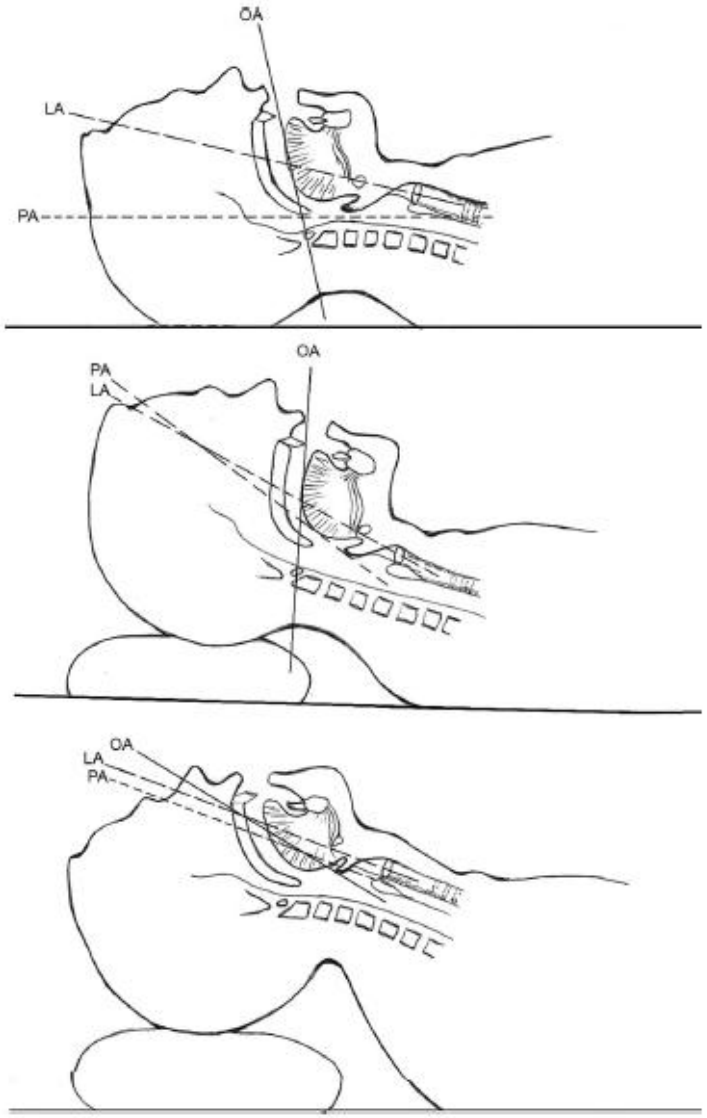
IOT en Décubitus latéral gauche

Adnet, CJA, 1998

Head and Neck Position for Direct Laryngoscopy

Mohammad El-Orbany, MD,* Harvey Woehlck, MD,* and M. Ramez Salem, MD†

July 2011 • Volume 113 • Number 1
ANESTHESIA & ANALGESIA

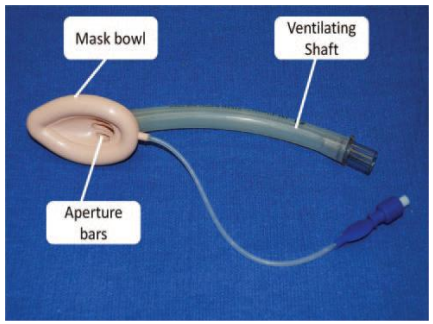


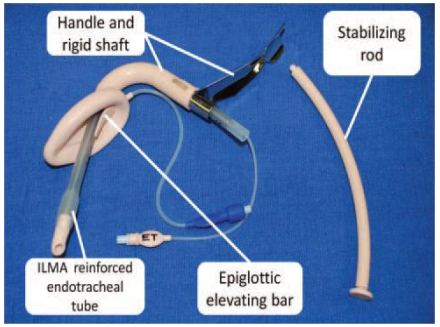
Sniffing position

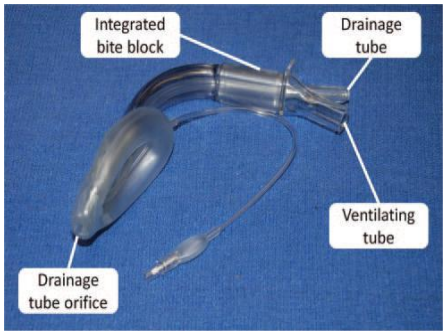
Dispositifs supra glottique

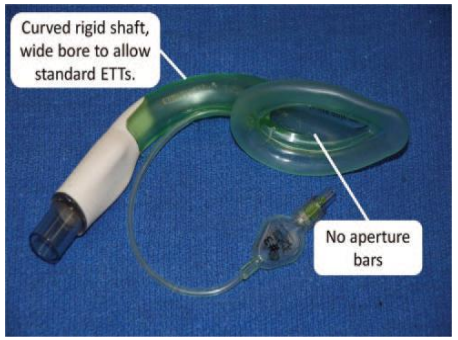
- Courbe d'apprentissage rapide
- Ventilation (O2, CO2) efficace
- mais …
  - pas de protection des voies aériennes, pas d'aspiration trachéale,
  - fuite importante en cas de ventilation difficile, gestion capnie difficile
  - morbidité liée à la surpression ballonnet, lésions oesophagiennes
  - attention anesthésie très profonde obligatoire

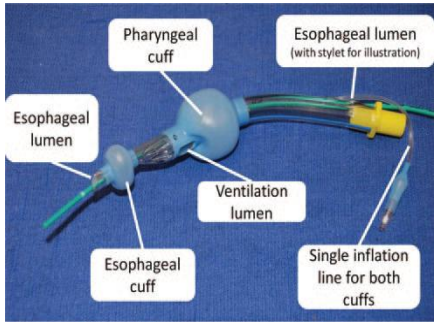
➔ non opposable à l'IOT, réservés aux échecs d'IOT

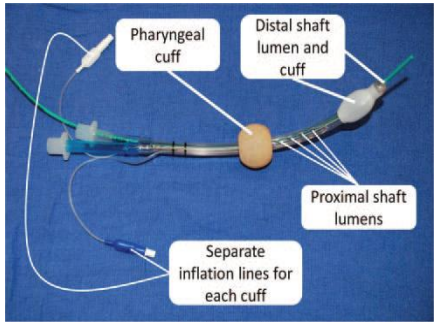


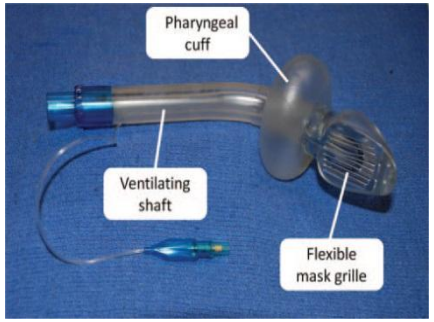


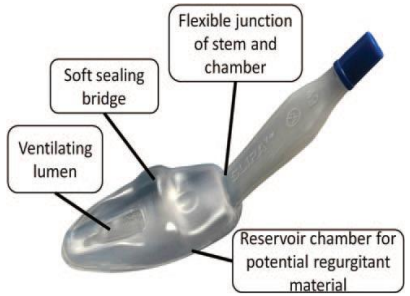












Use of the Airtraq laryngoscope for emergency intubation in the prehospital setting: A randomized control trial*

Helmut Trimmel, MD; Janett Kreutziger, MD; Georg Fertsak, MD; Robert Fitzka, MD; Markus Dittrich, MD; Wolfgang G. Voelckel, MD

Crit Care Med 2011 Vol. 39, No. 3

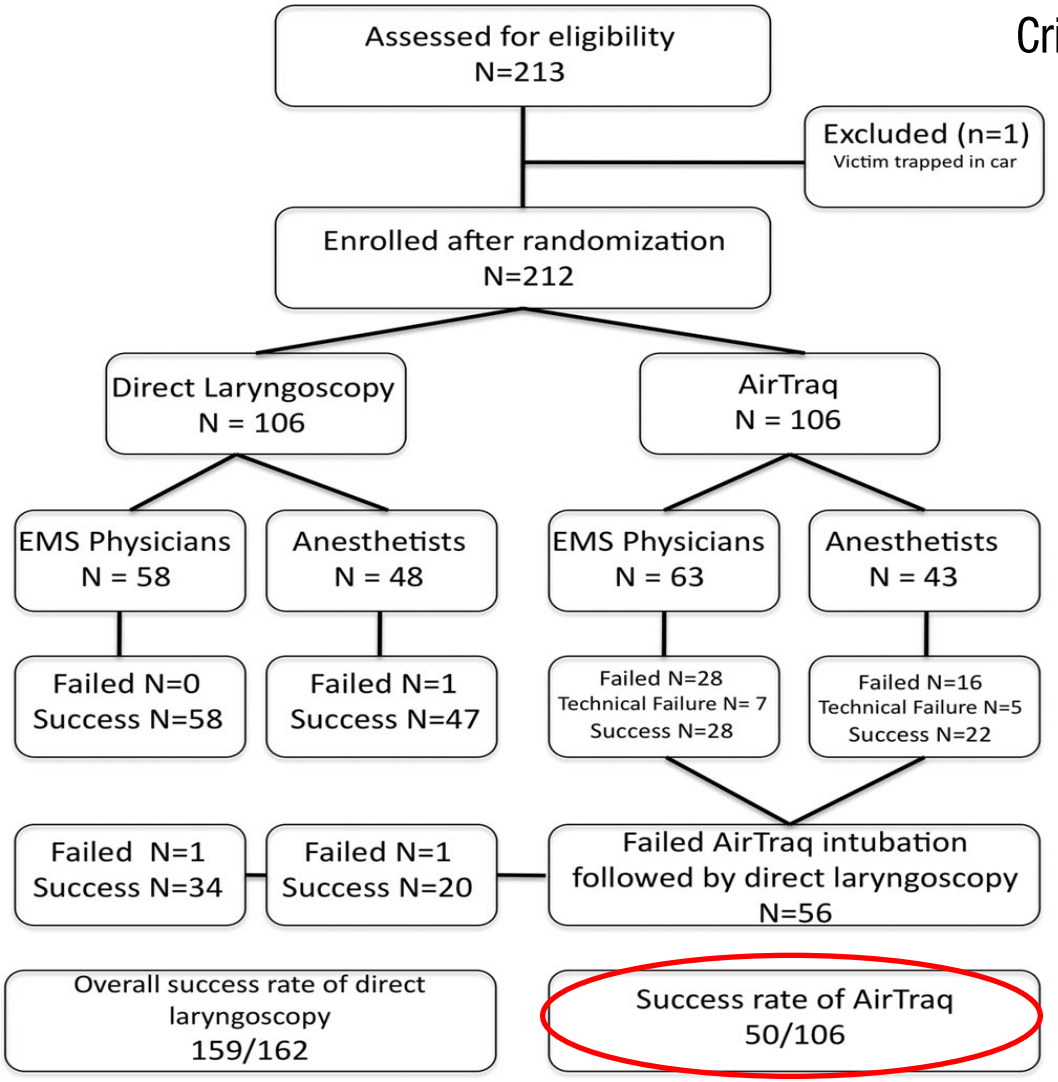


Table 3. Reasons for failed intubation while employing the Airtraq

Reasons for failed endotracheal intubation while employing the Airtraq	n = 56
Cuff damage noticed after successful endotracheal tube placement	10
Light source defect (continuous flashing)	2
Impaired sight and visibility due to vomitus, blood, or food bolus	9
Impaired mouth opening—Airtraq difficult to insert	5
Poor visibility due to environmental exposure (snow field, ambient light)	5
Esophageal intubation despite optimal view	3

Contents lists available at ScienceDirect

American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

American Journal of Emergency Medicine 32 (2014) 40–43

Original Contribution

Comparative analysis of airway scope and Macintosh laryngoscope for intubation primarily for cardiac arrest in prehospital setting

Takahiro Arima, MD [a,*], Osamu Nagata, MD [b], Takeshi Miura, MD [a], Katsuki Ikeda, MD [a], Tomoya Mizushima, MD [a], Azusa Takahashi, MD [a], Koji Sakaida, MD [a]

Primary and secondary endpoints

	AWS (n = 56)	MLS (n = 53)	P
Median time (IQR), s	155 (71–216)	120 (60–170)	.095
Ultimate success, %	96.4	100	.496
First attempt success, %	46.4	75.5	.002
Median IDS (IQR)	0 (0–1)	1 (0–2)	.066

6. Conclusion

Despite its many advantages seen in other settings, the AWS did not show superior efficacy to the MLS in relation to time required for intubation, ultimate or first attempt success rate, or difficulty level of intubation in the prehospital setting.

Brief Report

Evaluation of the Storz CMAC®, Glidescope® GVL, AirTraq®, King LTS-D™, and direct laryngoscopy in a simulated difficult airway☆,☆☆

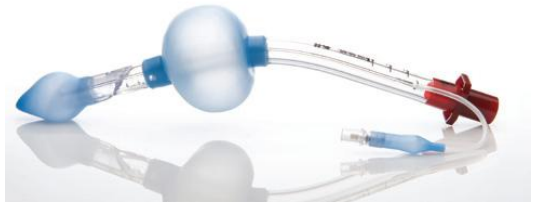
Jessie G. Nelson MD [a], Sandi S. Wewerka MPH, EMT-B [b], Casey M. Woster MD [a], Aaron M. Burnett MD [a],

American Journal of Emergency Medicine 31 (2013) 589–592

Device placement success rates and time to insertion

	Device type	First-attempt success rate (95% CI)	Overall success rate (95% CI)	Mean time to placement (95% CI)	Time to placement (median)
Overall	DL (n = 92)	79% (71%-87%)	97% (91%-99%)	39.72 (35.93-43.51)	37
	King LTS-D (n = 94)	85% (77%-91%)	96% (90%-98%)	25.78 (22.14-29.42)	20
	GVL (n = 93)	71% (61%-79%)	91% (84%-96%)	53.63 (48.66-58.61)	50
	AirTraq (n = 93)	33% (24%-43%)	56% (46%-66%)	60.36 (53.33-67.39)	63
	CMAC (n = 93)	76% (66%-83%)	92% (85%-96%)	42.86 (38.77-46.95)	39

Taux de succès des vidéolaryngoscopes pas meilleure que laryngo.
Airtraq moins bon que les autres.



King LT-D supraglottic airway

CASE REPORT

Prehospital fiberoptic intubation☆,☆☆

G. Gemes*, J. Heydar-Fadai, T. Boessner, G. Wildner, G. Prause

Resuscitation (2008) 76, 468–470

Figure 1 Insertion of the endotracheal tube via bronchoscopy at the accident scene.

- Echec IOT
- Echec ventilation manuelle
- Fibro dans l'hélico
- Diagnostic de rupture trachéale

FIBRO et IOT difficile non prévue

- Quasi impossible pdt ISR, car il faut garder la ventilation spontanée du patient.
- Courbe d'apprentissage rapide (10 essais = 90 % succès)
- Durée moyenne 4 minutes

cricothyroïdotomie

Différents abords trachéaux :

CT : cricothyrotoïdomie

TPC : trachéostomie percutanée

T : trachéotomie

1 Isthme thyroïdien

2 Membrane cricothyro

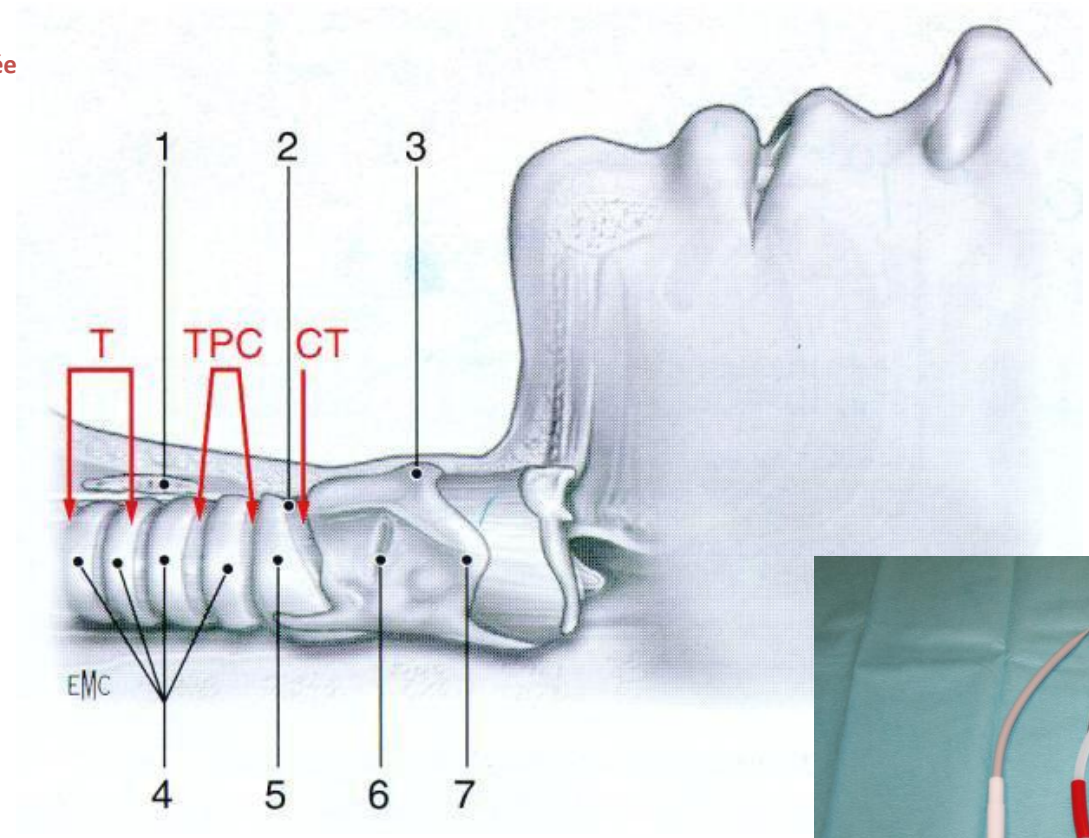
3 Pomme d'Adam

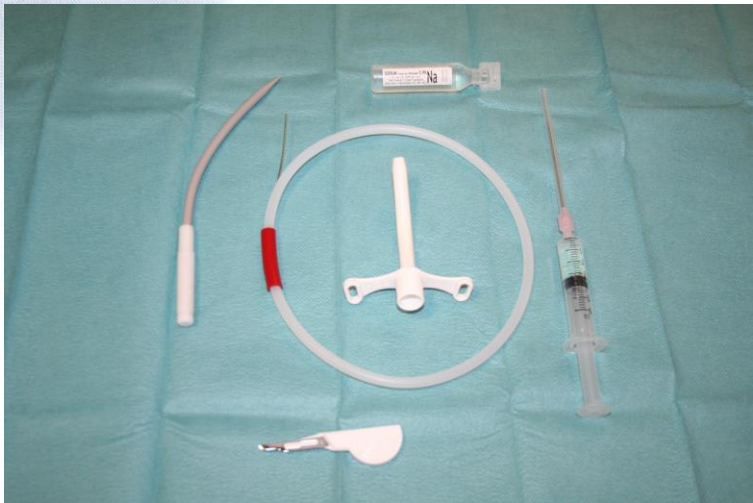
4 Quatre premiers cartilages trachéaux

5 Cartilage cricoïde

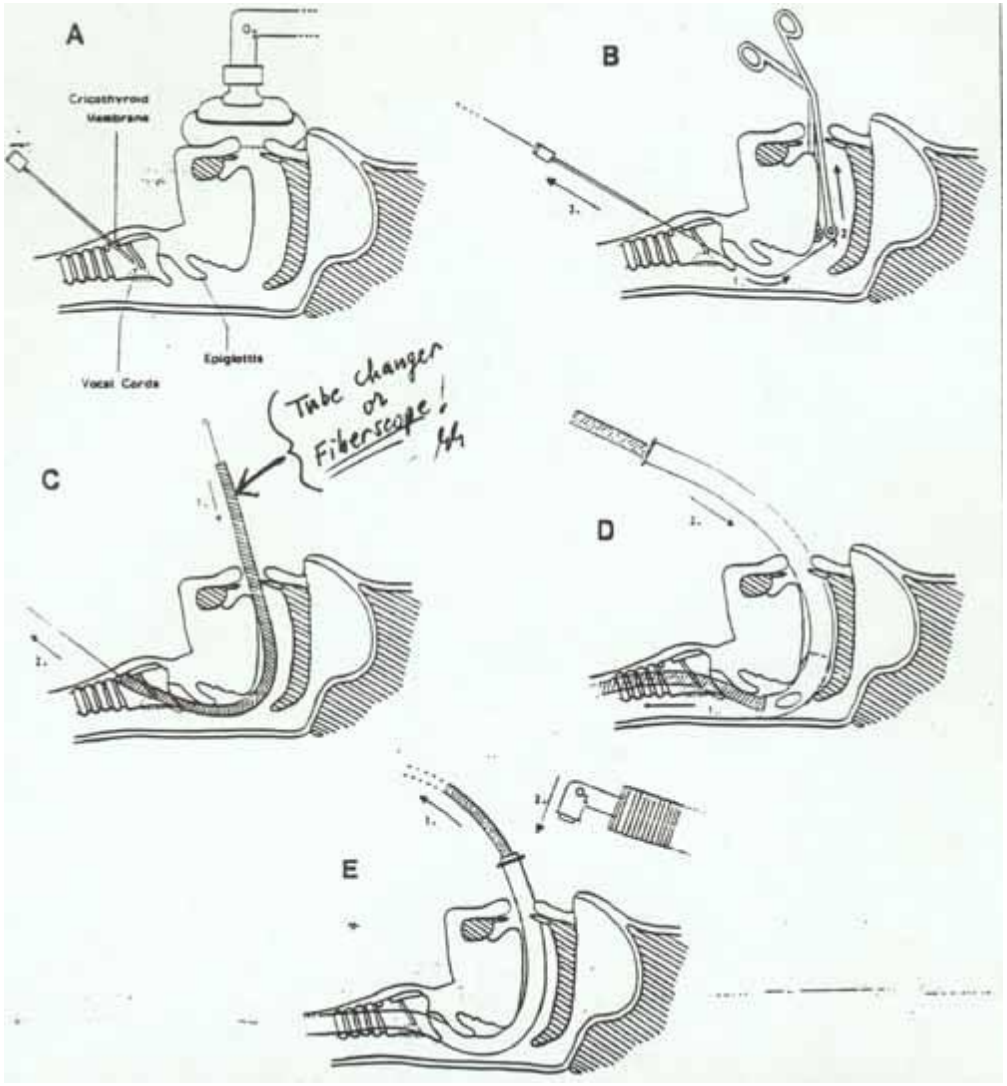
6 Cordes vocales

7 cartilage thyroide





Intubation retrograde



PAS D'IOT PREHOSP !
TRACHEOTOMIE SOUS AL AU BLOC !

Quelle gestion des voies aériennes pour ce patient en préhospitalier ?

- IOT standard (ISR)
- IOT en VS
- IOT au glottiscope
- IOT rétrograde
- IOT au fibro

CONCLUSION

L’intubation préhospitalière : une analyse bénéfice/risque !

« Les patients ne meurent pas d’échec d’intubation, mais d’acharnement à essayer de les intuber »

Algorithme: petits moyens puis mandrin, puis fastrach puis crico…Pas (encore…) de place pour glottiscope

Survey of Out-of-hospital Emergency Intubations in the French Prehospital Medical System: A Multicenter Study

Frédéric Adnet, MD, PhD*‡

ANNALS OF EMERGENCY MEDICINE 32:4 OCTOBER 1998

Photographie des 700 IOT pré hospitalières en IDF

- 96 % par voie orale

- 10,8 % d'IOT difficiles (très différents des 30 % aux US)

- succès IOT 99,1 % (60 % 1ere laryngoscopie, 5 % IOT oesophagiennes corrigées sur place)

- 0 cricothyroidotomie

Après 2 échecs…

Mandrin long béquillé :

- Positionné mandrin loin (carène)

- Glisser sonde sur mandrin avec laryngo (intro + facile, protection ballonnet, évite trauma aryth et epigl)

- Rotation sonde passage glotte (évite luxation aryth et retournement epiglotte)

FASTRACH

- si échec ventilation au masque
- Intubation si ventilation OK
- Non utilisable si OB < 20 mm
- Dégonfler coussinet et lubrifier face post et sonde
- Echec IOT : adulte 20 %, enfant 70 %
- Echec = mauvaise taille, spasme laryngé, abaissement épiglotte, anatomie

Use of the Airtraq® device for airway management in the prehospital setting – a retrospective study

Mikael Gellerfors[1*], Agneta Larsson[2,3], Christer H Svensén[1] and Dan Gryth[2,3]

Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2014, **22**:10

Figure 1 Airtraq®.

Table 2 Airtraq® intubation successrates

Airtraq® efficacy	Successrate N (%)
Children <16 (n)	1/2 (50)
Overall successrate	19/28 (67,9)
Cardiac arrest	15/23 (65,2)
Foreign body	2/3 (66,7)
Hanging	0/2 (0)
Drowning	1/1 (100)
Trauma	5/5 (100)
Drug facilitated intubation with suxamethonium	4/5 (80)
Anticipated or unexpected difficult airway	14/23 (60,8)
Prior failed conventional laryngoscopy intubation	4/11 (36,4)
Failed laryngeal mask (LMA)	2/2 (100)
Failed convent. laryngoscopy intubation or LMA	6/13 (46,2)

Airway management and out-of-hospital cardiac arrest outcome in the CARES registry☆

Jason McMullan[a,*], Ryan Gerecht[a], Jordan Bonomo[a], Rachel Robb[b], Bryan McNally[b], John Donnelly[c], Henry E. Wang[c], On behalf of the CARES Surveillance Group

[a] Department of Emergency Medicine, University of Cincinnati, United States

Resuscitation xxx (2014) xxx–xxx

Registre nord américain : 10000 ACR, gestion paramed

Table 3
Unadjusted outcomes after out-of-hospital cardiac arrest in the CARES network. Cells reflect column percentages. *P*-values based upon chi-square test.

Outcome	No advanced airway ($n=1929$)	Supraglottic airway ($n=3110$)	Endotracheal intubation ($n=5591$)	*P*-value
Field termination of resuscitation (%)	33.8	34.6	22.3	<0.001
Sustained ROSC (%)	36.5	25.5	33.8	<0.001
Survival to hospital admission (%)	33.4	21.4	26.6	<0.001
Survival to hospital discharge (%)	21.9	6.7	8.3	<0.001
Survival to hospital discharge with good neurologic outcome (%)	18.6	5.2	5.4	<0.001

supériorité de la non gestion des VAS !!! : MCE continu, reprise VS, reprise conscience, proximité hopital
MAIS … danger potentiel IOT : Majoration PNO, Echec IOT, IOT oeso, Dégradation hémodynamique (PEEP, Pplat, drogue anesthésique), Temps passé sur place, Capnie chez le TC

IOT > DSG : meilleure gestion capnie, pas de ventilation oesophagienne occulte