

**A COME
AIRWAYS:
COME VENTILARE,
CHI VENTILARE?**

Congresso Nazionale IRC

2019

11 • 12 OTTOBRE

Centro Congressi **Veronafiere**



Gabriella Arlotta
Fondazione Policlinico Universitario
A. Gemelli IRCCS, Roma

Obiettivi

CoSTR di ILCOR: Verso le Guidelines 2020

Trial clinici

Guidelines 2015

Gestione delle vie aeree - Guidelines 2015

Summary of airway management for cardiac arrest

The ILCOR ALS Task Force has suggested using either an advanced airway (tracheal intubation or SGA) or a bag-mask for airway management during CPR.⁴ This very broad recommendation is made because of the total absence of high quality data to indicate which airway strategy is best.

The type of airway used may depend on the skills and training of the healthcare provider. In comparison with bag-mask ventilation and use of a SGA, tracheal intubation requires considerably more training and practice and may result in unrecognised oesophageal intubation and increased hands-off time. A bag-mask, a SGA and a tracheal tube are frequently used in the same patient as part of a stepwise approach to airway management but this has not been formally assessed. Patients who remain comatose after initial

ABILITA'
OPERATORE

Trial Clinici

JAMA | **Original Investigation**

Effect of Bag-Mask Ventilation vs Endotracheal Intubation During Cardiopulmonary Resuscitation on Neurological Outcome After Out-of-Hospital Cardiorespiratory Arrest A Randomized Clinical Trial

Patricia Jabre, MD, PhD; Andrea Penaloza, MD, PhD; David Pinero, MD; Francois-Xavier Duchateau, MD; Stephen W. Borron, MD, MS; Francois Javaudin, MD; Olivier Richard, MD; Diane de Longueville, MD; Guillem Bouilleau, MD; Marie-Laure Devaud, MD; Matthieu Heidet, MD, MPH; Caroline Lejeune, MD; Sophie Fauroux, MD; Jean-Luc Greingor, MD; Alessandro Manara, MD; Jean-Christophe Hubert, MD; Bertrand Guihard, MD; Olivier Vermylen, MD; Pascale Lievens, MD; Yannick Auffret, MD; Celine Maisondieu, MD; Stephanie Huet, MD; Benoit Claessens, MD; Frederic Lapostolle, MD, PhD; Nicolas Javaud, MD, PhD; Paul-Georges Reuter, MD, MS; Elinor Baker, MD; Eric Vicaut, MD, PhD; Frédéric Adnet, MD, PhD

JAMA 2018 Feb 27;319(8):779-787.

- **Popolazione:** adulti vittime di arresto cardiaco extraospedaliero non traumatico
- **Interventi a confronto:** Ventilazione con pallone e maschera (eventuale intubazione di soccorso) vs Intubazione endotracheale.

Effettuati dal Servizio di Emergenza Medica (paramedici con medico) in Francia e Belgio

- **Outcomes:**
 - primario: sopravvivenza a 28 giorni con funzione neurologica favorevole (CPCs ≤ 2);
 - secondari: sopravvivenza a 28 giorni, sopravvivenza al ricovero, frequenza di ROSC, difficoltà o fallimento nell'intubazione o nell'uso di pallone e maschera
- **Studio:** randomizzato multicentrico per gruppi paralleli
- **Tempo:** 2015-2017

Risultati

- 2043 pazienti

Outcome	No. of Patients (%)		Proportion Difference, BMV(%) - ETI(%) (95% CI)	P Value ^a
	BMV Group	ETI Group		
Intention-to-Treat Population	n = 1018	n = 1022		
Survival at 28 d	55 (5.4)	54 (5.3)	0.1 (-1.8 to 2.1)	.90
CPCs^b				
1, Good cerebral performance	35 (3.4)	37 (3.6)		
2, Moderate cerebral disability	9 (0.9)	6 (0.6)		
3, Severe cerebral disability	4 (0.4)	7 (0.7)		.68
4, Coma or vegetative state	7 (0.7)	4 (0.4)		
5, Death	963 (94.6)	968 (94.7)		
Survival to hospital admission	294 (28.9)	333 (32.6)	-3.7 (-7.7 to 0.3)	.07
Return of spontaneous circulation	348 (34.2)	397 (38.9)	-4.7 (-8.8 to -0.5)	.03
Per-Protocol Analysis	n = 995	n = 943		
Survival at 28 d	54 (5.4)	51 (5.4)	0.1 (-10 to 9.7)	.99
CPCs^b				
1, Good cerebral performance	35 (3.5)	34 (3.5)		
2, Moderate cerebral disability	8 (0.8)	6 (0.6)		
3, Severe cerebral disability	4 (0.4)	7 (0.7)		.76
4, Coma or vegetative state	7 (0.7)	4 (0.4)		
5, Death	941 (94.6)	892 (94.6)		
Survival to hospital admission	289 (29.1)	312 (33.1)	-4.0 (-7.6 to 0.6)	.055
Return of spontaneous circulation	342 (34.4)	377 (30.0)	-5.6 (-9.9 to -1.3)	.01

Eventi Avversi

Safety Population	BMV Group	ETI Group	Absolute Difference, BMV(%) - ETI(%) (95% CI)	P Value ^a
BMV or ETI Difficulty				
BMV VAS, median (IQR), mm ^b	20 (5-55)	NA	NA	NA
Intubation Difficulty Scale score, median (IQR)	NA	1 (0-4)	NA	NA
Rate of airway management difficulty, No./total No. (%) ^c	186/1027 (18.1)	134/996 (13.4)	4.7 (1.5-7.9)	.004
BMV or ETI failure, No./total No. (%)	69/1028 (6.7)	21/996 (2.1)	4.6 (2.8-6.4)	<.001
BMV or ETI Complications, No. (%)	n = 1027	n = 999		
Regurgitation of gastric content	156 (15.2)	75 (7.5)	7.7 (4.9-10.4)	<.001
Mainstem intubation ^d	NA	20 (2.0)	NA	NA
Recognized esophageal intubation ^e	NA	102 (10.2)	NA	NA
Dental injury	NA	7 (0.7)	NA	NA
Extubation	NA	5 (0.5)	NA	NA

Conclusioni

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- Non inferiorità di maschera e pallone vs intubazione orotracheale per la sopravvivenza a 28 giorni con funzione neurologica favorevole non dimostrata
- Ulteriori studi

Trial Clinici

JAMA | **Original Investigation**

Effect of a Strategy of a Supraglottic Airway Device vs Tracheal Intubation During Out-of-Hospital Cardiac Arrest on Functional Outcome The AIRWAYS-2 Randomized Clinical Trial

Jonathan R. Benger, MD; Kim Kirby, MRes; Sarah Black, DClinRes; Stephen J. Brett, MD; Madeleine Clout, BSc; Michelle J. Lazaroo, MSc; Jerry P. Nolan, MBChB; Barnaby C. Reeves, DPhil; Maria Robinson, MSt; Lauren J. Scott, MSc; Helena Smartt, PhD; Adrian South, BSc (Hons); Elizabeth A. Stokes, DPhil; Jodi Taylor, PhD; Matthew Thomas, MBChB; Sarah Voss, PhD; Sarah Wordsworth, PhD; Chris A. Rogers, PhD

JAMA 2018 Aug 28;320(8):779-791

- **Popolazione:** adulti vittime di arresto cardiaco extraospedaliero non traumatico
- **Interventi a confronto:** Ventilazione con I-gel o Intubazione endotracheale da parte di paramedici in Inghilterra
- **Outcomes:**
 - primario: Rankin Scale Score alla dimissione o a 30 giorni;
 - secondari: successo nella ventilazione, rigurgito o aspirazione, frequenza di ROSC, spostamento accidentale del presidio, sequenza degli interventi, presidio posizionato al ROSC, chest compression fraction
- **Studio:** randomizzato multicentrico
- **Tempo:** giugno 2015- agosto 2017

Table 2. Primary Outcome, Survival Status, and Main Secondary Outcomes

	No. of Patients/Total No. (%) ^a		Adjusted Estimate (95% CI) ^b	P Value ^c	ICC	Adjusted Risk Difference Estimate (95% CI), % ^b	P Value ^c
	Tracheal Intubation (n = 4410)	Supraglottic Airway Device (n = 4886)					
Primary Outcome: Modified Rankin Scale Score at Hospital Discharge or 30 d							
0-3 range (good outcome)	300/4407 (6.8)	311/4882 (6.4)	OR, 0.92 (0.77 to 1.09)	.33	0.05	-0.6 (-1.6 to 0.4)	.24
0 (no symptoms)	124/4407 (2.8)	117/4882 (2.4)					
1	48/4407 (1.1)	41/4882 (0.8)					
2	50/4407 (1.1)	58/4882 (1.2)					
3	78/4407 (1.8)	95/4882 (1.9)					
4-6 range (poor outcome to death)	4107/4407 (93.2)	4571/4882 (93.6)					
4	46/4407 (1.0)	45/4882 (0.9)					
5	27/4407 (0.6)	39/4882 (0.8)					
6 (died)	4034/4407 (91.5)	4487/4882 (91.9)					
Secondary Outcomes							
Survival status							
Died at scene	2488/4407 (56.5)	2623/4882 (53.7)					
Died prior to ICU admission	1058/4407 (24.0)	1226/4882 (25.1)					
Died prior to ICU discharge	369/4407 (8.4)	503/4882 (10.3)					
Died prior to hospital discharge	120/4407 (2.7)	138/4882 (2.8)					
Survived to 30 d or hospital discharge	372/4407 (8.4)	392/4882 (8.0)					
Time to death							
No. of patients ^d	4400	4871					
Median (IQR), min	63 (41 to 216)	67 (41 to 267)	HR, 0.97 (0.93 to 1.02)	.22			
Time to death was 0-72 h							
No. of patients ^d	4400	4871					
Median (IQR), min	63 (41 to 205)	67 (41 to 246)	HR, 0.96 (0.92 to 1.00)	.07			
72-h Survival	575/4395 (13.1)	664/4872 (13.6)	OR, 1.04 (0.92 to 1.18)	.54	0.02	0.4 (-1.0 to 1.9)	.54
Initial ventilation success (≤2 attempts at advanced airway management)							
Tracheal intubation	3473/4397 (79.0)	4255/4868 (87.4)	OR, 1.92 (1.66 to 2.22)	<.001	0.12	8.3 (6.3 to 10.2)	<.001
Tracheal intubation	1891/2723 (69.4)	92/116 (79.3)					
Trial supraglottic airway device	542/617 (87.8)	3412/3994 (85.4)					
Other supraglottic airway device	55/72 (76.4)	29/36 (80.6)					
Any unintended loss of a previously established airway^e							
Tracheal intubation	153/3081 (5.0)	412/3900 (10.6)	OR, 2.29 (1.86 to 2.82)	<.001	0.07	5.9 (4.6 to 7.2)	<.001
Tracheal intubation	70/2149 (3.3)	33/570 (5.8)					
Trial supraglottic airway device	84/981 (8.6)	389/3455 (11.3)					
Other supraglottic airway device	5/171 (2.9)	3/33 (9.1)					

(continued)

Risultati

- 9296 pazienti

9296 Patients in trial

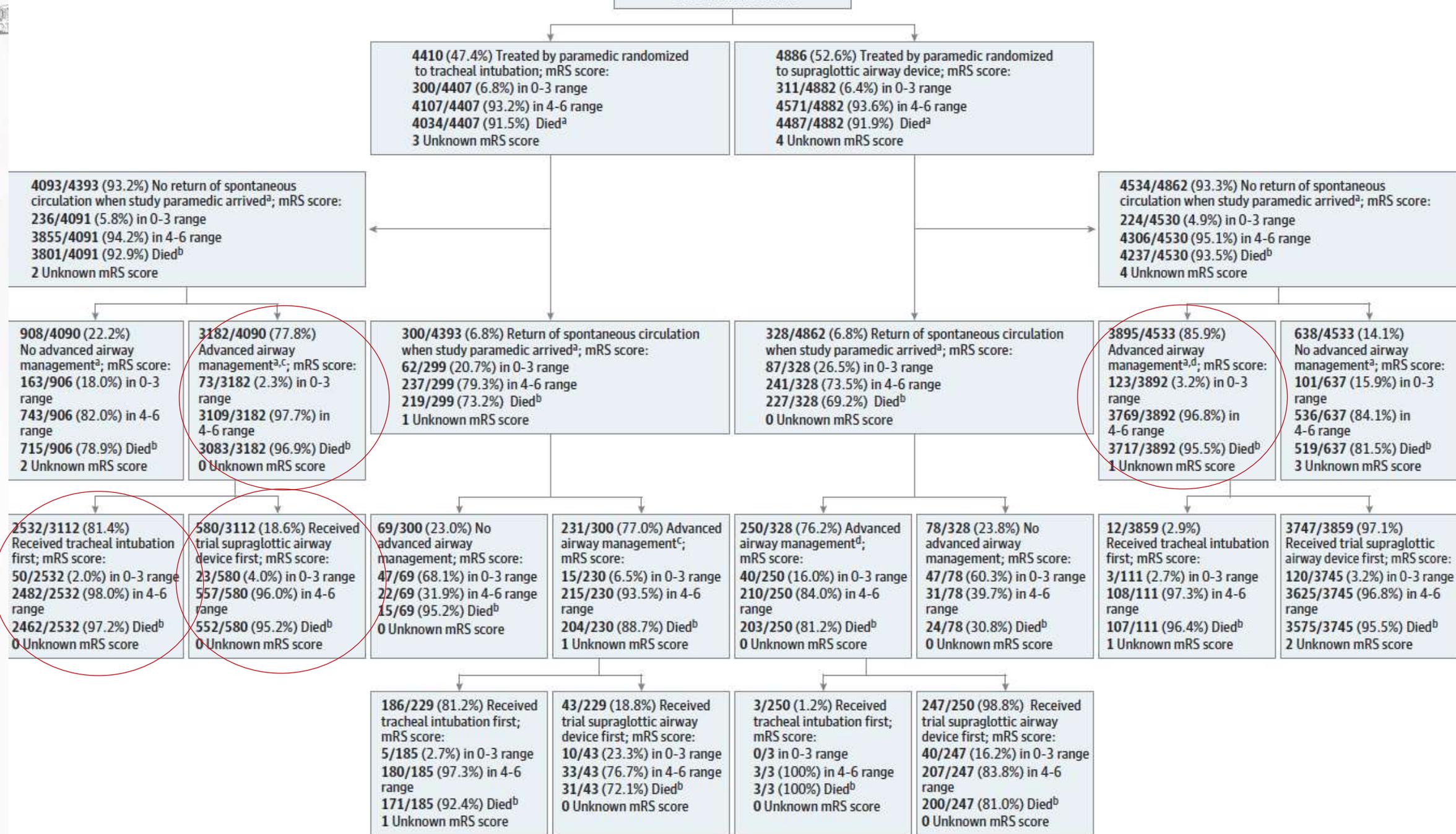


Table 2. Primary Outcome, Survival Status, and Main Secondary Outcomes (continued)

	No. of Patients/Total No. (%) ^a		Adjusted Estimate (95% CI) ^b	P Value ^c	ICC	Adjusted Risk Difference Estimate (95% CI), % ^b	P Value ^c
	Tracheal Intubation (n = 4410)	Supraglottic Airway Device (n = 4886)					
Regurgitation at any time	1072/4372 (24.5)	1268/4865 (26.1)	OR, 1.08 (0.96 to 1.20)	.21	0.06	1.4 (-0.6 to 3.4)	.17
Aspiration at any time	647/4337 (14.9)	729/4824 (15.1)	OR, 1.01 (0.88 to 1.16)	.84	0.08	0.1 (-1.5 to 1.8)	.86
Initial attempt with supraglottic airway device or tracheal intubation							
Regurgitation before	923/4379 (21.1)	846/4869 (17.4)					
Aspiration before	589/4355 (13.5)	532/4840 (11.0)					
Regurgitation during or after	543/4361 (12.5)	875/4857 (18.0)					
Aspiration during or after	304/4344 (7.0)	473/4829 (9.8)					
Admitted to ED or hospital	1922/4410 (43.6)	2263/4886 (46.3)					
Return of spontaneous circulation at arrival to ED or hospital	1249/4404 (28.4)	1495/4880 (30.6)	OR, 1.12 (1.02 to 1.23)	.02	0.01	2.2 (0.3 to 4.2)	.03
Survived to ED discharge	861/1919 (44.9)	1033/2259 (45.7)					

Conclusioni

JAMA | *Original Investigation*

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Elizabeth A. Stokes, DPhil; Jodi Taylor, PhD; Matthew Thomas, MBChB; Sarah Voss, PhD; Sarah Wordsworth, PhD; Chris A. Rogers, PhD

- L'uso di un presidio sovraglottico (I-Gel) vs intubazione orotracheale non migliora la funzione neurologica a 30 giorni o alla dimissione

Trial Clinici

JAMA | **Original Investigation**

Effect of a Strategy of Initial Laryngeal Tube Insertion vs Endotracheal Intubation on 72-Hour Survival in Adults With Out-of-Hospital Cardiac Arrest A Randomized Clinical Trial

Henry E. Wang, MD, MS; Robert H. Schmicker, MS; Mohamud R. Daya, MD, MS; Shannon W. Stephens, EMT-P; Ahamed H. Idris, MD; Justin N. Carlson, MD, MS; M. Riccardo Colella, DO, MPH; Heather Herren, MPH, RN; Matthew Hansen, MD, MCR; Neal J. Richmond, MD; Juan Carlos J. Puyana, BA; Tom P. Aufderheide, MD, MS; Randal E. Gray, MEd, NREMT-P; Pamela C. Gray, NREMT-P; Mike Verkest, AAS, EMT-P; Pamela C. Owens; Ashley M. Brienza, BS; Kenneth J. Sternig, MS-EHS, BSN, NRP; Susanne J. May, PhD; George R. Sopko, MD, MPH; Myron L. Weisfeldt, MD; Graham Nichol, MD, MPH

- **Popolazione:** adulti vittime di arresto cardiaco extraospedaliero non traumatico
- **Interventi a confronto:** Ventilazione iniziale con Tubo Laringeo vs Tubo endotracheale da parte del Servizio di Emergenza Medica (paramedici) in USA
- **Outcomes:**
 - primario: sopravvivenza a 72 ore;
 - secondari: frequenza di ROSC, sopravvivenza alla dimissione, sposizionamento accidentale del presidio, condizione neurologica alla dimissione (Modified Rankin Scale), presidio posizionato al ROSC, chest compression fraction
- **Studio:** randomizzato multicentrico
- **Tempo:** dicembre 2015- novembre 2017

Risultati

Risultati

- 3004 pazienti

Characteristic	No. (%)		Difference, % (95% CI) ^a	P Value
	Laryngeal Tube (n = 1505)	Endotracheal Intubation (n = 1499)		
Primary Outcome				
Survival to 72 h (intention-to-treat population)	275 (18.3)	230/1495 (15.4)	2.9 (0.2 to 5.6)	.04
Secondary Outcomes				
Return of spontaneous circulation on emergency department arrival	420 (27.9)	365 (24.3)	3.6 (0.3 to 6.8)	.03
Survival to hospital discharge	163/1504 (10.8)	121/1495 (8.1)	2.7 (0.6 to 4.8)	.01
Favorable neurologic status at discharge (Modified Rankin Scale score ≤3)	107/1500 (7.1)	75/1495 (5.0)	2.1 (0.3 to 3.8)	.02
Modified Rankin Scale score	n = 1500	n = 1495		
0-No symptoms	17 (1.1)	14 (0.9)		
1-No significant disability	32 (2.1)	29 (1.9)		
2-Slight disability	22 (1.5)	12 (0.8)		
3-Moderate disability	36 (2.4)	20 (1.3)		
4-Moderately severe disability	26 (1.7)	24 (1.6)		
5-Severe disability	26 (1.7)	22 (1.5)		
6-Dead	1341 (89.4)	1374 (91.9)		
Additional Analyses				
Per-protocol analysis-survival to 72 h	263/1437 (18.3)	209/1356 (15.4)	2.9 (0.1 to 5.7)	.045
Intention-to-treat post hoc adjusted analysis ^b			2.1 (-0.5 to 4.8)	.11
Per-protocol post hoc adjusted analysis ^b			2.3 (-0.4 to 5.1)	.09

Eventi Avversi

Characteristic	Laryngeal Tube (n = 1505)	Endotracheal Intubation (n = 1499)	Difference, % (95% CI)	P Value
Out-of-Hospital Adverse Events				
Multiple (≥3) insertion attempts^b				
Initial airway	6/1353 (0.4)	18/1299 (1.4)	-0.9 (-1.7 to -0.2)	.01
Across all airways	61/1353 (4.5)	245/1299 (18.9)	-14.4 (-17.0 to -11.7)	<.001
Unsuccessful insertion^b				
First airway technique	159/1353 (11.8)	573/1299 (44.1)	-32.4 (-35.6 to -29.1)	<.001
All airway techniques	78/1353 (5.8)	111/1299 (8.5)	-2.8 (-4.8 to -0.8)	.01
Unrecognized airway misplacement or airway dislodgement	10/1353 (0.7)	24/1299 (1.8)	-1.1 (-2.0 to -0.3)	.01
Inadequate ventilation	25/1353 (1.8)	8/1299 (0.6)	1.2 (0.3 to 2.1)	.01
In-Hospital Adverse Events				
Pneumothorax (first chest x-ray) ^c	17/485 (3.5)	30/428 (7.0)	-3.6 (-6.5 to -0.7)	.02
Rib fractures (first chest x-ray) ^c	16/485 (3.3)	30/428 (7.0)	-3.8 (-6.9 to -0.7)	.01
Oropharyngeal or hypopharyngeal injury (first 24 h) ^d	1/460 (0.2)	1/400 (0.3)	0 (-0.7 to 0.6)	.92
Airway swelling or edema (first 24 h) ^d	5/460 (1.1)	4/400 (1.0)	0.1 (-1.3 to 1.4)	.90
Pneumonia or aspiration pneumonitis (first 72 h) ^d	120/460 (26.1)	89/400 (22.3)	3.7 (-2.1 to 9.6)	.21

Conclusioni

JAMA | Original Investigation

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- Maggiore sopravvivenza a 72 ore, maggiore sopravvivenza alla dimissione, stato neurologico migliore nel gruppo trattato con Tubo Laringeo
- Tubo Laringeo può essere considerato come strategia iniziale per la gestione delle vie aeree nell'arresto cardiaco dell'adulto

ILCOR Consensus on science....

- Differenti settings: maggiore o minore probabilità di successo nell'intubazione (Jabre trial 98%, Bengler trial 69%, Wang trial 52%)
- Differenti tipi di presidio sopraglottico
- Differenti condizioni del paziente
- Differenti skills dei soccorritori
- Necessari ulteriori studi

ILCOR Treatment Recommendations....verso le Guidelines del 2020

- Utilizzare maschera e pallone o un presidio avanzato durante RCP in qualunque setting
- Se si usa un presidio avanzato, è preferibile un presidio sovraglottico nell'arresto cardiaco extraospedaliero in un contesto con ridotto successo nell'intubazione
- Se si usa un presidio avanzato, è preferibile un presidio sovraglottico o il tubo endotracheale nell'arresto cardiaco extraospedaliero in un contesto con elevato successo nell'intubazione
- Se si usa un presidio avanzato, è preferibile un presidio sovraglottico o il tubo endotracheale nell'arresto cardiaco intraospedaliero

Riassunto

CoSTR di ILCOR: Verso le Guidelines 2020

Trial clinici

Guidelines 2015