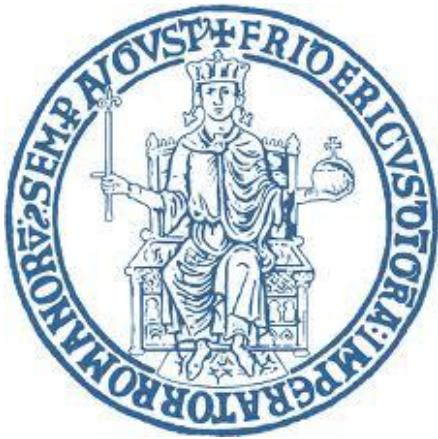


# Gestione dell'arresto respiratorio

Dott.ssa M. Vargas  
Università degli Studi di Napoli “Federico II”



XVI CONVEGNO  
NAZIONALE  
DEGLI UFFICIALI MEDICI  
E DEL PERSONALE  
SANITARIO C.R.I.

**Arresto cardiaco:**

**Arresto dell'attività cardiaca**

**Arresto respiratorio:**

**Arresto dell'attività respiratoria spontanea**

**Arresto cardiorespiratorio:**

**Arresto delle funzioni sia cardiache che  
respiratorie**

# Overview of Respiratory Arrest

by Charles D. Bortle, EdD, Richard Levitan, MD

 **NOTE:** This is the Professional Version. **CONSUMERS:** Click here for the Consumer Version >

Respiratory and cardiac arrest are distinct, but inevitably if untreated, one leads to the other. (See also respiratory failure on [Respiratory Failure and Mechanical Ventilation](#), dyspnea on [Dyspnea](#), and hypoxia on [Oxygen Desaturation](#).)

Interruption of pulmonary gas exchange for > 5 min may irreversibly damage vital organs, especially the brain. Cardiac arrest almost always follows unless respiratory function is rapidly restored. However, aggressive ventilation may also have negative hemodynamic consequences, particularly in the periarrest period and in other circumstances when cardiac output is low. In most cases, the ultimate goal is to restore adequate ventilation and oxygenation without further compromising a tentative cardiovascular situation.

## Respiratory Arrest

### Overview of Respiratory Arrest

[Airway Establishment and Control](#)



# Epidemiologia

## Resuscitation Science

### Bystander-Initiated Rescue Breathing for Out-of-Hospital Cardiac Arrests of Noncardiac Origin

Tetsuhisa Kitamura, MD, MS; Taku Iwami, MD, PhD; Takashi Kawamura, MD, PhD; without mouth-to-mouth ventilation.<sup>11</sup> It is reported that 20% to 40% of adult OHCAs are of noncardiac origin, most of which involve respiratory compromise such as drowning or asphyxia.<sup>1–6</sup> However, evidence of the effectiveness of bystander CPR (*Circulation*. 2010;122:293–299.)

Arresto di origine non  
cardiaca= 20-40%

### Epidemiology, trends, and outcome of out-of-hospital cardiac arrest of non-cardiac origin<sup>☆</sup>

Erik P. Hess<sup>a</sup>, Ronna L. Campbell<sup>a</sup>, Roger D. White<sup>b,\*</sup>

Overall, 21.7% of all EMS-treated OHCAs were of non-cardiac etiology. This percentage falls within the range of 10–34% reported in other studies.<sup>7,8,19</sup>

Resuscitation (2007) 72, 200–206

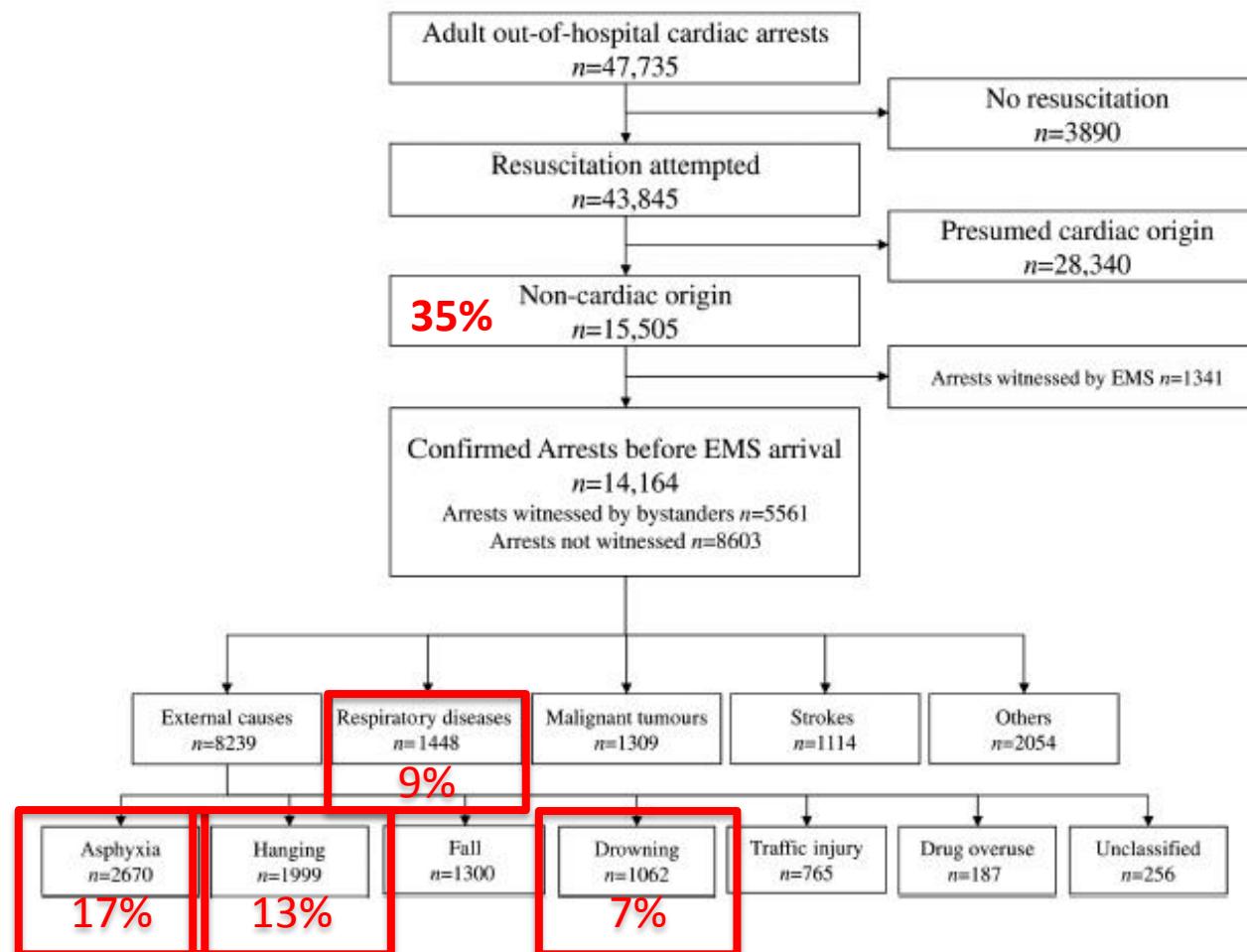
# CAUSE

Table 2 Etiology of non-cardiac causes of out-of-hospital cardiac arrest

Etiology	N (%)	Survived n (%)
Respiratory failure	32 (35.6)	2 (6.25)
Unknown	14 (15.6)	0
Pulmonary embolism	12 (13.3)	2 (16.7)
Overdose	9 (10.0)	1 (11.1)
Non-traumatic bleeding	8 (8.9)	1 (12.5)
Electrolyte abnormality	4 (4.4)	2 (50)
Sepsis	4 (4.4)	0
Drowning	2 (2.2)	0
Intracranial process	3 (3.3)	0
Hematologic abnormality	1 (1.1)	0
Malignancy	1 (1.1)	0

***Maggiore incidenza e minore mortalità***

# BMJ Open Epidemiology and outcome of adult out-of-hospital cardiac arrest of non-cardiac origin in Osaka: a population-based study

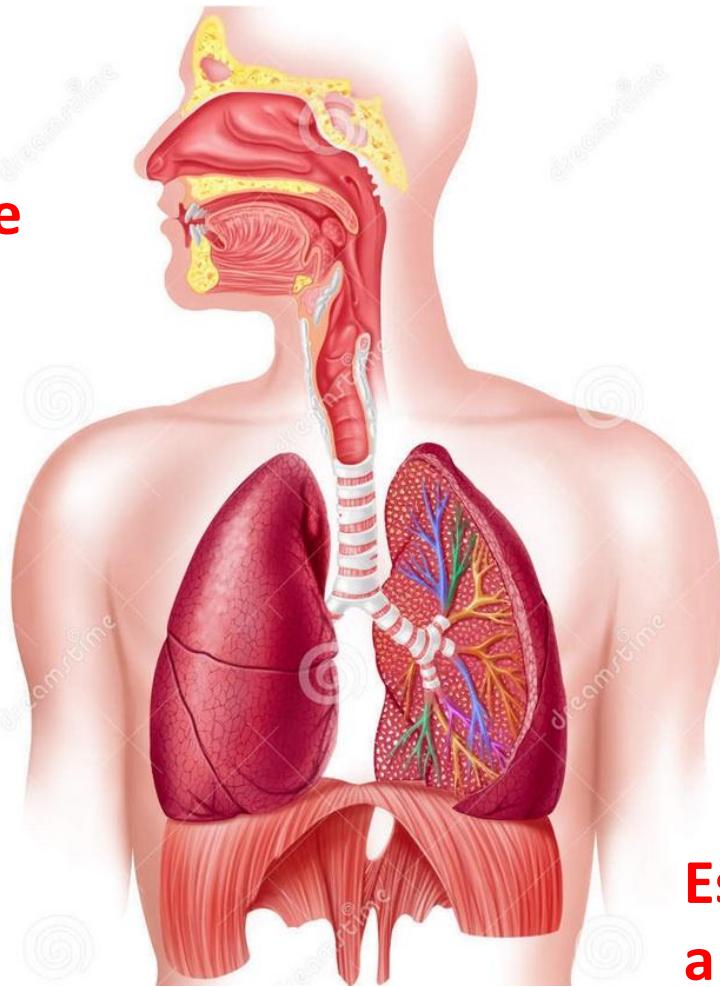


# Eziologia

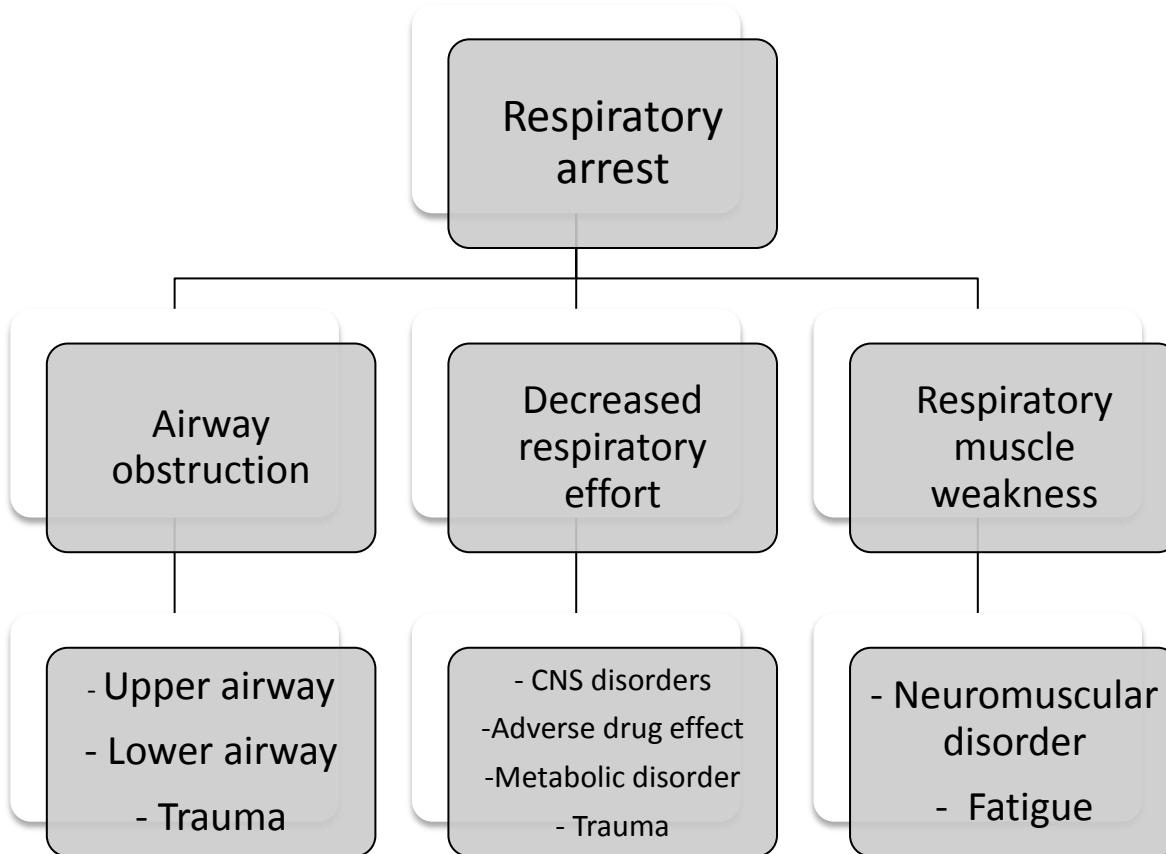
Ostruzione  
delle vie aeree

Riduzione/scompar-  
sa dello sforzo  
respiratorio

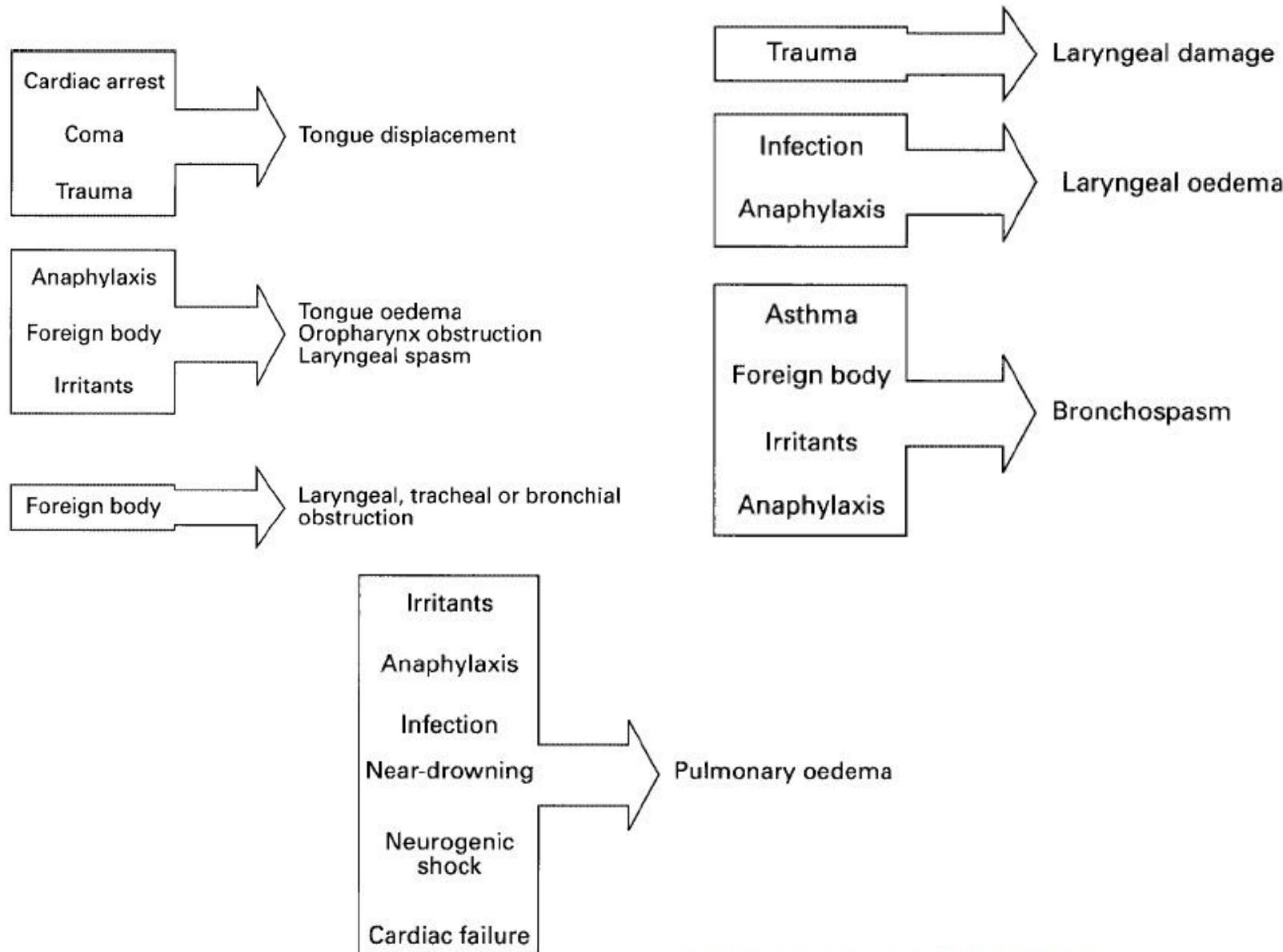
Esaurimento/fatic-  
a dei muscoli  
respiratori



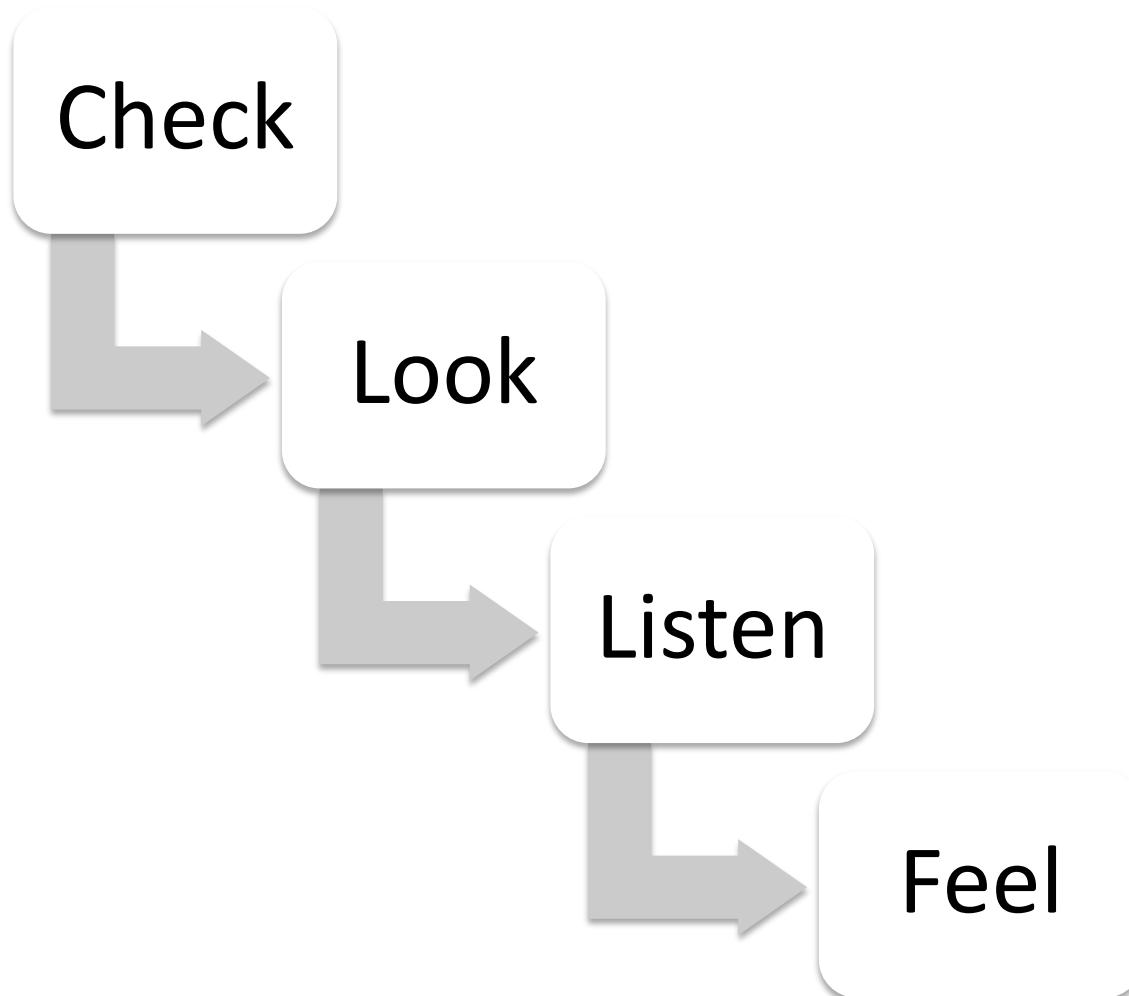
# Eziologia



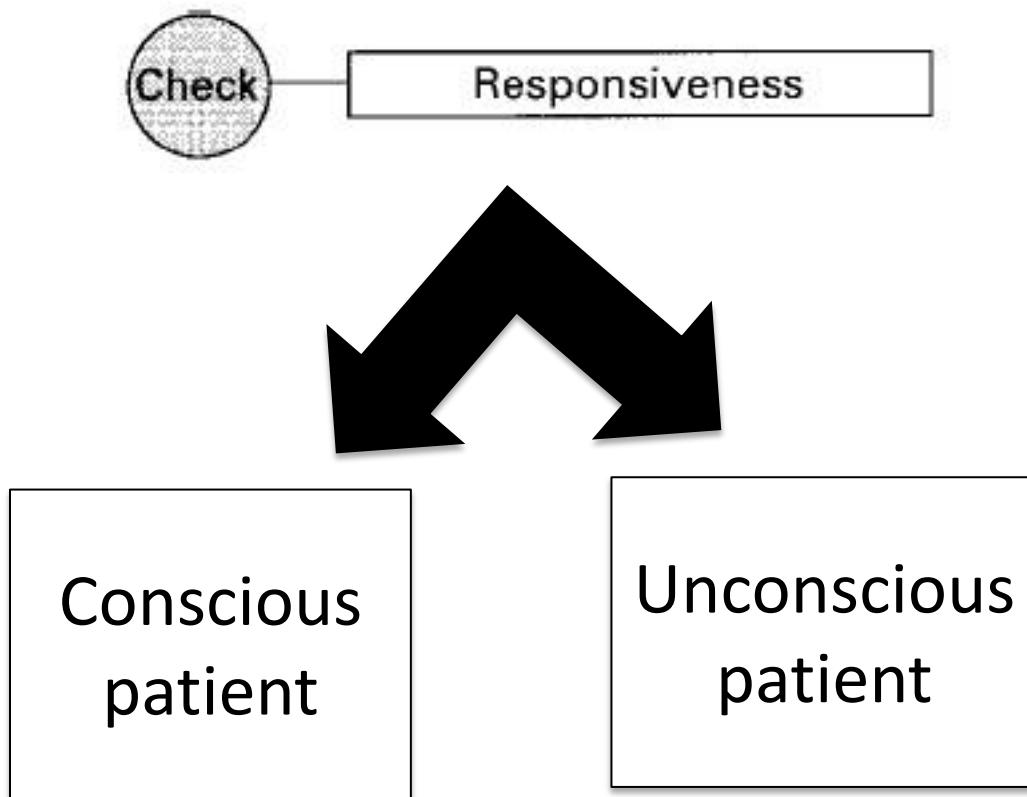
# Airway obstruction



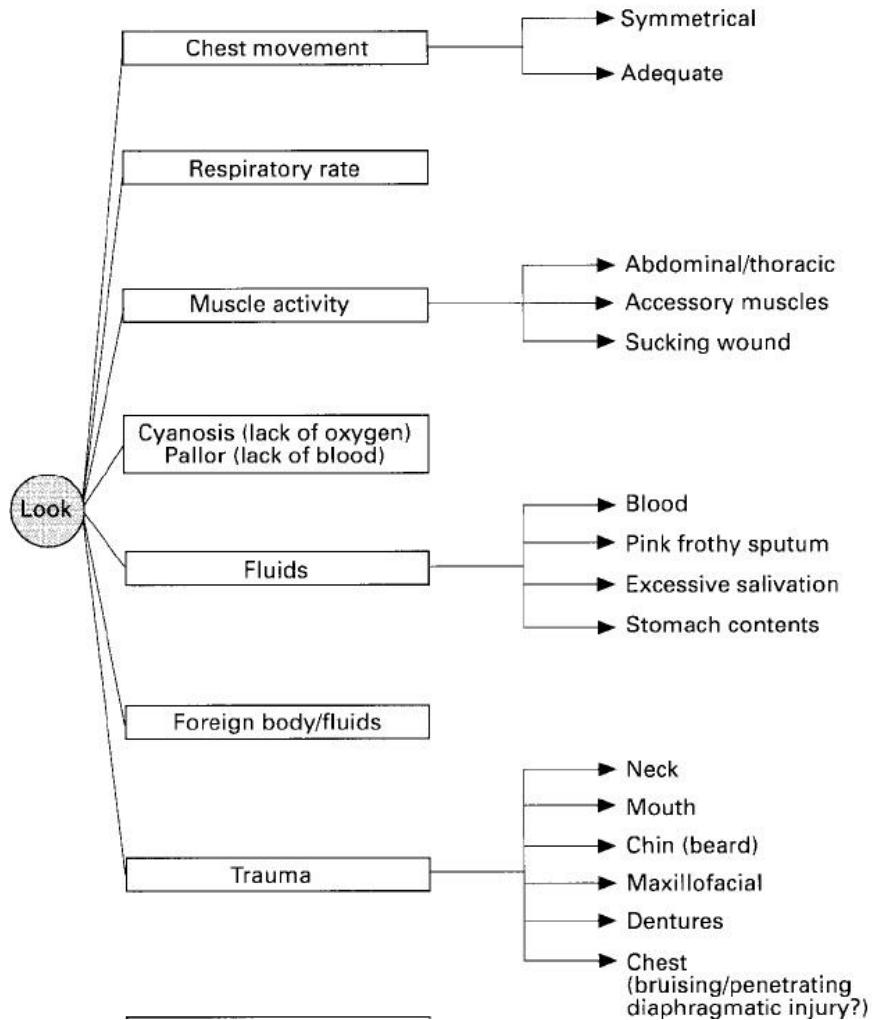
# Valutazione dell'arresto respiratorio



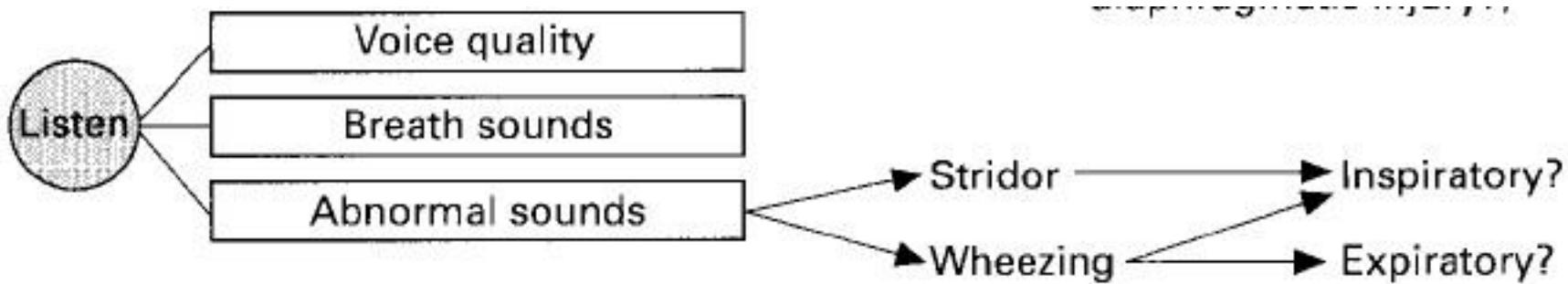
# Valutazione dell'arresto respiratorio: CHECK



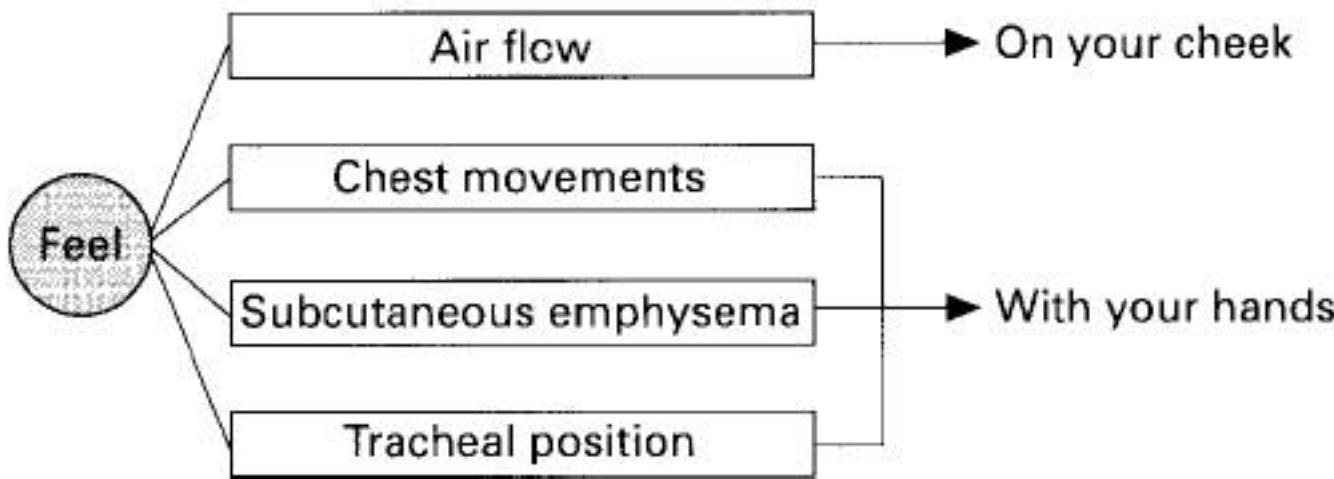
# Valutazione dell'arresto respiratorio: LOOK



# Valutazione dell'arresto respiratorio: LISTEN



# Valutazione dell'arresto respiratorio: FEEL



# Valutazione dell'arresto respiratorio

**Look + listen + feel = unica manovra**

- Look, listen and feel for breathing
- No longer than 10 seconds



# 1° Scenario

- Pz cosciente → riesce a parlare
- Movimenti respiratori ancora presenti ma non validi → stridor, sibili respiratori



Probabile ostruzione parziale da corpo estraneo

# 1° Scenario

Probabile ostruzione parziale da corpo estraneo

Conscious

5 back blows  
5 abdominal thrusts

# Back blows



# Abdominal thrusts



## 2° Scenario

- Paziente non cosciente
- No attività respiratoria



# Soccorritore laico e/o ambiente non medicalizzato

**Unconscious**

**Open airway**  
**5 breaths**  
**Start CPR**

**Eseguire head tilt  
and chin lift → se  
non trauma  
cervicale**



Fig. 2.5. Head tilt and chin lift.

# Soccorritore laico e/o ambiente non medicalizzato

**Unconscious**

**Open airway**

**5 breaths**

**Start CPR**

**Mouth to  
mouth  
ventilation**



**2.11.** Blow steadily into his mouth whilst watching for his chest to rise.

# Soccorritore non laico e/o ambiente medicalizzato

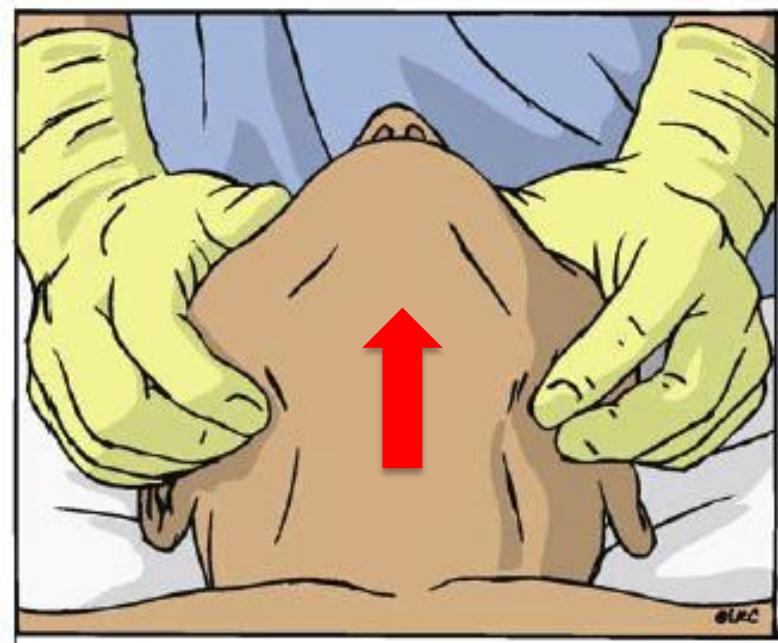
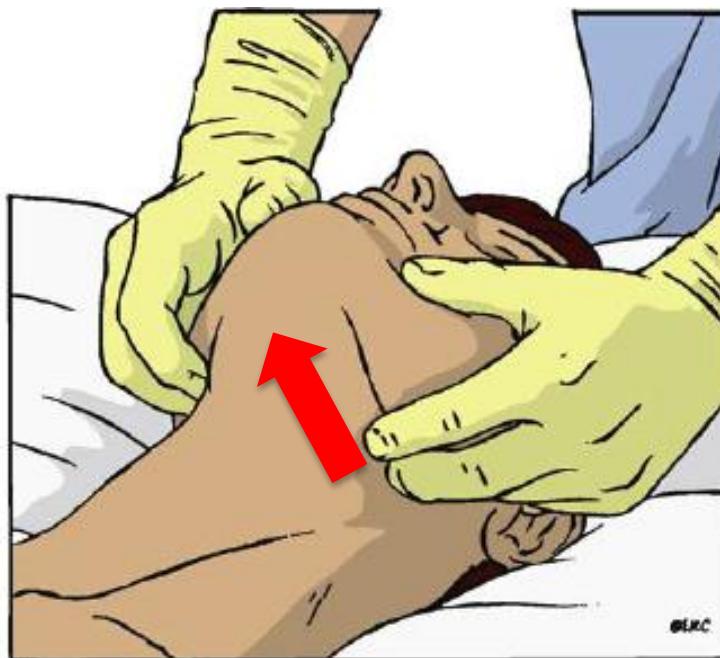
Unconscious

Open airway

5 breaths

Start CPR

Jaw-thrust →  
sublussazione  
della mandibola



# Soccorritore non laico e/o ambiente medicalizzato

Unconscious

Open airway

5 breaths

Start CPR

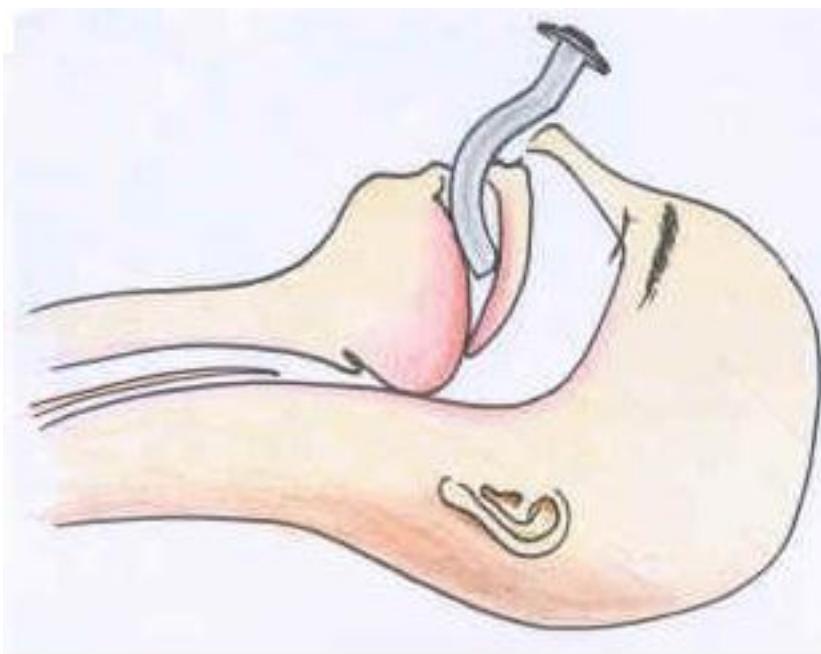
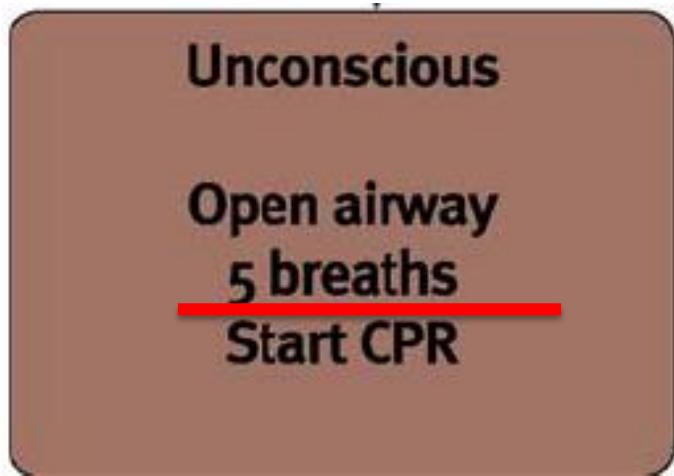


Fig. 1. Insertion of oropharyngeal airway.

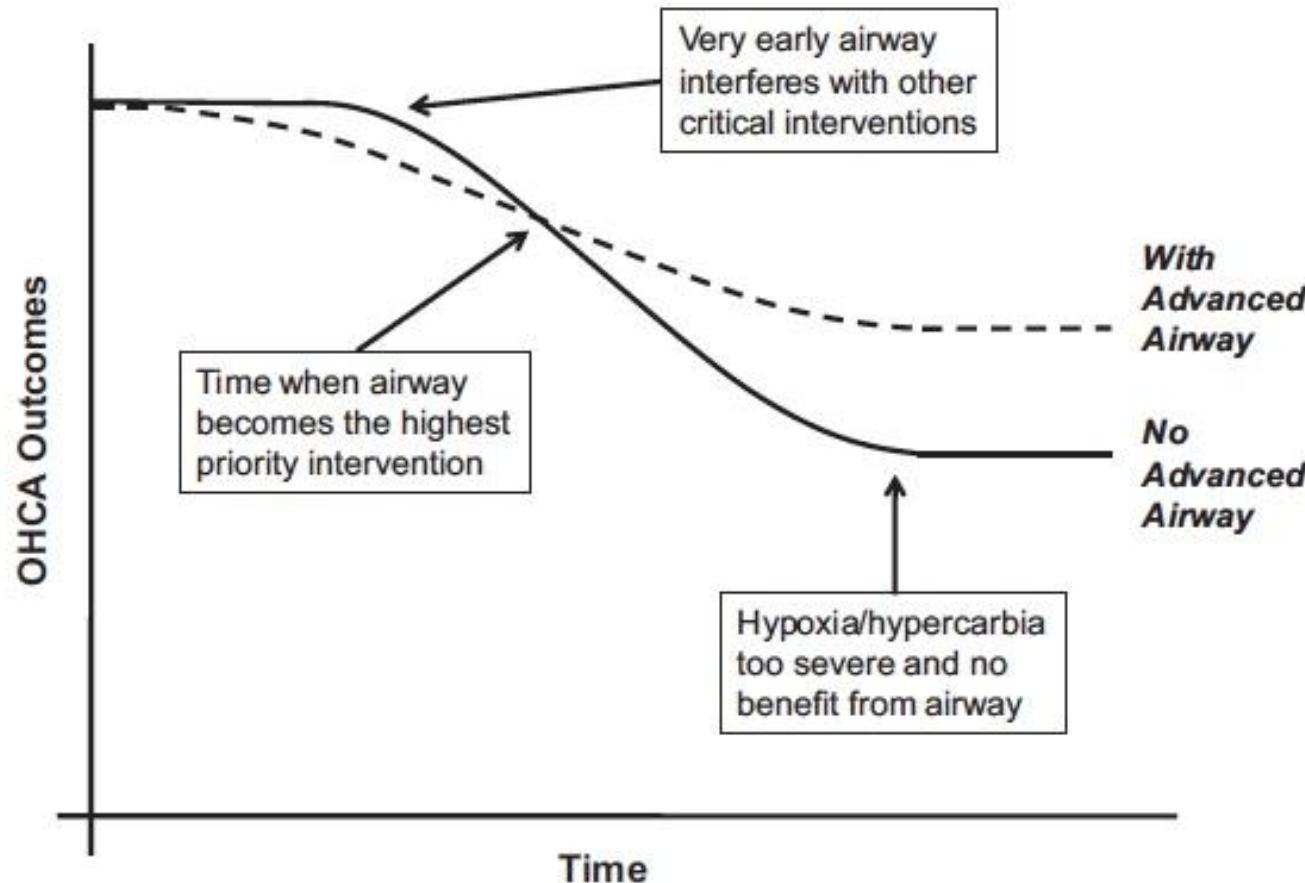
# Soccorritore non laico e/o ambiente medicalizzato



Ventilazione del  
paziente in  
arresto  
respiratorio/cardi  
orespiratorio

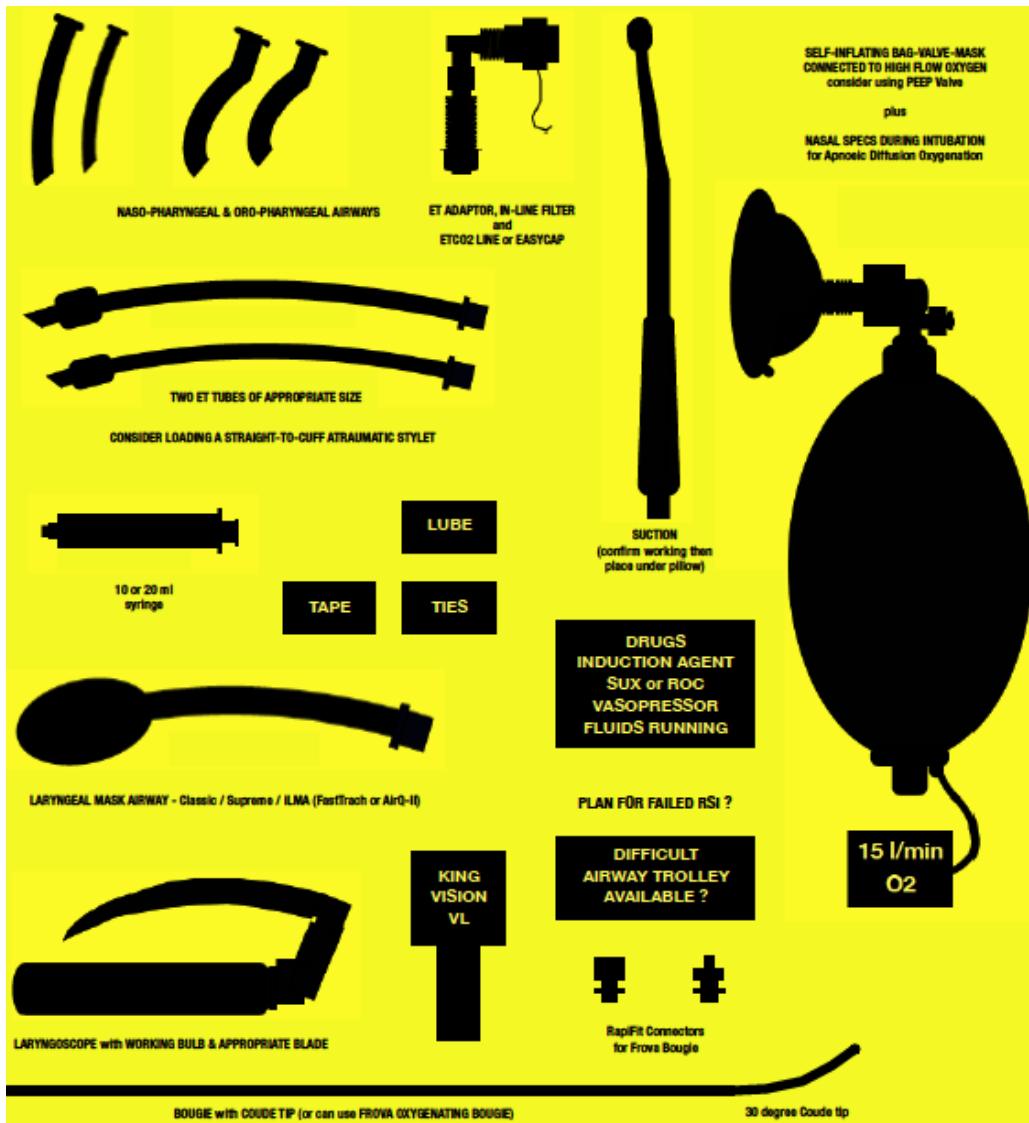
*Provide artificial ventilation as soon as possible for any patient in whom spontaneous ventilation is inadequate or absent.*

# Ventilazione del paziente in arresto respiratorio



**Il tempo è vita !!!**

# Device per la ventilazione



Convenzionali e  
avanzati

# Device per la ventilazione: convenzionali

C.D. Deakin et al. /  
Resuscitation 81  
(2010) 1305–1352

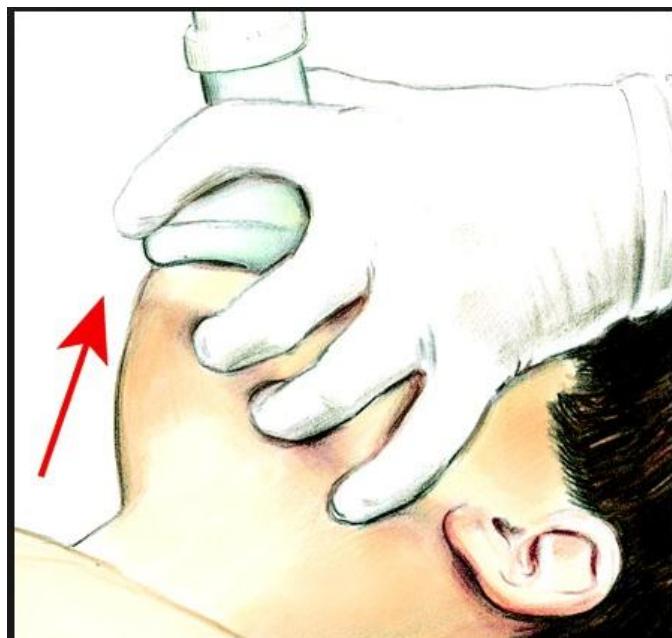


as possible by ventilation with oxygen-enriched air. The pocket resuscitation mask is used widely. It is similar to an anaesthetic facemask, and enables mouth-to-mask ventilation. It has a unidirectional valve, which directs the patient's expired air away from the rescuer. The mask is transparent so that vomit or blood from the patient can be seen. Some masks have a connector for the addition

# Device per la ventilazione: convenzionali



Fig. 4.7. The two-person technique for bag-mask ventilation.

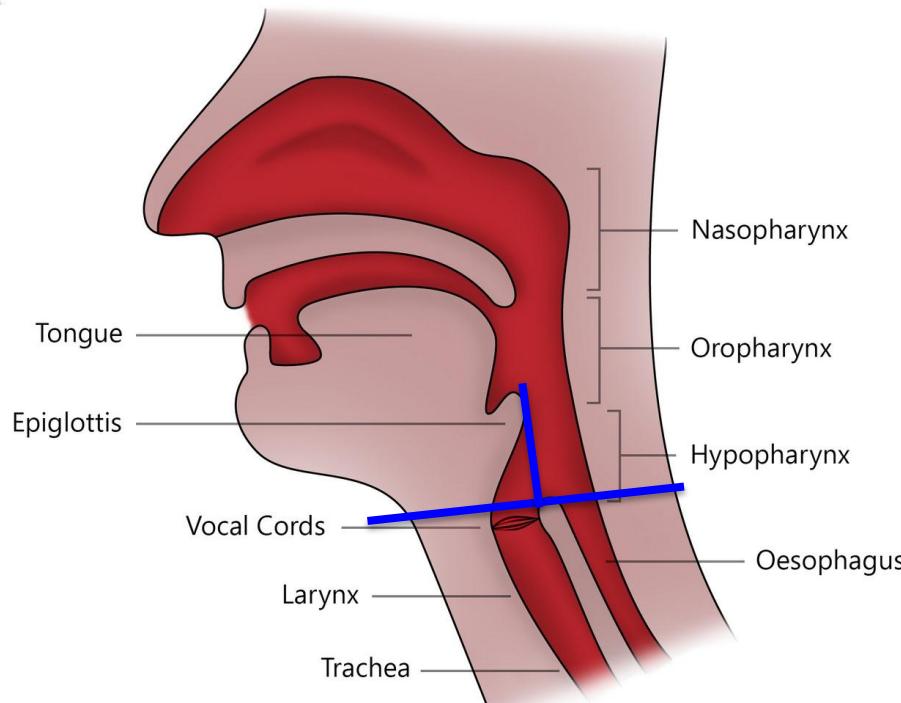


of oxygen. When using masks without a connector, supplemental oxygen can be given by placing the tubing underneath one side and ensuring an adequate seal. Use a two-hand technique to maximise the seal with the patient's face (Fig. 4.6).

# Device per la ventilazione: avanzati

## Device sovraglottici

century ago. What began as an operating room adjunct has been adopted and widely used in the emergency room and prehospital environment. Although the term “supraglottic airway” is most commonly used to refer to these devices, the term, “extraglottic” also defines the class. These devices do not violate the larynx and are inserted via the oropharynx to provide ventilation.<sup>1</sup>



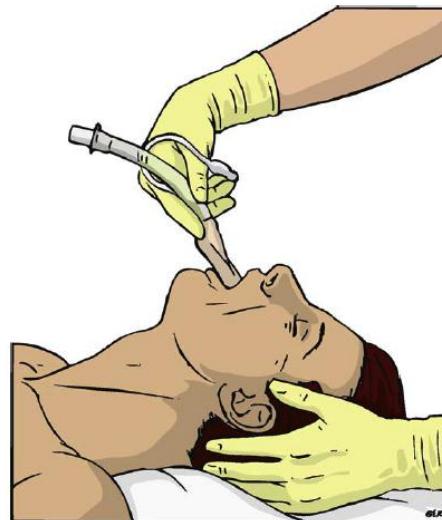
# Device per la ventilazione: avanzati

## European Resuscitation Council Guidelines for Resuscitation 2010 Section 4. Adult advanced life support

Charles D. Deakin<sup>a,1</sup>, Jerry P. Nolan<sup>b,\*,1</sup>, Jasmeet Soar<sup>c</sup>, Kjetil Sunde<sup>d</sup>, Rudolph W. Koster<sup>e</sup>, Gary B. Smith<sup>f</sup>, Gavin D. Perkins<sup>f</sup>

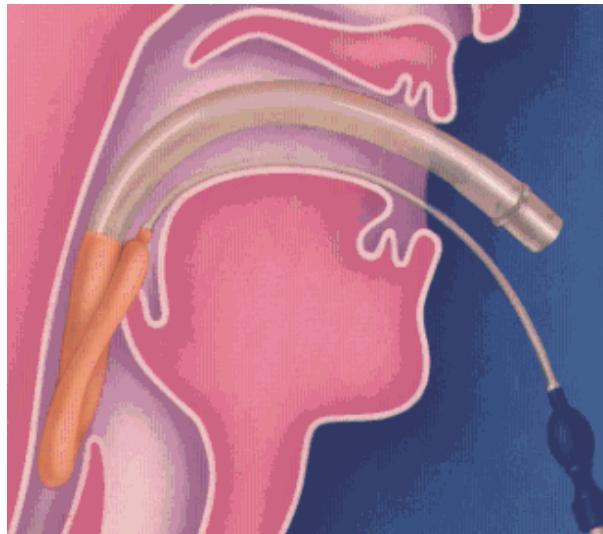
Several alternative airway devices have been considered for airway management during CPR. There are published studies on the use during CPR of the Combitube, the classic laryngeal mask airway (cLMA), the laryngeal tube (LT) and the I-gel, but none of these studies have been powered adequately to enable survival to be studied as a primary endpoint; instead, most researchers have studied insertion and ventilation success rates. The supraglottic airway devices (SADs) are easier to insert than a tracheal tube and, unlike tracheal intubation, can generally be inserted without interrupting chest compressions.<sup>356</sup>

# Device per la ventilazione: avanzati Maschera laringea



The laryngeal mask airway (Fig. 4.8) is quicker and easier to insert than a tracheal tube.<sup>357–364</sup> The original LMA (cLMA), which is reusable, has been studied during CPR, but none of these studies has compared it directly with the tracheal tube. A wide variety of single-use LMAs are used for CPR, but they have different characteristics to the cLMA and there are no published data on their

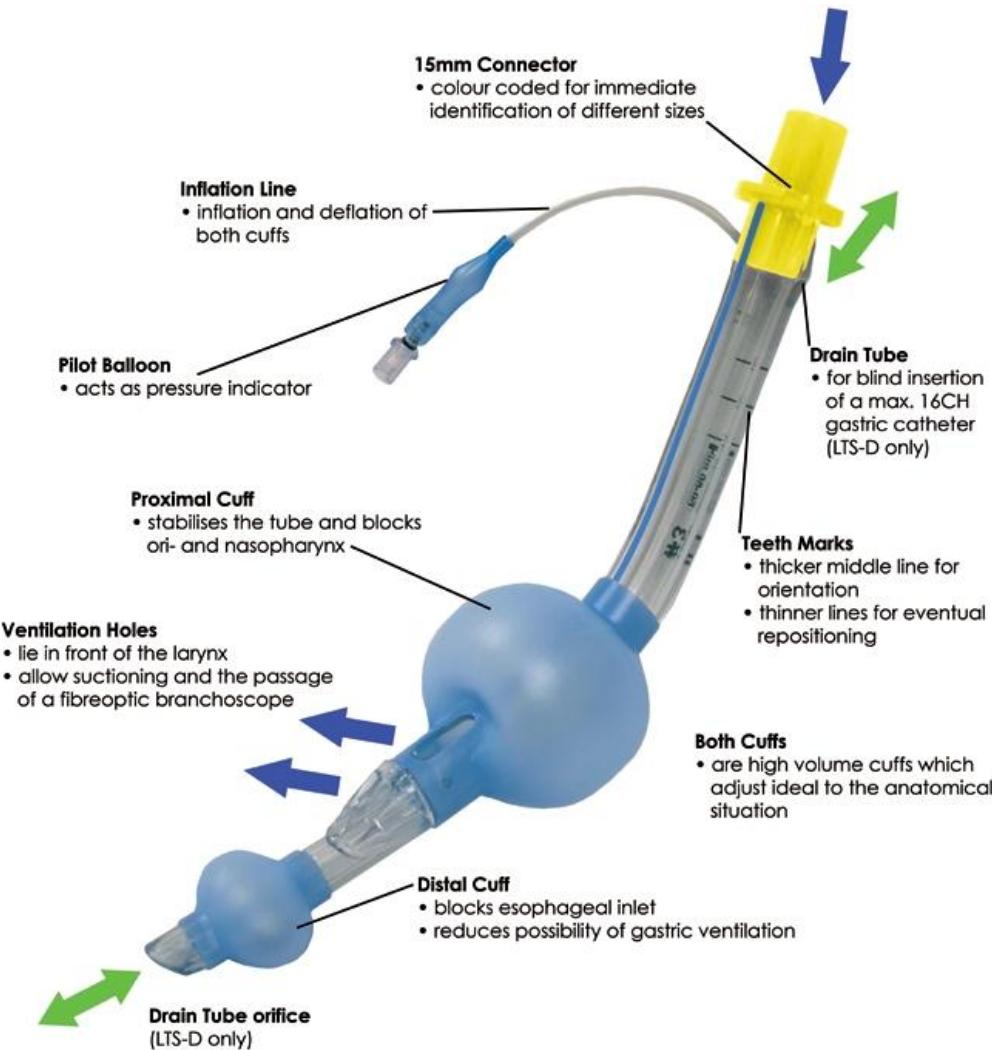
# Device per la ventilazione: avanzati Maschera laringea



performance in this setting.<sup>365</sup> Reported rates of successful ventilation during CPR with the LMA are very high for in-hospital studies (86–100%)<sup>366–369</sup> but generally less impressive (71–90%)<sup>370–372</sup> for out-of-hospital cardiac arrest (OHCA). The reason for the relatively disappointing results from the LMA in OHCA is not clear.

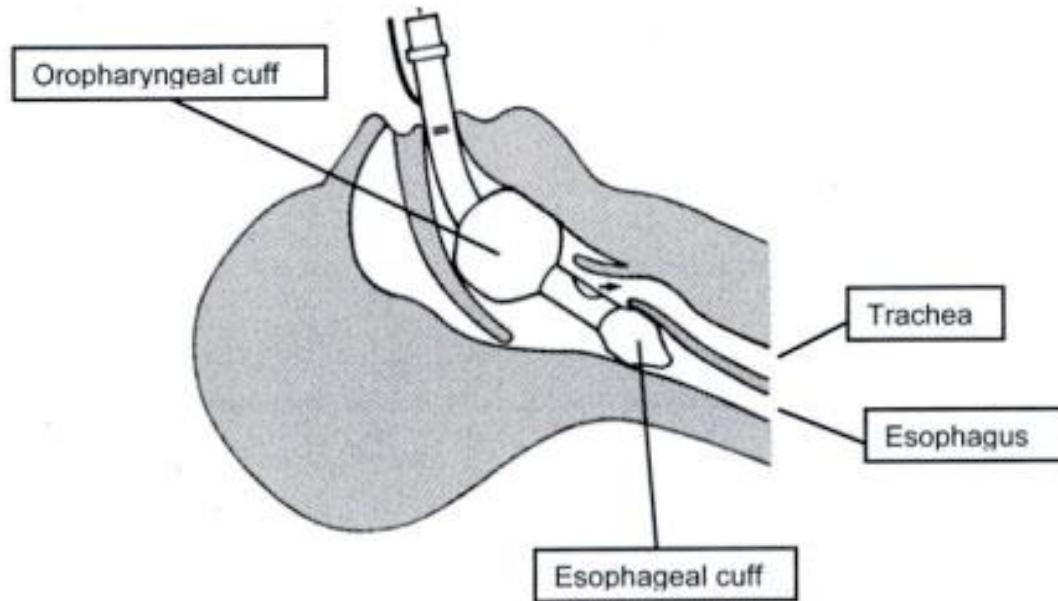
# Device per la ventilazione: avanzati

## Tubo laringeo



# Device per la ventilazione: avanzati

## Tubo laringeo



and ProSeal LMA.<sup>382,383</sup> After just 2 h of training, nurses successfully inserted a laryngeal tube and achieved ventilation in 24 of 30 (80%) of OHCAs.<sup>384</sup> A disposable version of the laryngeal tube (LT-D) is available and was inserted successfully by paramedics in 92 OHCAs (85 on the first attempt and 7 on the second attempt).<sup>385</sup>

# Tubo laringeo

Original Contribution

## Safety and Feasibility of the Laryngeal Tube When Used by EMTs During Out-of-Hospital Cardiac Arrest<sup>☆</sup>

Dominik Roth, MD <sup>a</sup>, Christina Hafner, MD <sup>a,b</sup>, Werner Aufmesser, MD <sup>c</sup>, Kurt Hudabiunigg, MD <sup>c</sup>, Christian Wutti, MD <sup>c</sup>, Harald Herkner, MD, MSc <sup>a,\*</sup>, Wolfgang Schreiber, MD <sup>a,c</sup>

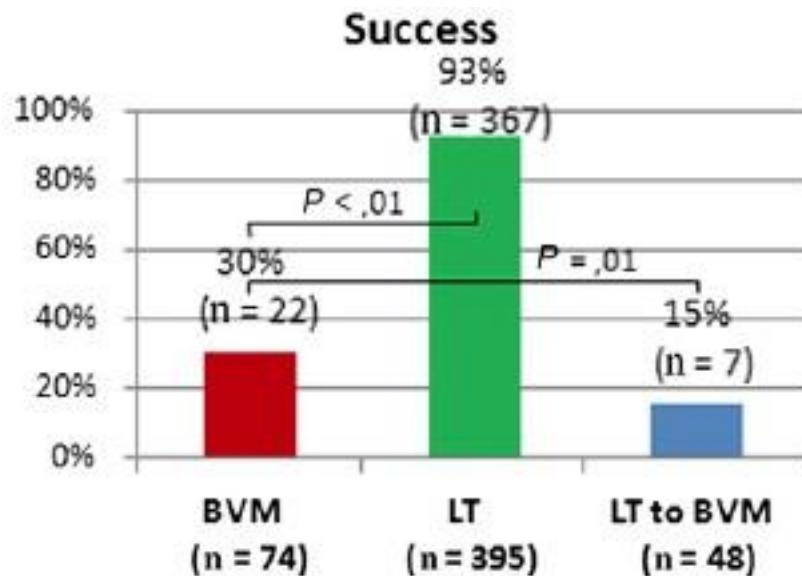


Fig. 3. Frequencies of successful ventilation.

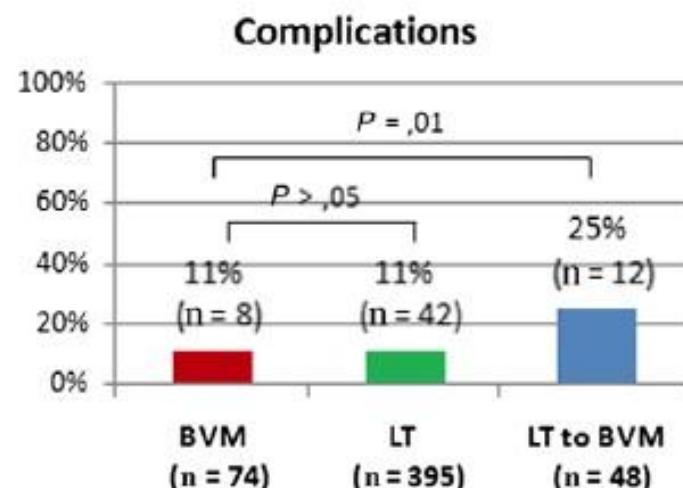


Fig. 2. Prevalence of complications (ie, regurgitation plus injuries plus cuff rupture).

# Tubo laringeo

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### Primary and secondary outcomes

	BVM (n = 74)	LT (n = 395)
	Risk (%), baseline	Risk (%), RR (95% CI) <sup>a</sup> , P value
Complications	8 (11%)	42 (11%), 2.17(0.61-7.71), P = .23
Ventilation success	22 (30%)	367 (93%), 3.05(1.31-7.14), P < .01
Any ROSC	7 (10%)	62 (16%), 1.00 (0.48-2.11), P = .99
Sustained ROSC/survival to hospital admission	5 (7%)	54 (14%), 1.20 (0.49-3.15), P = .71
Survival to hospital discharge	2 (3%)	14 (4%), 0.83 (0.17-4.15), P = .83
Survival with good neurologic outcome <sup>b</sup>	1 (1%)	13 (3%), 1.62 (0.20-13.36), P = .66

***Migliore ventilazione e maggiore ripristino dei  
ROSC***

# Device per la ventilazione: avanzati

## I-GEL



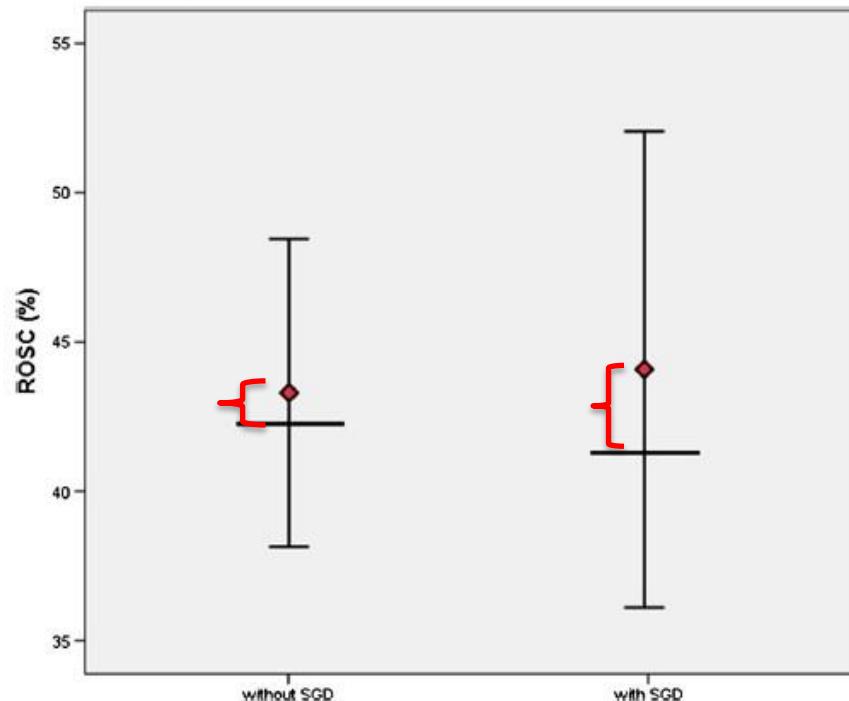
The cuff of the I-gel is made of thermoplastic elastomer gel (styrene ethylene butadene styrene) and does not require inflation; the stem of the I-gel incorporates a bite block and a narrow oesophageal drain tube (Fig. 4.10). It is very easy to insert, requiring only minimal training and a laryngeal seal pressure of 20–24 cm H<sub>2</sub>O can be achieved.<sup>387,388</sup> In two manikin studies, insertion of the I-gel was significantly faster than several other airway devices.<sup>356,389</sup> The ease of insertion of the I-gel and its

# Device sovraglottici

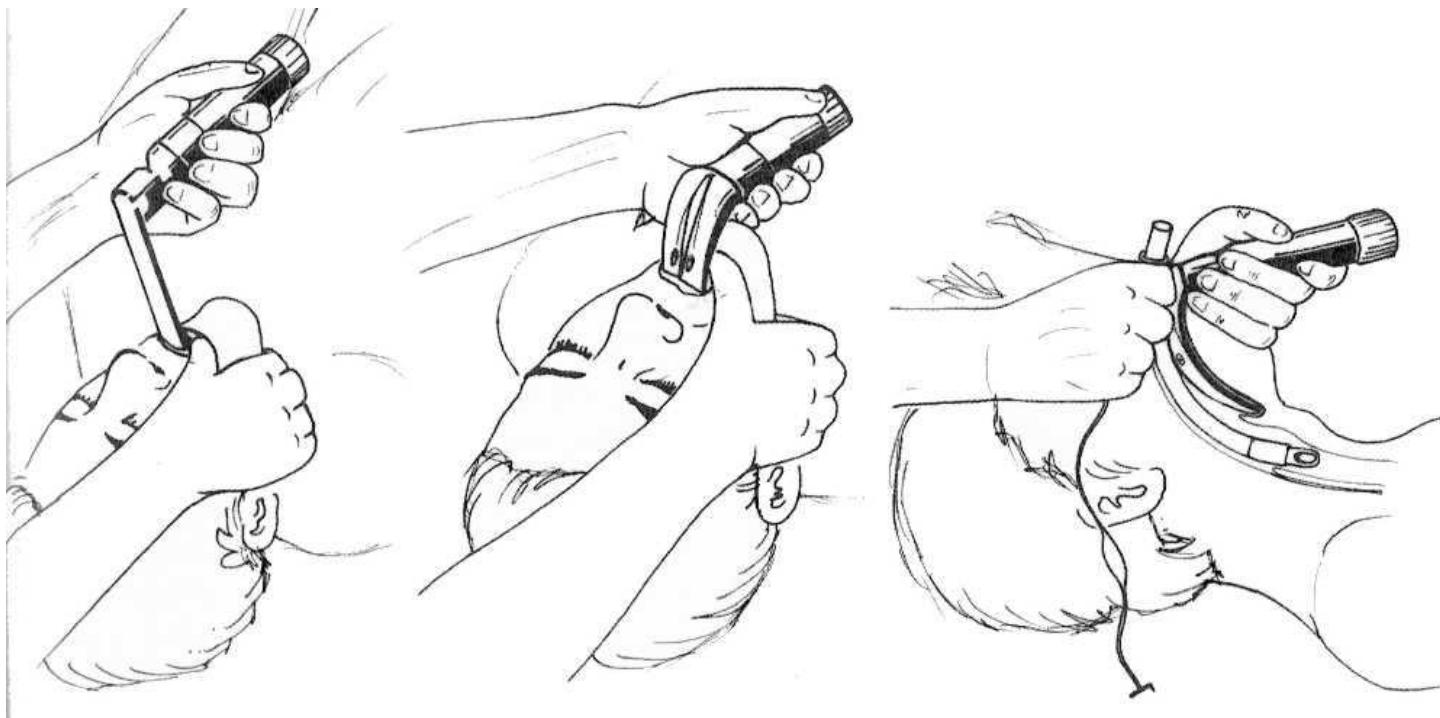


## Difficult intubation and outcome after out-of-hospital cardiac arrest: a registry-based analysis

Jan Wnent<sup>1\*†</sup>, Rüdiger Franz<sup>2†</sup>, Stephan Seewald<sup>3</sup>, Rolf Lefering<sup>4</sup>, Matthias Fischer<sup>5</sup>, Andreas Bohn<sup>6,7</sup>, Jörg W. Walther<sup>8</sup>, Jens Scholz<sup>3</sup>, Roman-Patrik Lukas<sup>7</sup>, Jan-Thorsten Gräsner<sup>3</sup> and the German Resuscitation Registry Study Group



# Device per la ventilazione: intubazione tracheale



Tracheal intubation is perceived as the optimal method of providing and maintaining a clear and secure airway. It should be used only when trained personnel are available to carry out the procedure with a high level of skill and confidence.

# Device per la ventilazione: intubazione tracheale

## Vantaggi intubazione vs altri device

- enabling effective ventilation, particularly when lung and/or chest compliance is poor;
- minimising gastric inflation and the risk of regurgitation;
- protection against pulmonary aspiration of gastric contents;
- the potential to free the rescuer's hands for other tasks
- More gastric distension
- More regurgitation
- More aspiration

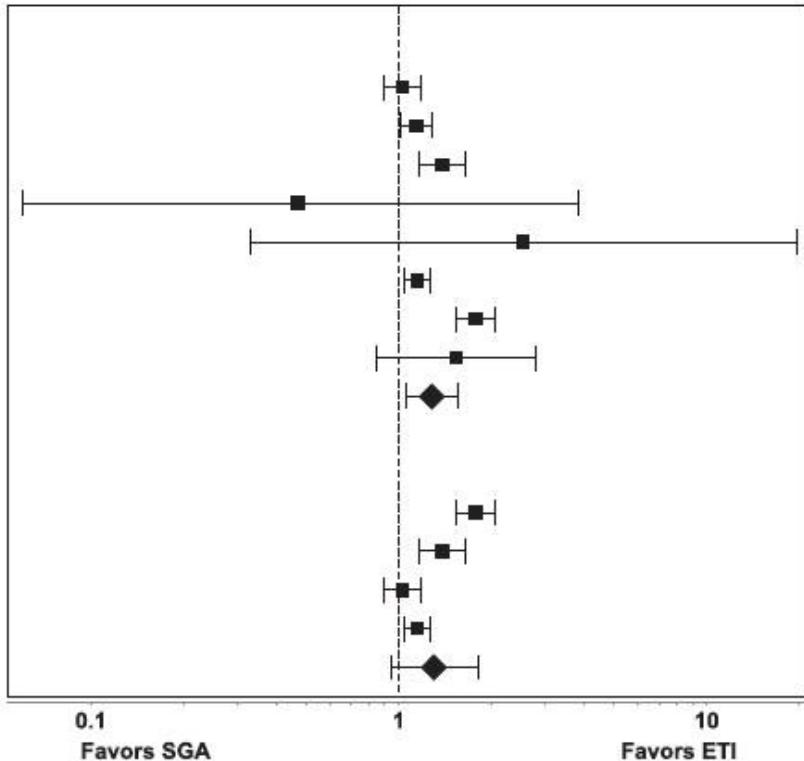
# Intubazione vs Device sovraglottici

Review article

Endotracheal intubation versus supraglottic airway placement in out-of-hospital cardiac arrest: A meta-analysis

Justin L. Benoit\*, Ryan B. Gerecht, Michael T. Steuerwald, Jason T. McMullan

ROSC



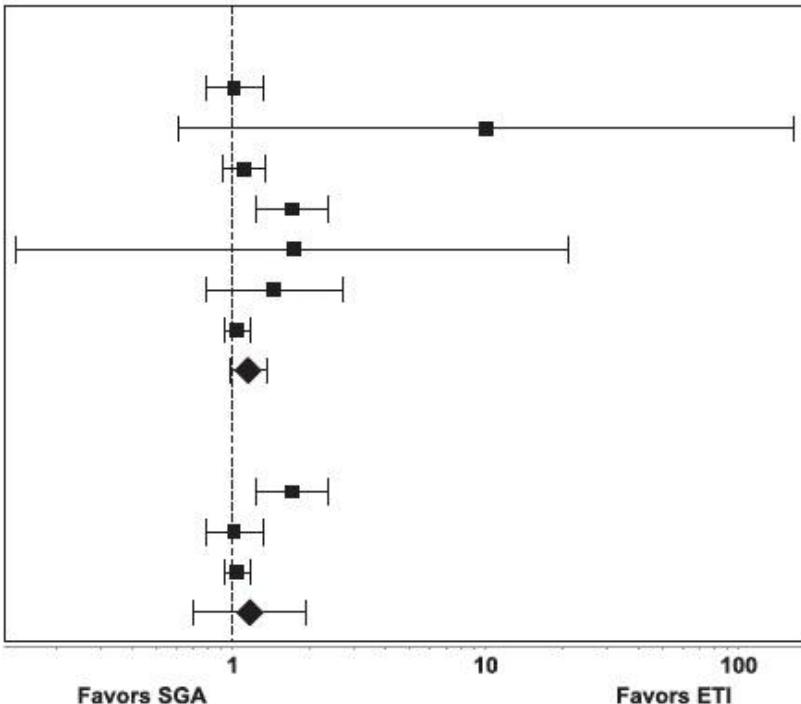
# Intubazione vs Device sovraglottici

Review article

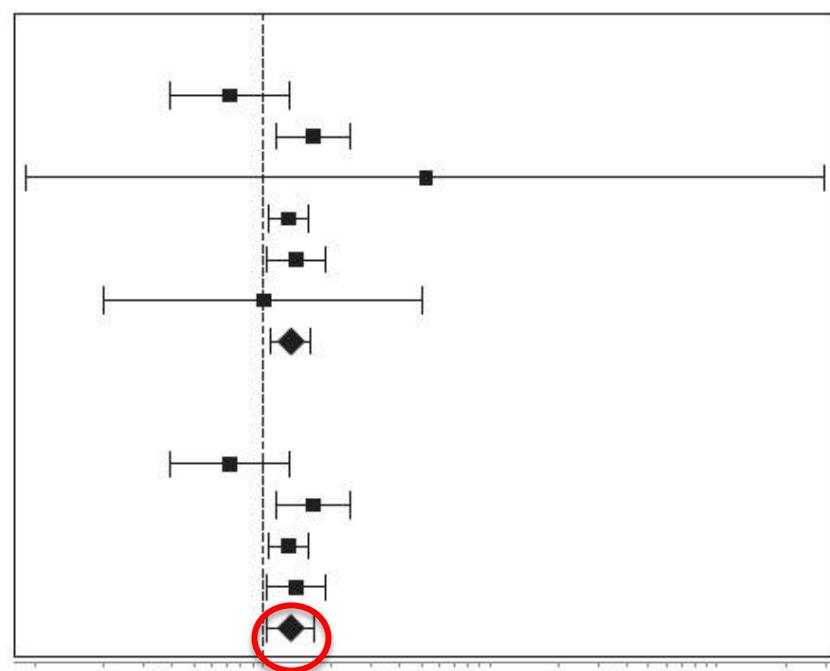
Endotracheal intubation versus supraglottic airway placement in out-of-hospital cardiac arrest: A meta-analysis

Justin L. Benoit\*, Ryan B. Gerecht, Michael T. Steuerwald, Jason T. McMullan

SURVIVAL TO HOSP DISCHARGE

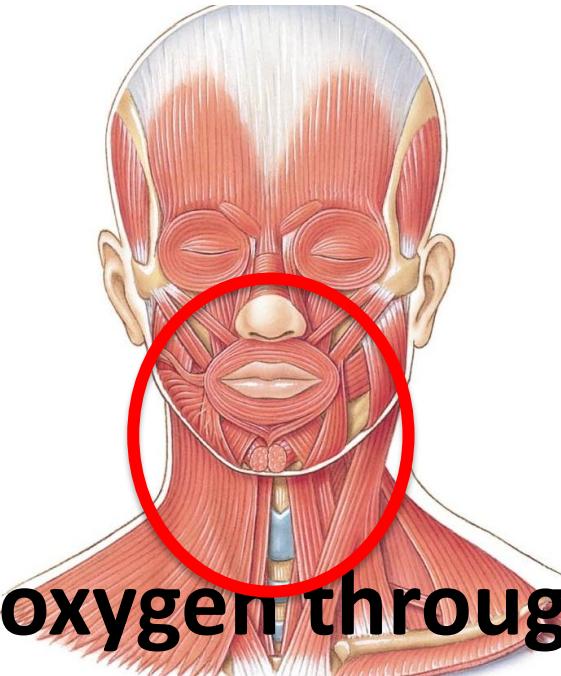


NEUROLOGIC OUTCOME AT HOSP DISCH



# Device per la ventilazione

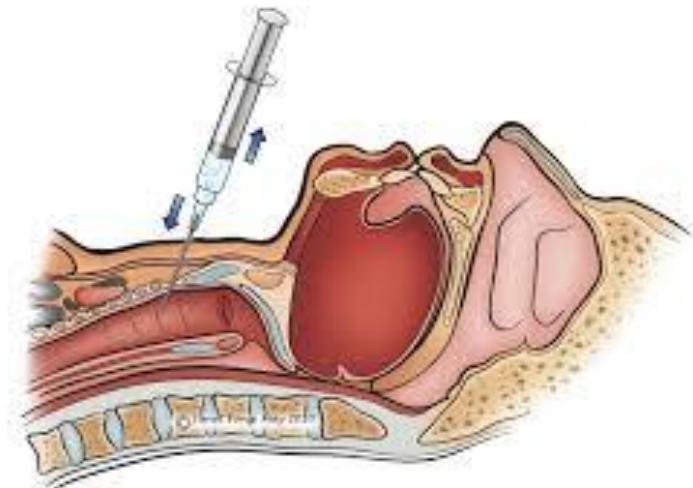
## Impossibile ventilare il paziente con maschere e intubazione



**delivery of oxygen through a needle or  
surgical cricothyroidotomy may be life-  
saving**

# Device per la ventilazione

Impossibile ventilare il paziente con  
maschere e intubazione

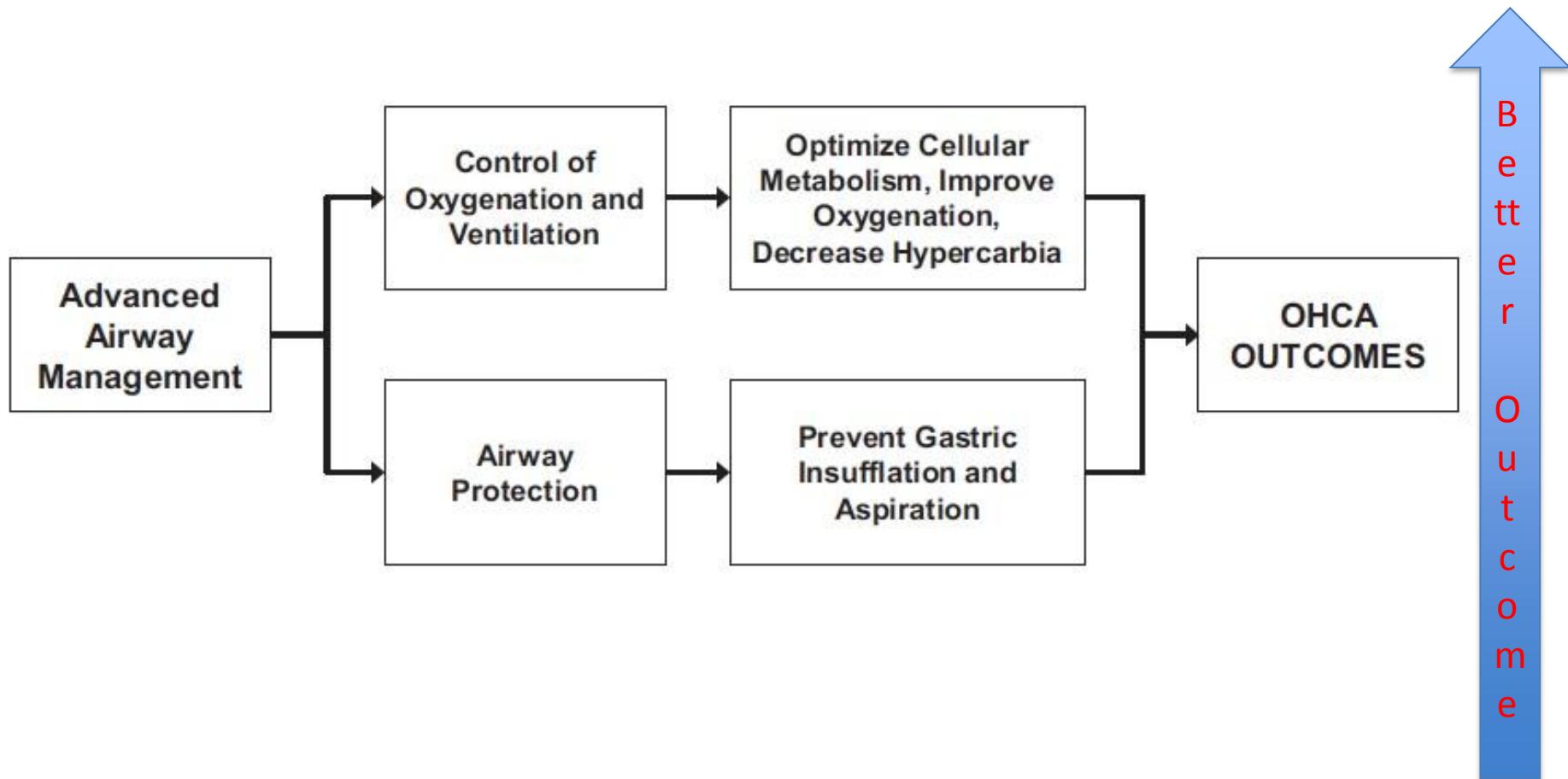


# Device per la ventilazione

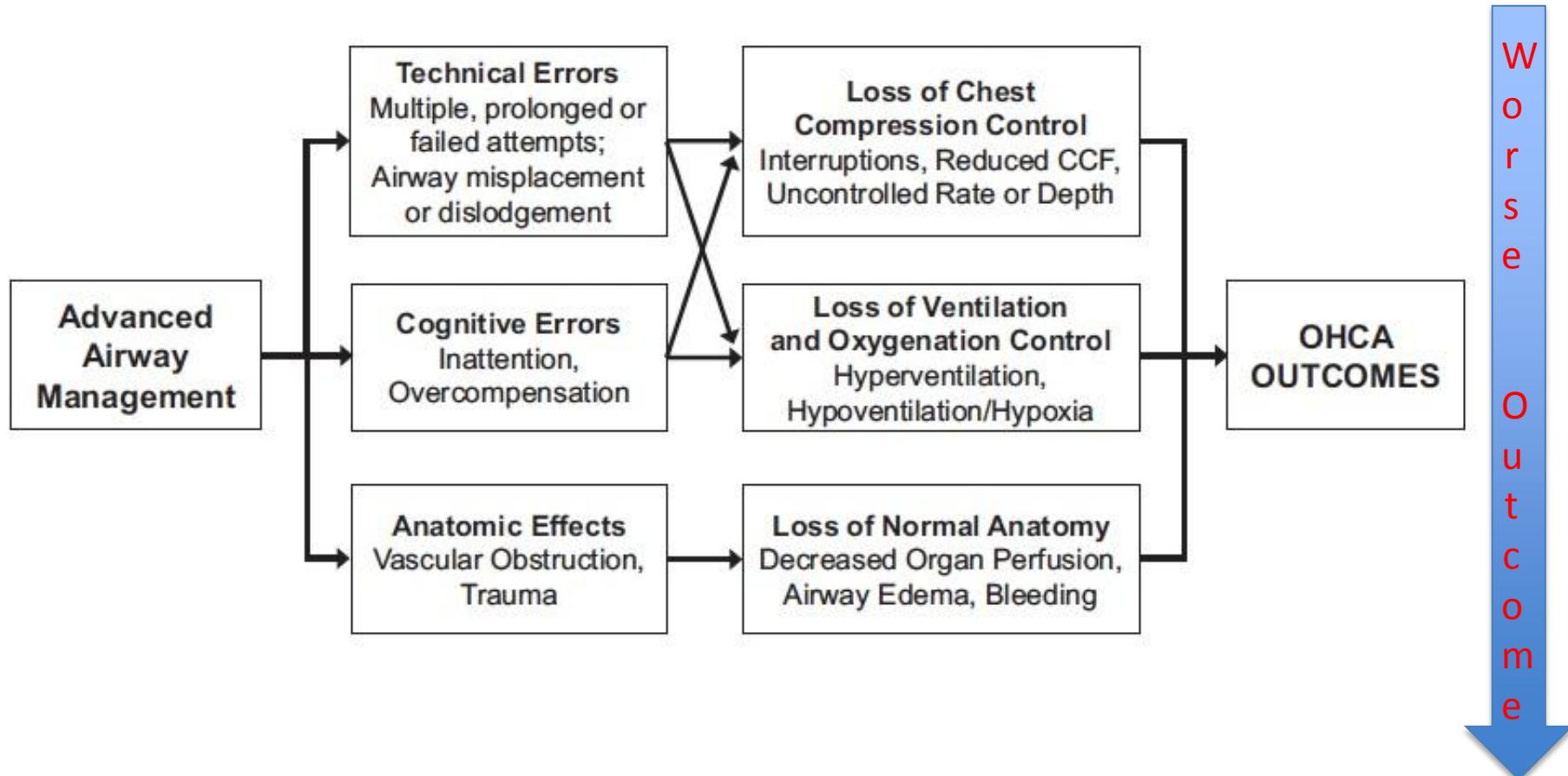
Impossibile ventilare il paziente con  
maschere e intubazione



# Gestione dell'arresto respiratorio: What should I do?



# Gestione dell'arresto respiratorio: What should I avoid?



# Arresto respiratorio: Key points

- Distinguere tra vittima cosciente e non-cosciente
- Esplorare la pervietà delle vie aeree
- Ventilare il paziente con il device che meglio conosco
- Intubazione tracheale solo se esperti
- Ricordarci di iniziare anche le compressioni