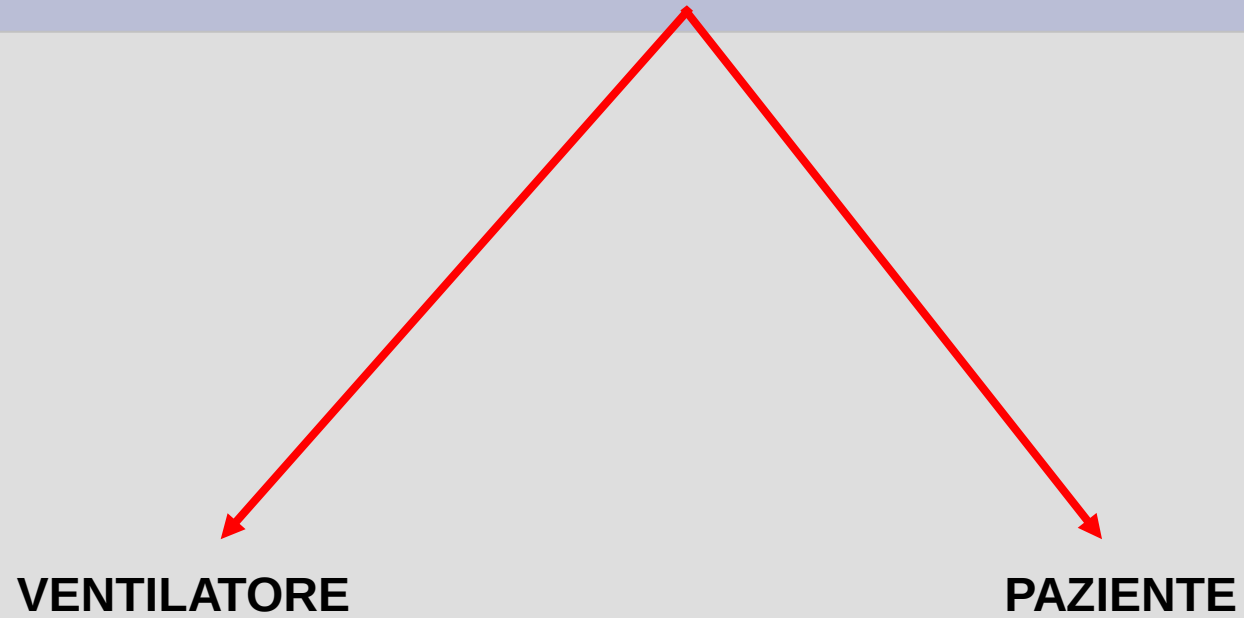


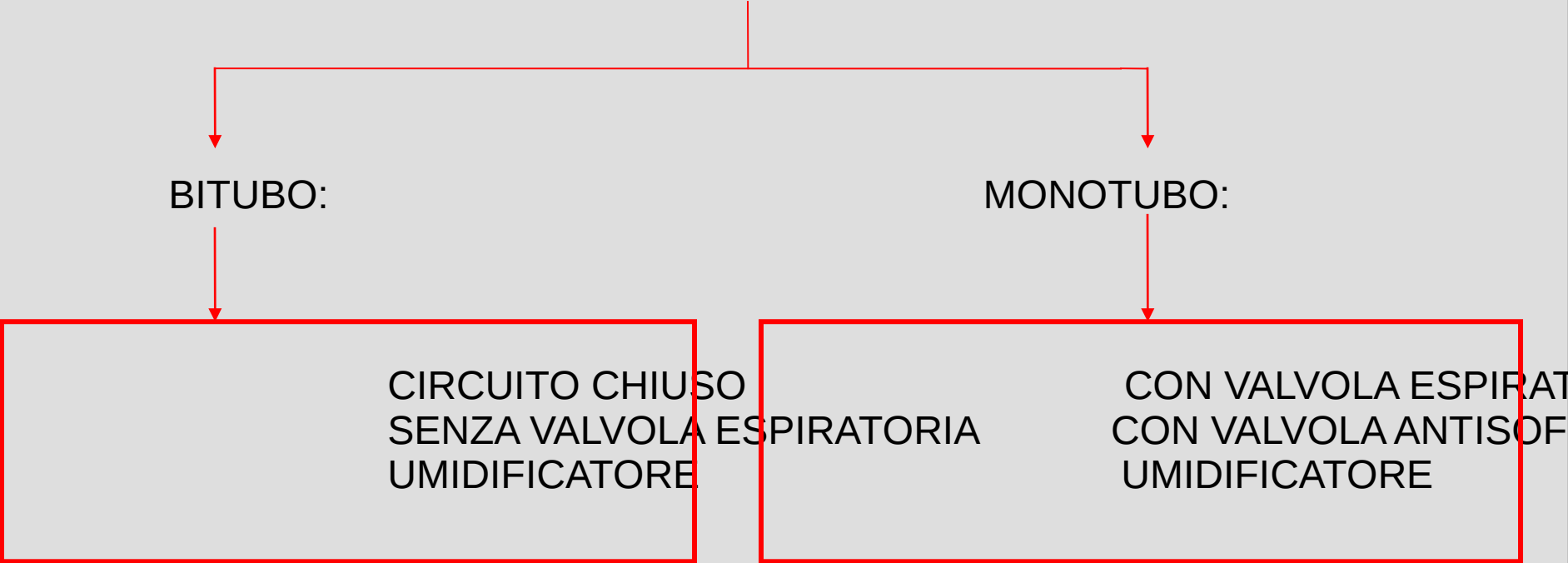
**ASSISTENZA INFERMIERISTICA E  
RESPONSABILITA'  
NELLA VENTILAZIONE NON INVASIVA**

CPSE Mauro Chiavassa  
S.C. Medicina d'Urgenza

# ASSISTENZA INFERMIERISTICA



# VENTILATORE



```
graph TD; A[VENTILATORE] --> B[BITUBO:]; A --> C[MONOTUBO:]; B --> D["CIRCUITO CHIUSO<br/>SENZA VALVOLA ESPIRATORIA<br/>UMIDIFICATORE"]; C --> E["CON VALVOLA ESPIRATORIA<br/>CON VALVOLA ANTISOBILLO<br/>UMIDIFICATORE"]
```

The diagram is a hierarchical flowchart. At the top is the word 'VENTILATORE'. A vertical line descends from it, then splits into two horizontal lines. Each horizontal line has a downward-pointing arrow leading to the words 'BITUBO:' and 'MONOTUBO:' respectively. From 'BITUBO:', a vertical line with a downward arrow leads to a red-bordered box containing three lines of text: 'CIRCUITO CHIUSO', 'SENZA VALVOLA ESPIRATORIA', and 'UMIDIFICATORE'. From 'MONOTUBO:', a vertical line with a downward arrow leads to a red-bordered box containing three lines of text: 'CON VALVOLA ESPIRATORIA', 'CON VALVOLA ANTISOBILLO', and 'UMIDIFICATORE'.

BITUBO:

MONOTUBO:

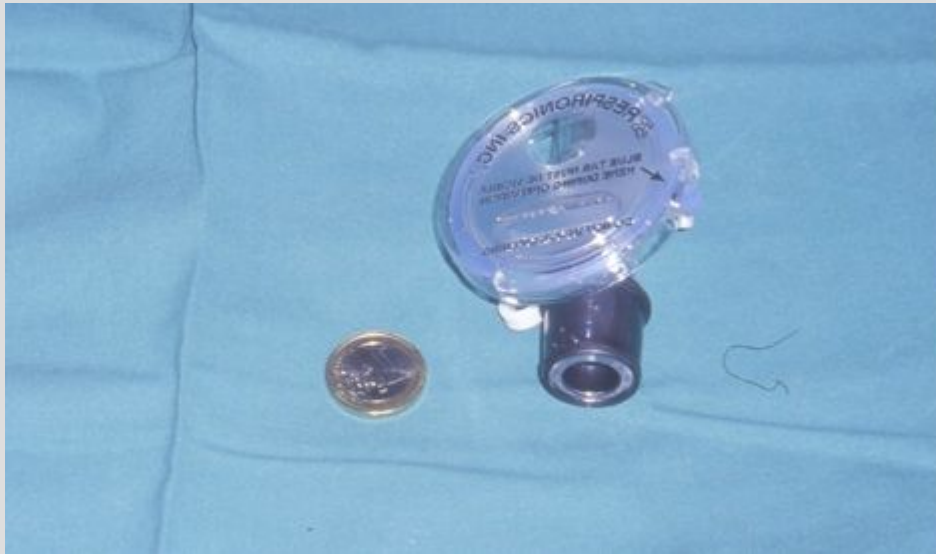
CIRCUITO CHIUSO  
SENZA VALVOLA ESPIRATORIA  
UMIDIFICATORE

CON VALVOLA ESPIRATORIA  
CON VALVOLA ANTISOBILLO  
UMIDIFICATORE





# VALVOLE ESPIRATORIE





1/1



Rotate



Mark



Recognize



Note



More

# UMIDIFICAZIONE

□ PASSIVA: FILTRI ANTIBATTERICI O IGROSCOPICI

□ ATTIVA: INTEGRATA  
INSERITA NEL CIRCUITO



-A FREDDO: GORGOGLIATORI

-A CALDO: UMIDIFICATORI A CAMPANA O PIASTRA

# ASSISTENZA AL PAZIENTE

## PRIMA



- ☐ VALUTARE CONTROINDICAZIONI ALLA NIV
- ☐ INFORMAZIONE
- ☐ PRESENTAZIONE DEL VENTILATORE
- ☐ SCOPI

## DURANTE



- ☐ MONITORAGGIO PARAMETRI VITALI
- ☐ COMPLIANCE
- ☐ SORVEGLIANZA ALLARMI
- ☐ PAUSE PASTI/IDRATAZIONE
- ☐ TERAPIA INALATORIA
- ☐ COMPLICANZE

# COMPLICANZE

**DA MASCHERA**

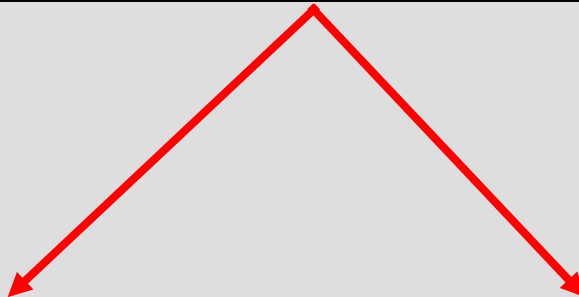
**LESIONI DA DECUBITO**

**DA FLUSSI**

**LESIONI CORNEALI  
LESIONI PALPEBRALI  
SECCHENZA MUCOSE  
DISTENSIONE ADDOME**



# ATTENZIONE



**PROTESI DENTARIE  
MOBILI**

**VOMITO**

**TABLE 4** Suggested minimum monitoring of noninvasive positive pressure ventilation during acute respiratory failure

| Target                             | Tool                                                                      |
|------------------------------------|---------------------------------------------------------------------------|
| <b>Clinical</b>                    |                                                                           |
| Sensorium                          | KELLY and MATTHAY [107] scale, Glasgow Coma Scale                         |
| Dyspnoea                           | Borg Scale, Visual Analogue Scale                                         |
| Respiratory rate                   | Clinical, ventilator monitor                                              |
| Respiratory distress               | Use of accessory muscles, abdominal paradox                               |
| Mask comfort                       | Clinical                                                                  |
| Compliance with ventilator setting | Clinical                                                                  |
| Vital signs                        | Clinical                                                                  |
| <b>Physiology</b>                  |                                                                           |
| Arterial oxygen saturation         | Pulse oximetry, arterial blood gas sample (frequently during first hours) |
| Arterial blood pressure            | Clinical, monitoring (noninvasive)                                        |
| ECG                                |                                                                           |
| <b>Ventilator setting</b>          |                                                                           |
| Air leaks                          | Clinical, ventilator monitor                                              |
| Patient-ventilator interaction     | Clinical, ventilator monitor                                              |
| Set parameters                     | Ventilator monitor                                                        |

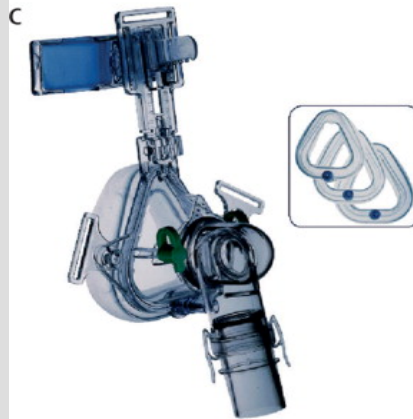
Ambrosino N, Vagheggini G, Non invasive positive pressure ventilation in acute care setting: where are we?  
Eur Respir J 2008;31;874-886



Full face mask



Total face mask



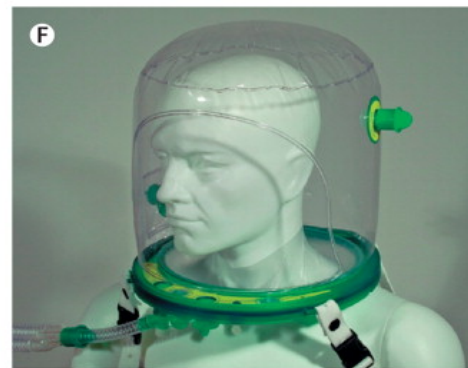
Nasal mask



Mouthpiece



Nasal pillows



Helmet

**Panel 3: Advantages and disadvantages of different types of interfaces**

**Total face mask—covers mouth, nose, and eyes**

**Advantages**

- Minimum airleaks
- Little cooperation required
- Easy fitting and application

**Disadvantages**

- Vomiting (risk of aspiration)
- Claustrophobia
- Speaking difficult

**Full face (or oronasal) mask—covers mouth and nose**

**Advantages**

- Few air leaks
- Little cooperation required
- Can be adjusted for comfort

**Disadvantages**

- Vomiting
- Claustrophobia
- Possible nasal skin damage
- Speaking and coughing difficult

**Nasal mask—covers nose and not mouth**

**Advantages**

- Possibility of speaking and drinking
- Allows cough
- Reduced danger of vomiting
- Minimum risk of asphyxia

**Disadvantages**

- Air leaks if mouth opens
- Possible nasal skin damage
- Needs patent nasal passages

(Continues in next column)

(Continued from previous column)

**Mouthpieces—placed between lips and held in place by lip seal**

**Advantages**

- Can be applied as rotating strategy with other interfaces

**Disadvantages**

- Vomiting and salivation
- Possible air leaks
- Gastric distension
- Speaking difficult

**Nasal pillows or plugs—inserted into nostrils**

**Advantages**

- Can be applied as rotating strategy with other advantages of nasal masks
- Absence of nasal skin damage

**Disadvantages**

- Unreliable monitoring of expired tidal volume
- Inspiratory and expiratory air leaks
- Nasal irritation

**Helmet—covers the whole head and all or part of the neck (no contact with face)**

**Advantages**

- Minimum airleaks
- Little cooperation required
- Absence of nasal or facial skin damage

**Disadvantages**

- Rebreathing
- Vomiting
- Noisy
- Asynchrony with pressure support ventilation
- Discomfort of axillae (from straps)

#### **Panel 4: How to apply NIV during first few hours**

- Explain technique to patient (if competent)
- Choose correct interfaces and size
- Set pressures starting from low levels (ie, pressure support about 8 cm H<sub>2</sub>O and external PEEP 4–5 cm H<sub>2</sub>O)
- Place interface gently over face, holding it in place and start ventilation
- When patient tolerant, tighten straps just enough to avoid major leaks, but not too tight
- Set F<sub>I</sub>O<sub>2</sub> on ventilator or add low-flow oxygen into the circuit, aiming for SO<sub>2</sub> > 90%
- Set alarms—low pressure alarm should be above PEEP level
- Be mindful of and try to optimise patient's comfort
- Reset pressures (pressure support increased to get expired tidal volume 6 mL/kg or higher—raise PEEP external to get oxygen saturation 90% or higher).
- Protect site of skin pressure from the interface (ie, artificial skin, wound-care dressing, or rotating interfaces)
- Consider use of mild sedation if patient is agitated
- Monitor comfort, respiratory rate, oxygen saturation, and dyspnoea every 30 min for 6–12 h then hourly
- Measure arterial blood gases at baseline and within 1 h from start
- Humidification advised for applications longer than 6 hours

**GRAZIE DELL'ATTENZIONE**