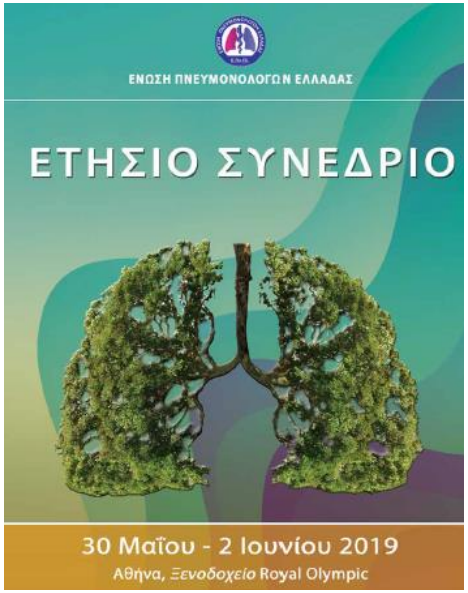


Ενδείξεις έναρξης επεμβατικού μηχανικού αερισμού

Δημήτριος Τουμπανάκης

Πνευμονολόγος – Διδάκτωρ Ιατρικής Σχολής ΕΚΠΑ

Εξειδικευόμενος Ιατρός

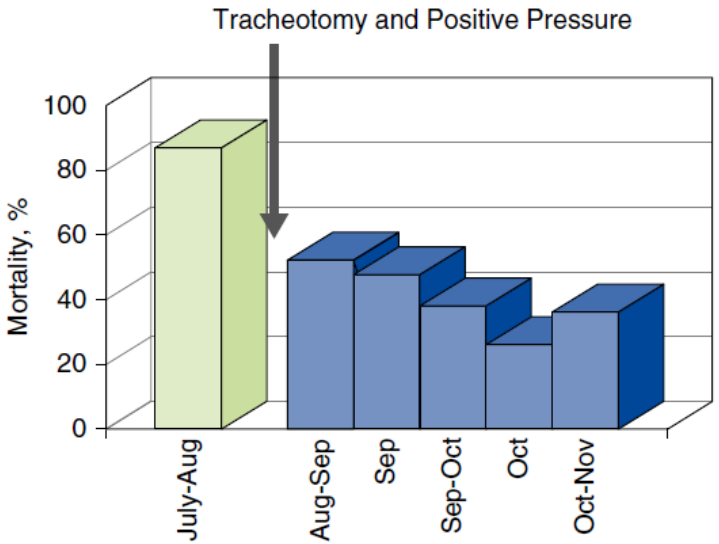
ΜΕΘ ΓΝΑ Γ.Γεννηματάς

Μηχανικός αερισμός : κάθε μέθοδος κατά την οποία χρησιμοποιείται μηχανική συσκευή προς ενίσχυση ή ολική αντικατάσταση του αερισμού του αρρώστου (συνήθως με εφαρμογή θετικής πίεσης).

Επεμβατικός: Η σύνδεση του αναπνευστήρα με τον ασθενή γίνεται μέσω ενδοτραχειακού σωλήνα ή τραχειοστομίας

“But that life may be restored to the animal, an opening must be attempted in the trunk of the trachea, into which a tube of reed or cane should be put; you will then blow into this, so that the lung may rise again and take air”

Vesalius A. De humani corporis fabrica. 1543



Mortality rate from bulbar polio. The mortality rate in July and August 1952

The Lancet · Saturday 12 August 1967

ACUTE RESPIRATORY DISTRESS IN ADULTS

DAVID G. ASHBAUGH
M.D. Ohio State
ASSISTANT PROFESSOR OF SURGERY

D. BOYD BIGELOW
M.D. Colorado
ASSISTANT IN MEDICINE AND AMERICAN THORACIC SOCIETY-NATIONAL TUBERCULOSIS ASSOCIATION FELLOW IN PULMONARY DISEASE

THOMAS L. PETTY
M.D. Colorado
ASSISTANT PROFESSOR OF MEDICINE

BERNARD E. LEVINE
M.D. Michigan
AMERICAN THORACIC SOCIETY-NATIONAL TUBERCULOSIS ASSOCIATION FELLOW IN PULMONARY DISEASE*

From the Departments of Surgery and Medicine, University of Colorado Medical Center, Denver, Colorado, U.S.A.

Summary The respiratory-distress syndrome in 12 patients was manifested by acute onset of tachypnœa, hypoxæmia and loss of compliance after a variety of stimuli; the syndrome did not respond to usual and ordinary methods of respiratory therapy. The clinical and pathological features closely resembled those seen in infants with respiratory distress and to conditions in congestive atelectasis and postperfusion lung. The theoretical relationship of this syndrome to alveolar surface active agent is postulated. Positive end-expiratory pressure was most helpful in combating atelectasis and hypoxæmia. Corticosteroids appeared to have value in the treatment of patients with fat-embolism and possibly viral pneumonia.

The objectives of mechanical ventilation are primarily to decrease the work of breathing and reverse life threatening hypoxemia or acute progressive respiratory acidosis

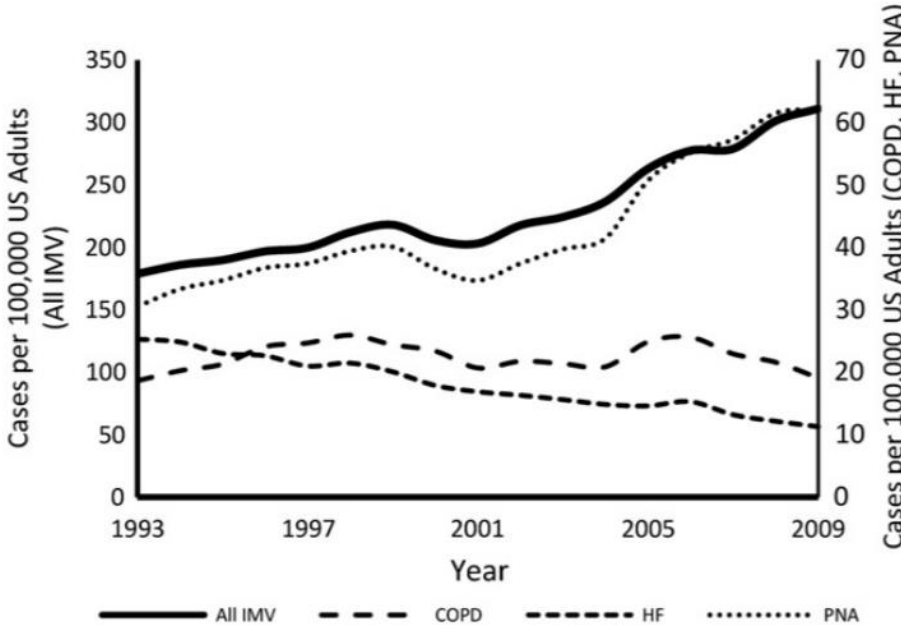
Tobin M· N Engl J Med, Vol. 344, No. 26 · June 28, 2001 ·

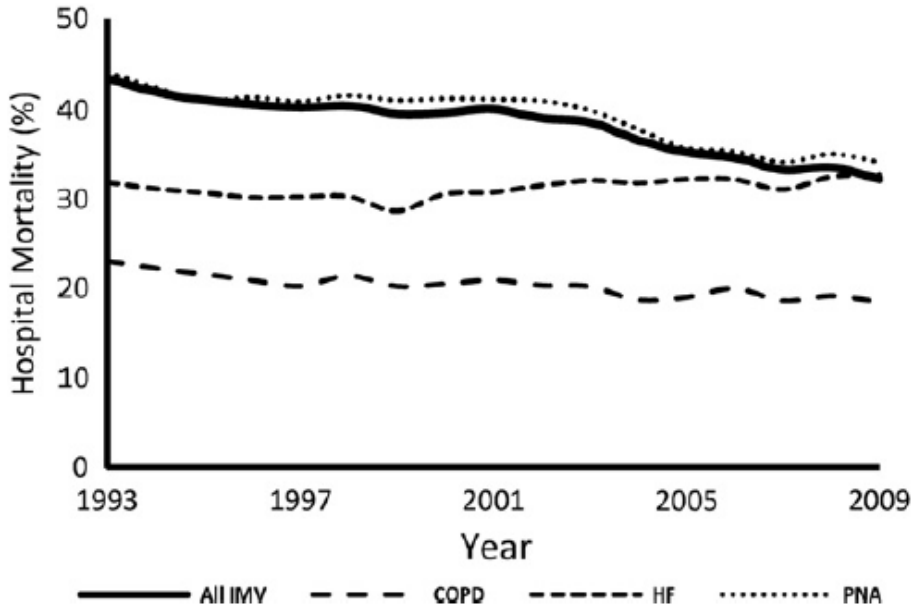
- Minimizing iatrogenic injury
- Improving patient ventilator interaction
- Promoting liberation from mechanical ventilation in a timely manner

Epidemiological trends in invasive mechanical ventilation in the United States: A population-based study☆,☆☆

Anuj B. Mehta, MD [a,*,1], Sohera N. Syeda, MD [a,b,2],
Renda Soylemez Wiener, MD, MPH [a,c,3], Allan J. Walkey, MD, MSc [a,4]

Journal of Critical Care 30 (2015) 1217–1221





Mechanical Ventilation: State of the Art

Tài Pham, MD, PhD; Laurent J. Brochard, MD; and Arthur S. Slutsky, MD

Mayo Clin Proc. 2017;92(9):1382-1400

Despite this extensive use of MV, no precise recommendations exist summarizing when to initiate MV for acute respiratory failure.

The main indications are

(1) airway protection for a patient with a decreased level of consciousness (eg, head trauma, stroke, drug overdose, anesthesia),

(2) hypercapnic respiratory failure due to airway, chest wall, or respiratory muscle diseases,

(3) Hypoxemic respiratory failure, or

(4) circulatory failure, in which sedation and MV can decrease the oxygen cost of breathing.

Η απόφαση για διασωλήνωση και μηχανικό αερισμό βασίζεται:

- Στα συμπτώματα του ασθενούς
- Ευρήματα από την κλινική εξέταση
- Διαγνωστική προσπέλαση (π.χ. ανάλυση αερίων αίματος, σπιρομέτρηση ....)

Respiratory abnormalities suggestive of the need for mechanical ventilation

Parameter	
Clinical assessment	
Apnea	
Stridor	
Severely depressed mental status	
Flail chest	
Inability to clear respiratory secretions (eg, excessive secretions, loss of protective reflexes, neuromuscular failure)	
Trauma to mandible, larynx, trachea	
Loss of ventilatory reserve	
Respiratory rate	>35 breaths/min
Vital capacity	<10 mL/kg
Negative inspiratory force	Weaker than –25 cm H_2O
Rise in $PaCO_2$	>10 mmHg (1.33 kPa)
Refractory hypoxemia	
Alveolar-arterial gradient (FiO_2 = 1)	>450
PaO_2/PAO_2	<0.15
PaO_2 with supplemental O_2	<55 mmHg (7.32 kPa)

UptoDate 2019

Source: Tobin MJ: *Principles and Practice of Mechanical Ventilation,*

Examples of conditions often requiring mechanical ventilation

Alveolar filling processes
Pneumonitis - infectious, aspiration
Noncardiogenic pulmonary edema/ARDS
Cardiogenic pulmonary edema
Pulmonary vascular disease
Pulmonary thromboembolism
Amniotic fluid embolism, tumor emboli
Diseases causing airways obstruction: central
Tumor
Laryngeal angioedema
Tracheal stenosis
Diseases causing airways obstruction: distal
Acute exacerbation of chronic obstructive pulmonary disease
Acute, severe asthma
Hypoventilation: decreased central drive
General anesthesia
Drug overdose
Hypoventilation: peripheral nervous system/respiratory muscle dysfunction
Amyotrophic lateral sclerosis
Cervical quadriplegia
Guillain-Barré syndrome
Myasthenia gravis
Hypoventilation: chest wall and pleural disease
Kyphoscoliosis
Trauma (eg, flail chest)
Massive pleural effusion
Pneumothorax
Increased ventilatory demand
Severe sepsis
Septic shock
Severe metabolic acidosis

UptoDate 2019

How Is Mechanical Ventilation Employed in the Intensive Care Unit?

An International Utilization Review

ANDRÉS ESTEBAN, ANTONIO ANZUETO, INMACULADA ALÍA, FEDERICO GORDO, CARLOS APEZTEGUÍA, FERNANDO PÁLIZAS, DAVID CIDE, ROSANNE GOLDWASER, LUIS SOTO, GUILLERMO BUGEDO, CARLOS RODRIGO, JORGE PIMENTEL, GUILLERMO RAIMONDI, and MARTIN J. TOBIN for the Mechanical Ventilation International Study Group

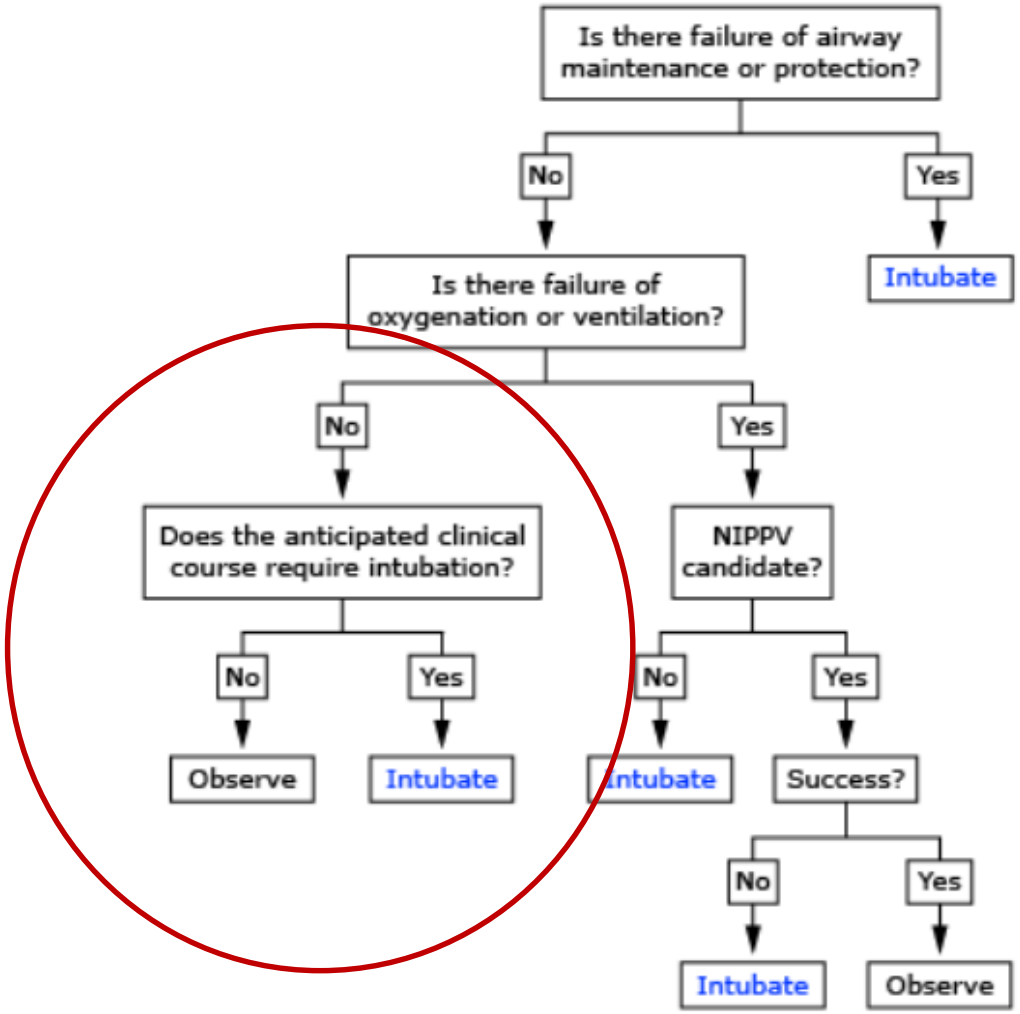
Am J Respir Crit Care Med Vol 161. pp 1450–1458, 2000

INDICATIONS FOR THE INITIATION OF MECHANICAL VENTILATION ACCORDING TO COUNTRY*

	USA/Canada	Spain	Argentina	Brazil	Chile	Portugal	Uruguay	Total
Reason for MV	(*n* = 747)	(*n* = 443)	(*n* = 154)	(*n* = 122)	(*n* = 60)	(*n* = 68)	(*n* = 44)	(*n* = 1,638)
COPD	16 (13, 18)	11 (8, 14)	10 (6, 16)	9 (5, 16)	10 (4, 21)	23 (14, 36)	5 (1, 17)	13 (11, 15)
ARF	74 (70, 77)	64 (59, 68)	50 (42, 58)	66 (56, 74)	62 (48, 74)	47 (35, 59)	50 (35, 65)	66 (63, 68)
Coma	7 (6, 9)	20 (17, 25)	32 (25, 40)	21 (15, 30)	15 (7, 27)	10 (5, 21)	43 (29, 59)	15 (13, 17)
Neuromuscular	3 (2, 5)	4 (3, 7)	8 (5, 14)	4 (1, 10)	13 (6, 25)	19 (11, 31)	2 (0, 13)	5 (4, 6)
Cause of ARF	(*n* = 547)	(*n* = 283)	(*n* = 77)	(*n* = 80)	(*n* = 37)	(*n* = 32)	(*n* = 22)	(*n* = 1,078)
ARDS	9 (7, 12)	14 (10, 18)	18 (11, 29)	11 (6, 21)	32 (18, 50)	6 (1, 22)	14 (4, 36)	12 (10, 14)
Postoperative	17 (14, 21)	13 (10, 18)	10 (5, 20)	5 (2, 13)	5 (1, 19)	28 (14, 47)	23 (9, 46)	15 (13, 17)
Heart Failure	13 (10, 16)	14 (11, 19)	16 (9, 26)	5 (2, 13)	5 (1, 19)	16 (6, 33)	4 (0, 25)	12 (10, 14)
Aspiration	3 (1, 4)	2 (1, 5)	8 (3, 17)	8 (3, 16)	3 (0, 16)	3 (0, 18)	14 (4, 36)	3 (2, 5)
Pneumonia	13 (10, 16)	18 (13, 23)	17 (10, 27)	29 (20, 40)	19 (9, 36)	19 (8, 37)	23 (9, 46)	16 (14, 18)
Sepsis	17 (14, 20)	12 (8, 16)	19 (12, 30)	16 (9, 27)	24 (12, 42)	12 (4, 30)	18 (6, 41)	16 (13, 18)
Trauma	13 (10, 16)	15 (12, 20)	3 (0, 10)	9 (4, 18)	8 (2, 23)	12 (4, 30)	4 (0, 25)	12 (10, 14)
Others	16 (13, 19)	11 (8, 15)	9 (4, 18)	16 (9, 27)	3 (0, 16)	3 (0, 18)	—	13 (11, 15)

Definition of abbreviations: ARF = acute respiratory failure; MV = mechanical ventilation.
* Results are shown as percentages with 95% confidence intervals shown in parentheses.

The decision to intubate



UptoDate 2019

Ενδείξεις Ενδοτραχειακής Διασωλήνωσης

- Αναπνευστική ανεπάρκεια

- Επείγουσα διασωλήνωση – καρδιοαναπνευστική ανακοπή / καταπληξία
- Απόφραξη αεραγωγών
- Προστασία βατότητας αεραγωγών (πτώση επιπέδου συνείδησης, εισπνευστικό έγκαυμα, αιμοραγία, τραύμα)
- Αδυναμία διαχείρησης εκκρίσεων - αποφυγή εισρόφησης

Ενδοτραχειακή Διασωλήνωση

Πλεονεκτήματα:

Προστασία των αεραγωγών από εισρόφηση

Επιτρέπει την διενέργεια βρογχοαναρροφήσεων και επεμβατικών διαγνωστικών πράξεων (βρογχοσκόπηση)

Μειώνει τον νεκρό χώρο

Εξασφαλίζει την σταθερή σύνδεση του ασθενούς με τον αναπνευστήρα

Επιτρέπει την χρήση αναισθησίας και μυοχάλασης και ελεγχόμενου αερισμού

Ενδοτραχειακή Διασωλήνωση

Κόστος:

Απώλεια προστατευτικών μηχανισμών των ανωτέρων αεραγωγών (εφύγρανση εισπνεόμενου αέρα – προστασία λοιμώξεων)

Μείωση του αντανακλαστικού του βήχα

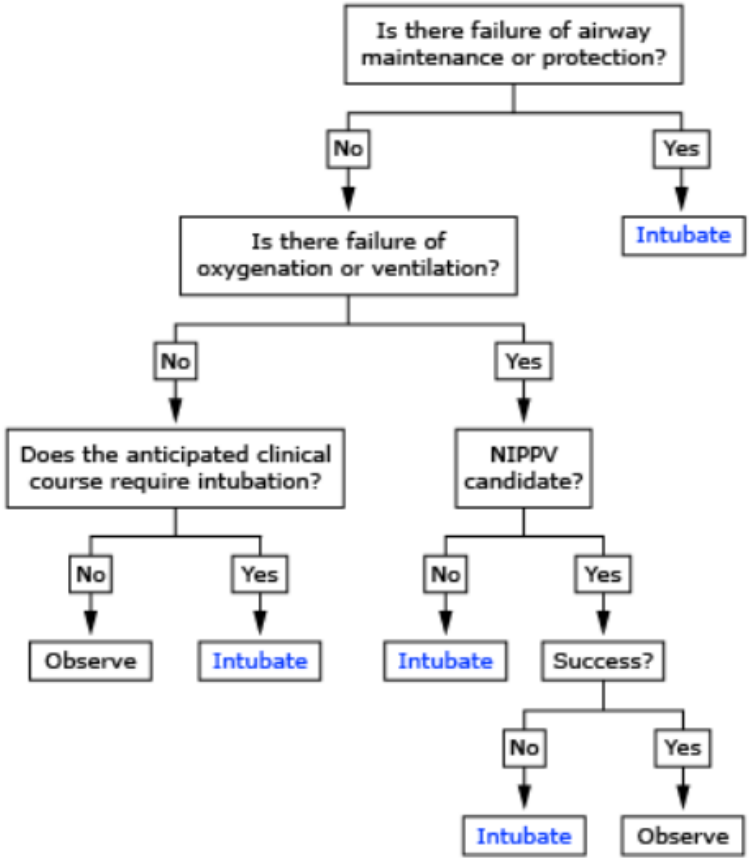
Αύξηση του κινδύνου παλινδρόμησης

Πνευμονία του αναπνευστήρα

Κίνδυνος τραυματισμού τραχεία

Απώλεια φωνής

The decision to intubate



Non-invasive ventilation in acute respiratory failure

Stefano Nava, Nicholas Hill

Lancet 2009; 374: 250-59

Contraindications

Absolute

- Respiratory arrest
- Unable to fit mask

Relative

- Medically unstable—hypotensive shock, uncontrolled cardiac ischaemia or arrhythmi uncontrolled copious upper gastrointestinal bleeding
- Agitated, uncooperative
- Unable to protect airway
- Swallowing impairment
- Excessive secretions not managed by secretion clearance techniques
- Multiple (ie, two or more) organ failure
- Recent upper airway or upper gastrointestinal surgery

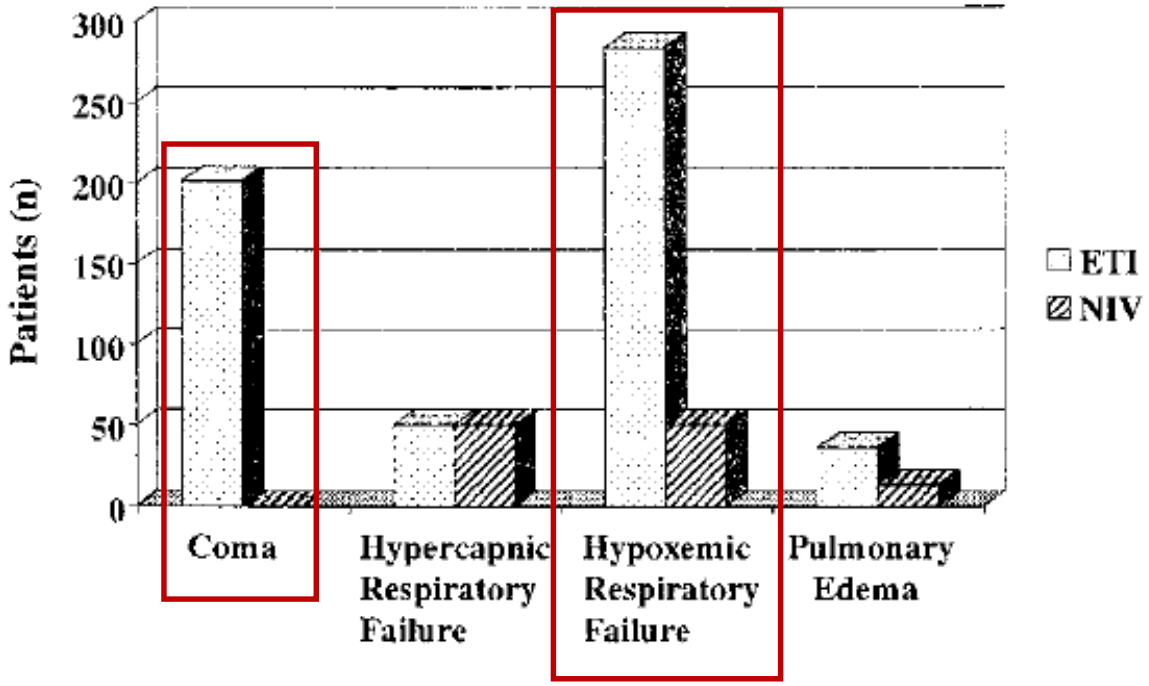
NIV=non-invasive ventilation; $PaCO_2$=arterial partial pressure of carbondioxide; PaO_2=arterial partial pressure of oxygen; F_iO_2=fraction of inspired oxygen.

Noninvasive Versus Conventional Mechanical Ventilation

An Epidemiologic Survey

ANNALISA CARLUCCI, JEAN-CHRISTOPHE RICHARD, MARC WYSOCKI, ERIC LEPAGE, LAURENT BROCHARD
and the SRLF Collaborative Group on Mechanical Ventilation

Am J Respir Crit Care Med Vol 163. pp 874–880, 2001



Official ERS/ATS clinical practice guidelines: noninvasive ventilation for acute respiratory failure

Eur Respir J 2017; 50: 1602426

TABLE 2 Recommendations for actionable PICO questions

Clinical indication[#]	Certainty of evidence[¶]	Recommendation
Prevention of hypercapnia in COPD exacerbation	⊕⊕	Conditional recommendation against
Hypercapnia with COPD exacerbation	⊕⊕⊕⊕	Strong recommendation for
Cardiogenic pulmonary oedema	⊕⊕⊕	Strong recommendation for
Acute asthma exacerbation		No recommendation made
Immunocompromised	⊕⊕⊕	Conditional recommendation for
***De novo* respiratory failure**		No recommendation made
Post-operative patients	⊕⊕⊕	Conditional recommendation for
Palliative care	⊕⊕⊕	Conditional recommendation for
Trauma	⊕⊕⊕	Conditional recommendation for
Pandemic viral illness		No recommendation made
Post-extubation in high-risk patients (prophylaxis)	⊕⊕	Conditional recommendation for
Post-extubation respiratory failure	⊕⊕	Conditional recommendation against
Weaning in hypercapnic patients	⊕⊕⊕	Conditional recommendation for

[#]: all in the setting of acute respiratory failure; [¶]: certainty of effect estimates: ⊕⊕⊕⊕, high; ⊕⊕⊕, moderate; ⊕⊕, low; ⊕, very low.

Management of Exacerbations

INDICATIONS FOR NONINVASIVE MECHANICAL VENTILATION (NIV)

At least one of the following:

- Respiratory acidosis ($PaCO_2 \geq 6.0$ kPa or 45 mmHg and arterial pH ≤ 7.35).
- Severe dyspnea with clinical signs suggestive of respiratory muscle fatigue, increased work of breathing, or both, such as use of respiratory accessory muscles, paradoxical motion of the abdomen, or retraction of the intercostal spaces.
- Persistent hypoxemia despite supplemental oxygen therapy.

TABLE 5.5

Management of Exacerbations

INDICATIONS FOR INVASIVE MECHANICAL VENTILATION

- Unable to tolerate NIV or NIV failure.
- Status post - respiratory or cardiac arrest.
- Diminished consciousness, psychomotor agitation inadequately controlled by sedation.
- Massive aspiration or persistent vomiting.
- Persistent inability to remove respiratory secretions.
- Severe hemodynamic instability without response to fluids and vasoactive drugs.
- Severe ventricular or supraventricular arrhythmias.
- Life-threatening hypoxemia in patients unable to tolerate NIV.

TABLE 5.6

Official ERS/ATS clinical practice guidelines: noninvasive ventilation for acute respiratory failure

Eur Respir J 2017; 50: 1602426

Recommendations

We recommend bilevel NIV for patients with ARF leading to acute or acute-on-chronic respiratory acidosis (pH ⩽7.35) due to COPD exacerbation. (Strong recommendation, high certainty of evidence.)

We recommend a trial of bilevel NIV in patients considered to require endotracheal intubation and mechanical ventilation, unless the patient is immediately deteriorating. (Strong recommendation, moderate certainty of evidence.)

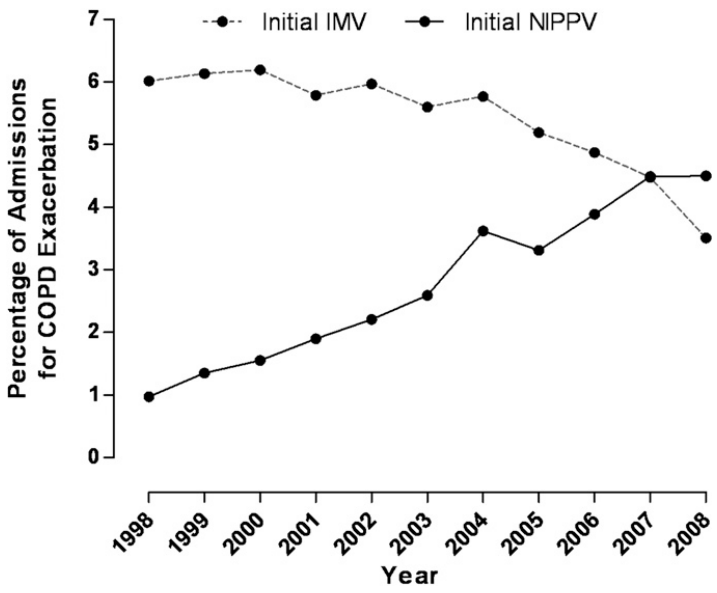
There is no lower limit of pH below which a trial of NIV is inappropriate;

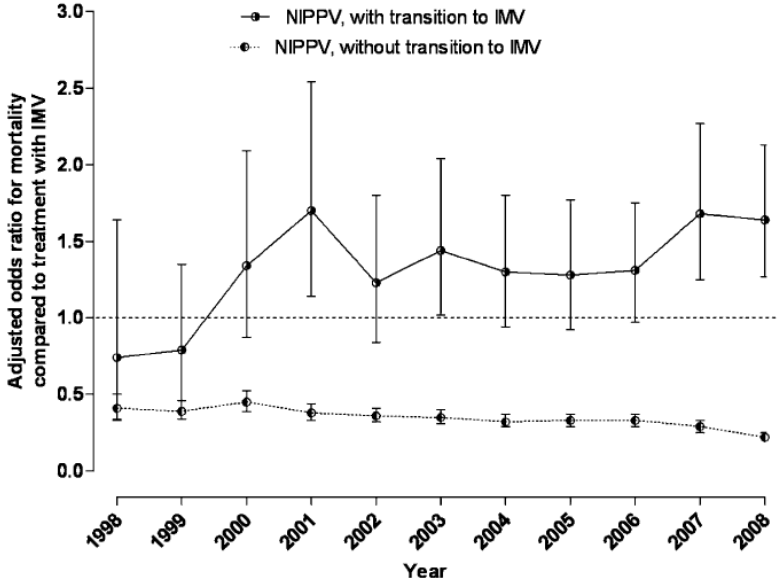
however, the lower the pH, the greater risk of failure, and patients must be very closely monitored with rapid access to endotracheal intubation and invasive ventilation if not improving

Outcomes of Noninvasive Ventilation for Acute Exacerbations of Chronic Obstructive Pulmonary Disease in the United States, 1998–2008

Divay Chandra[1]*, Jason A. Stamm[1]*, Brian Taylor[2], Rose Mary Ramos[1], Lewis Satterwhite[2], Jerry A. Krishnan[3], David Mannino[4], Frank C. Sciurba[1], and Fernando Holguín[1]

Am J Respir Crit Care Med Vol 185, Iss. 2, pp 152–159, Jan 15, 2012





Official ERS/ATS clinical practice guidelines: noninvasive ventilation for acute respiratory failure

Eur Respir J 2017; 50: 1602426

Question 2a: Should NIV be used in ARF due to cardiogenic pulmonary oedema?

Recommendation

We recommend either bilevel NIV or CPAP for patients with ARF due to cardiogenic pulmonary oedema. (Strong recommendation, moderate certainty of evidence.)

Given the justifiable reluctance to include patients with acute coronary syndrome or cardiogenic shock in studies evaluating NIV for cardiogenic pulmonary edema, the above recommendation does not apply to these subgroups.

The Neurology of Acutely Failing Respiratory Mechanics

Eelco F. M. Wijdicks, MD, PhD

ANN NEUROL 2017;81:485–494

1) weakness or paralysis of the diaphragm and accessory respiratory muscles resulting in acute alveolar hypoventilation;

2) oropharyngeal weakness with upper airway obstruction;

3) ineffective cough resulting in accumulation of bronchial secretions with pulmonary atelectasis hypoxaemia and infection, and

4) Bulbar dysfunction with impaired swallowing and aspiration pneumonia

Neuromuscular Disease Causing Acute Respiratory Failure

Sangeeta Mehta MD FRCPC

Respir Care 2006;51(9):1016–1021.

Table 1. Signs and Symptoms of Respiratory Failure and the Need for Endotracheal Intubation

General Warning Signs
Increasing generalized weakness
Dysphagia
Dysphonia
Dyspnea on exertion and at rest
Subjective Assessment
Rapid shallow breathing
Tachycardia
Weak cough
Staccato speech
Accessory muscle use
Abdominal paradox
Orthopnea
Weakness of trapezius and neck muscles
Single-breath count
Cough after swallowing
Objective Assessment
Vital capacity < 15 mL/kg, vital capacity < 1 L, or 50% drop in vital capacity
Maximum inspiratory pressure > -30 cm H_2O
Maximum expiratory pressure < 40 cm H_2O
Nocturnal desaturation

BTS/ICS guideline for the ventilatory management of acute hypercapnic respiratory failure in adults

Davidson AC, *et al*. *Thorax* 2016;**71**:ii1–ii35. doi:10.1136/thoraxjnl-2015-208209

50. NIV should almost always be trialled in the acutely unwell patients with NMD or CWD with hypercapnia. Do not wait for acidosis to develop (Grade D).

51. In patients with NMD or CWD, NIV should be considered in acute illness when vital capacity (VC) is known to be <1 L and RR >20, even if normocapnic (Grade D).

53. In NMD or CWD, unless escalation to IMV is not desired by the patient, or is deemed to be inappropriate, intubation should not be delayed if NIV is failing (Grade D).

Good practice points

•In patients with NMD or CWD, deterioration may be rapid or sudden, making HDU/ICU placement for therapy more appropriate.

•In patients with NMD, it should be anticipated that bulbar dysfunction and communication difficulties, if present, will make NIV delivery difficult, and may make it impossible.

CURRENT OPINION
2016

Noninvasive ventilation for neuromuscular respiratory failure: when to use and when to avoid

Alejandro A. Rabinstein

KEY POINTS

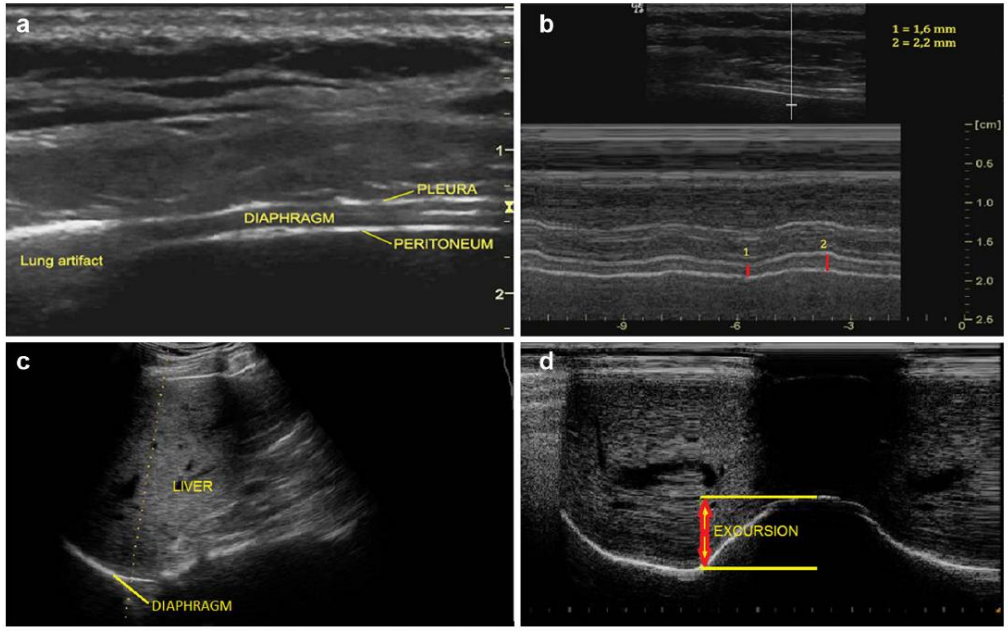
- The choice of ventilatory support in patients with neuromuscular disease should be made based on the knowledge of the specific diagnosis.
- NIV with BiPAP can avert intubation and shorten the duration of hospitalization in patients with myasthenia gravis, but only if initiated early (optimally before development of hypercapnia).
- NIV should be avoided in patients with GBS manifested with rapidly progressive weakness and labile dysautonomia.

Intensive Care Med (2017) 43:29–38
DOI 10.1007/s00134-016-4524-z

SYSTEMATIC REVIEW

Assessment of diaphragmatic dysfunction in the critically ill patient with ultrasound: a systematic review

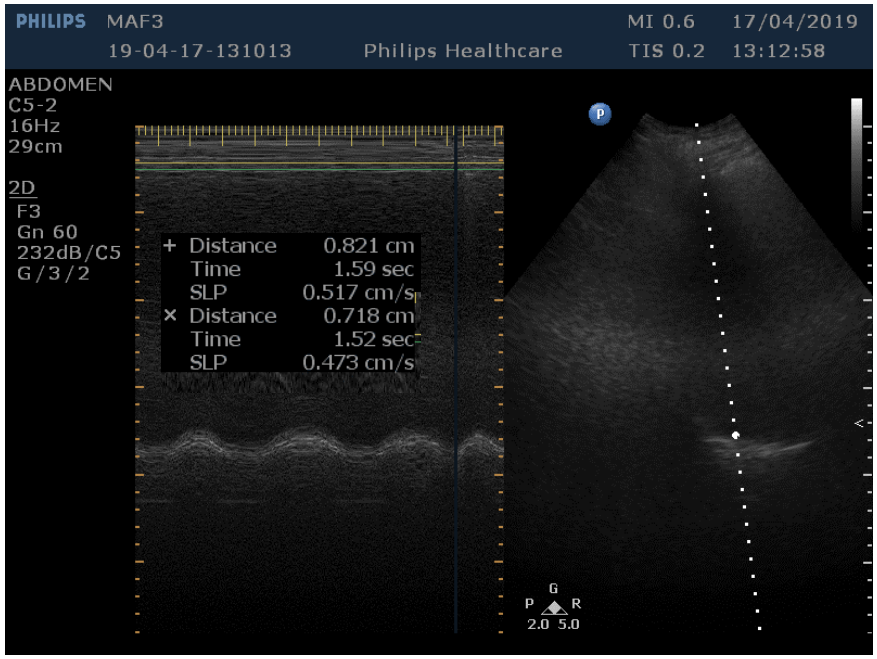
Massimo Zambon[1*], Massimiliano Greco[2], Speranza Bocchino[2], Luca Cabrini[2], Paolo Federico Beccaria[2] and Alberto Zangrillo[2,3]



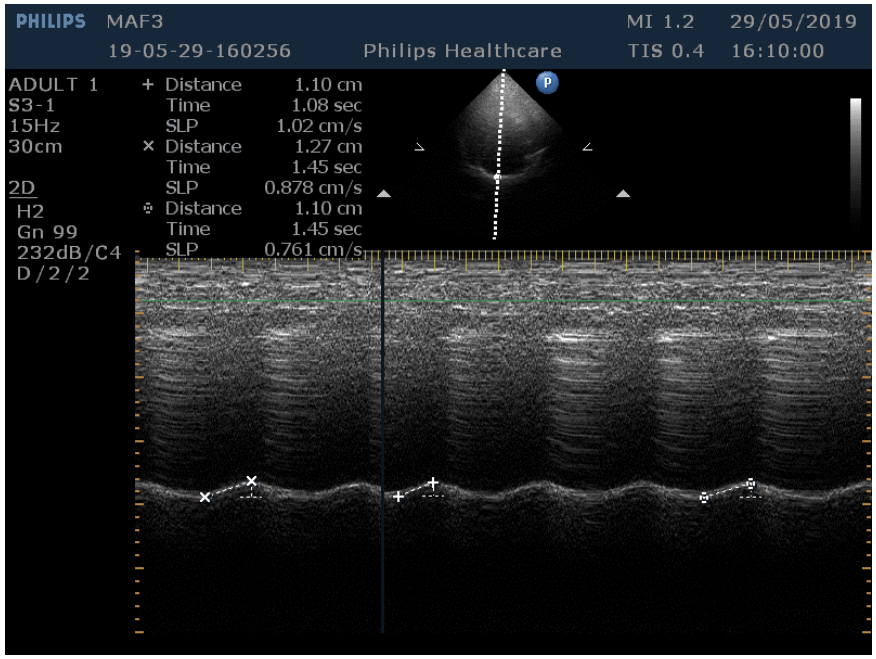
Matamis D et al, 2013, Intens Care Med

Ασθενής 50 ετών με επισκληρίδιο εμπύημα στον νωτιαίο σωλήνα και τετραπληγία

Μετατόπιση διαφράγματος σε αυτόματη αναπνοή



Τραχειοστομία –
Υπερκαπνία –
Ανάγκη υποβοηθούμενου μηχανικού αερισμού



Αποσωλήνωση – Αυτόματη αναπνοή - Νορμοκαπνία

De novo Acute Respiratory failure

- Χωρίς προηγούμενο ιστορικό καρδιακής ή πνευμονικής νόσου
- Υποξαιμική αναπνευστική ανεπάρκεια με αυξημένη αναπνευστική συχνότητα
- Συχνότερες διαγνώσεις : πνευμονία, ARDS

ORIGINAL ARTICLE

Noninvasive Ventilation of Patients with Acute Respiratory Distress Syndrome

Insights from the LUNG SAFE Study

Am J Respir Crit Care Med Vol 195, Iss 1, pp 67–77, Jan 1, 2017

- NIMV in 15% of 2813 ARDS pts
- NIMV failure ▫ 22.2% mild ARDS
  - ▫ 42.3% moderate ARDS
  - ▫ 47.1% severe ARDS
- Hospital mortality ▫ NIMV success 16% ▫ NIMV failure 45%,
- ICU mortality NIMV >IMV $PaO_2/FiO_2 < 150$

Intensive Care Med (2001) 27: 1718–1728
DOI 10.1007/s00134-001-1114-4

ORIGINAL

Predictors of failure of noninvasive positive pressure ventilation in patients with acute hypoxemic respiratory failure: a multi-center study

Table 2 Univariate and multivariate analysis of the risk factors for failure of noninvasive ventilation

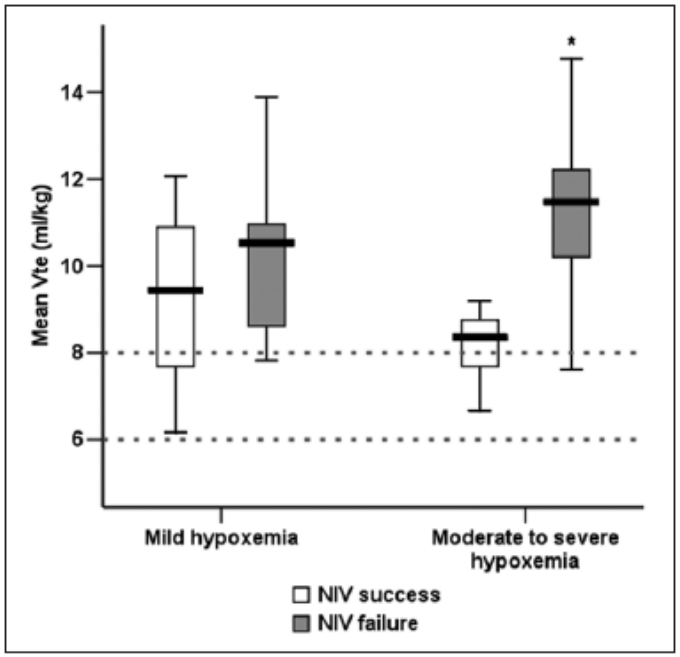
Variables	No. of failures/total (%)	Univariate analysis		Multivariate analysis	
		OR	95 % CI	OR	95 % CI
Reason for ICU admission					
Medical	58/218 (27)	1.00			
Surgical/trauma	50/136 (37)	1.96	1.11–3.45		
Age, years					
≤40	18/93 (19.4)	1.00			
> 40	90/261 (34.5)	2.19	1.19–4.06	1.72	0.92–3.23
SAPS II					
< 35	55/236 (23.3)	1.00		1.00	
≥35	53/118 (44.9)	2.68	1.63–4.42	1.81	1.07–3.06
Underlying disease					
None or none of the following	97/333 (29)	1.00			
Diabetes	11/21 (52)	2.47	1.06–5.74		
Etiology of respiratory failure					
None of the following	42/225 (18.6)	1.00		1.00	
ARDS, CAP	66/129 (51.1)	4.77	2.86–7.96	3.75	2.25–6.24
Respiratory rate at baseline, breaths/min					
≤38	79/285 (27.7)	1.00			
> 38	29/69 (42)	1.89	1.06–3.37		
PaO2:FiO2 after 1 h of NPPV					
> 146	64/264[a] (24.2)	1.00		1.00	
≤146	44/89 (49.4)	3.06	1.79–5.21	2.51	1.45–4.35
Sepsis on admission					
No	77/295 (26.1)	1.00			
Yes	31/59 (52.5)	3.13	1.70–5.78		

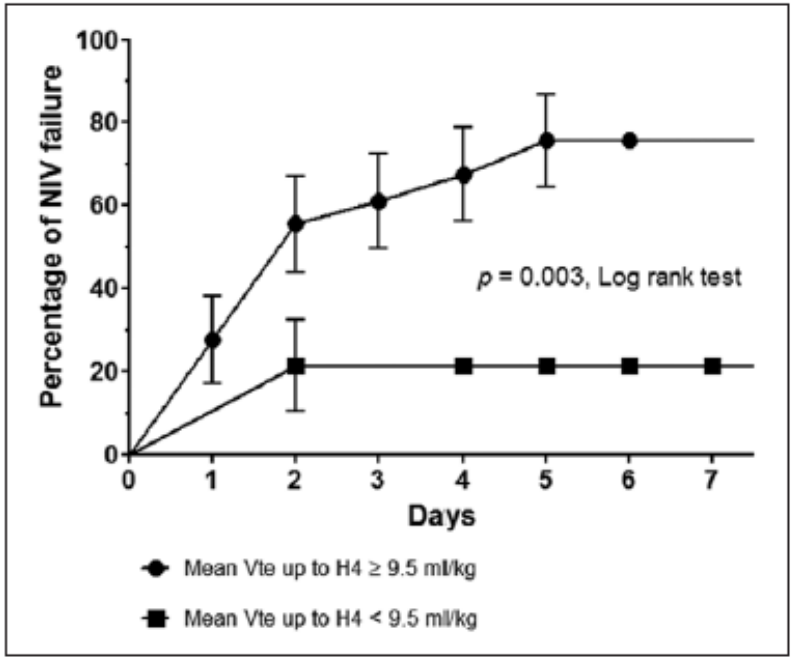
[a] For one patient PaO2:FiO2 value 1 h after NIV was missing

Failure of Noninvasive Ventilation for De Novo Acute Hypoxemic Respiratory Failure: Role of Tidal Volume*

Guillaume Carteaux, MD[1,2,3]; Teresa Millán-Guilarte, MD[4]; Nicolas De Prost, MD, PhD[1,2,3]; Keyvan Razazi, MD[1,2,3]; Shariq Abid, MD, PhD[3]; Arnaud W. Thille, MD, PhD[5]; Frédérique Schortgen, MD, PhD[1,3]; Laurent Brochard, MD[3,6,7]; Christian Brun-Buisson, MD[1,2,8]; Armand Mekontso Dessap, MD, PhD[1,2,3]

Crit Care Med, 2016





Official ERS/ATS clinical practice guidelines: noninvasive ventilation for acute respiratory failure

Eur Respir J 2017; 50: 1602426

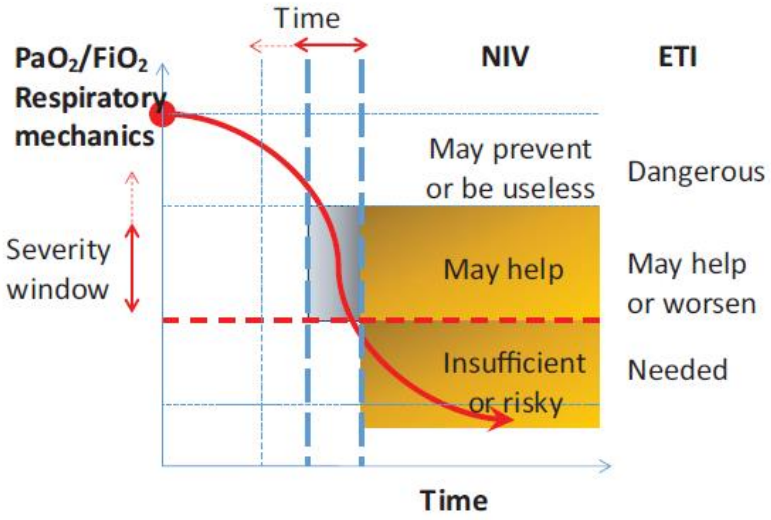
Recommendation

Given the uncertainty of evidence we are unable to offer a recommendation on the use of NIV for *de novo* ARF.

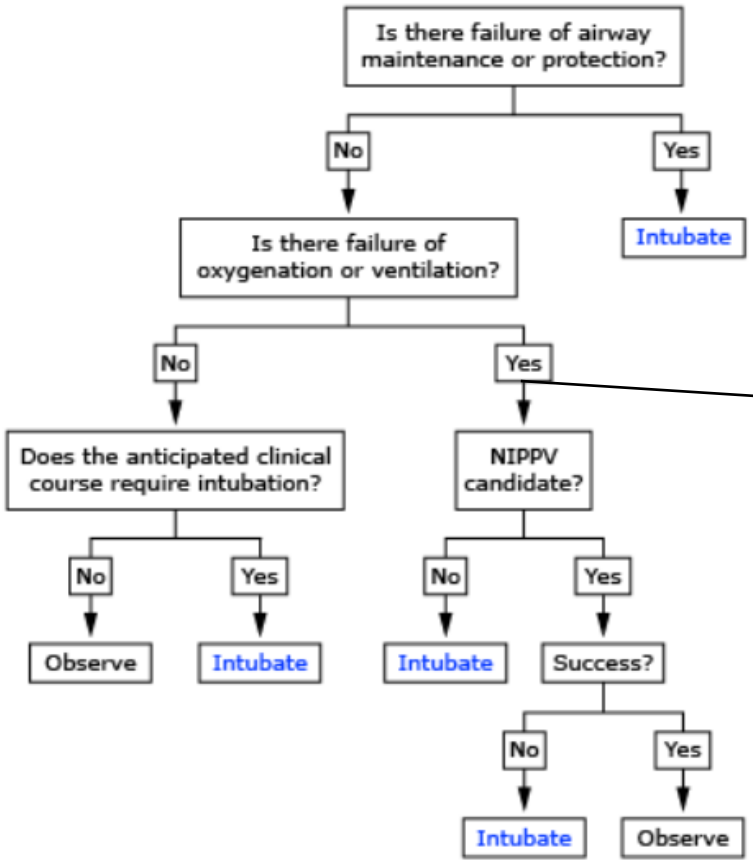
Noninvasive Ventilation for Patients with Hypoxemic Acute Respiratory Failure

Laurent Brochard, MD[1,2,3] Jean-Claude Lefebvre, MD[3,4] Ricardo Luiz Cordioli, MD[3,5]
Evangelia Akoumianaki, MD[3,6] Jean-Christophe M. Richard, MD[3,7]

Semin Respir Crit Care Med 2014;35:492–500.



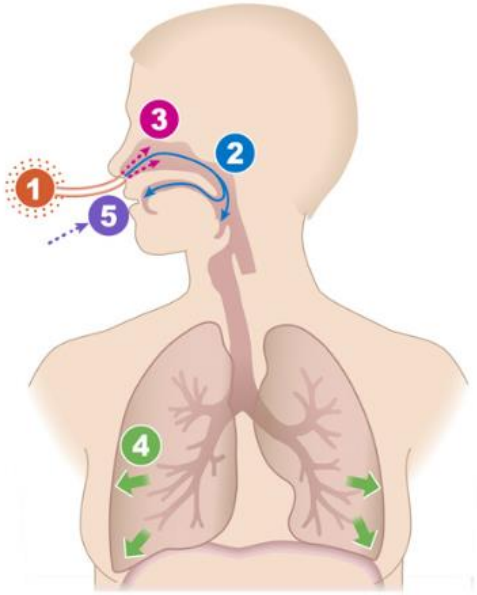
The decision to intubate

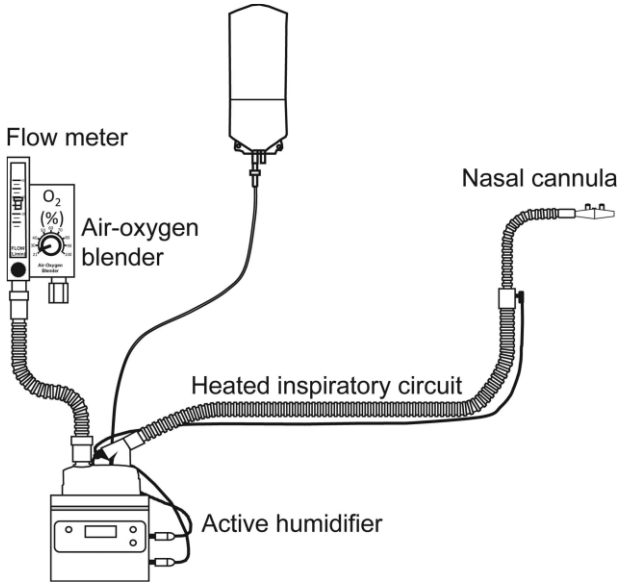


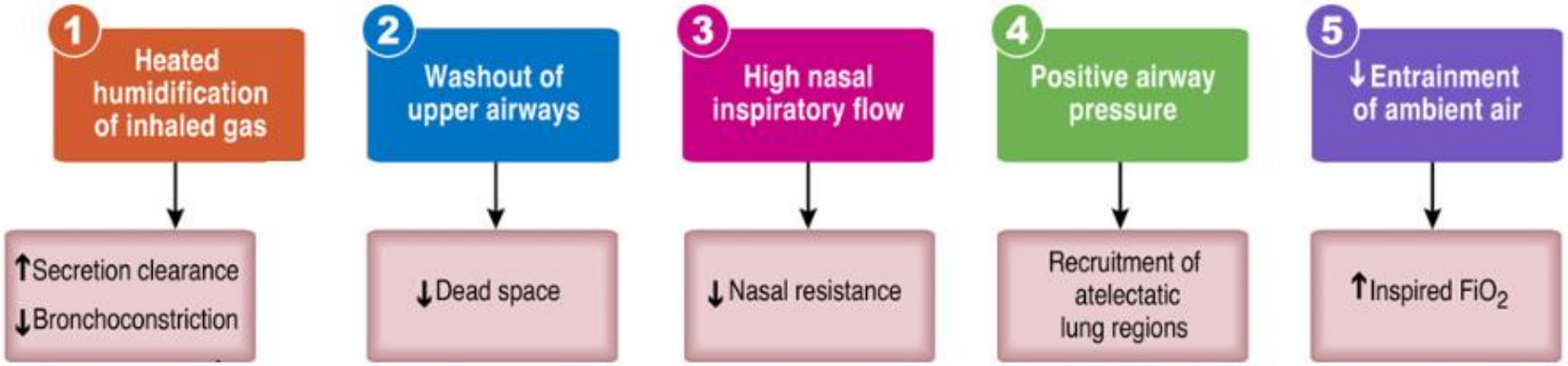
HFNC candidate ?

Not Just Oxygen? Mechanisms of Benefit from High-Flow Nasal Cannula in Hypoxemic Respiratory Failure

American Journal of Respiratory and Critical Care Medicine Volume 195 Number 9 | May 1 2017







CHEST 2015

Heated Humidified High-Flow Nasal Oxygen in Adults

Mechanisms of Action and Clinical Implications

Giulia Spoletini, MD; Mona Alotaibi, MD; Francesco Blasi, MD; and Nicholas S. Hill, MD, FCCP

TABLE 2] Potential Clinical Applications of High-Flow Nasal Oxygen

Application	Benefits
Procedures	Enhanced oxygenation during endoscopy[44]
Hypoxemic respiratory failure	
ARDS	Mild and early[45]
Pneumonia	Enhanced oxygenation[5,16]
Idiopathic pulmonary fibrosis	Lower respiratory rate[24]
Cardiogenic pulmonary edema	Enhanced oxygenation Reduced dyspnea[45]
Postoperatively	
Cardiothoracic and vascular	Improved thoracoabdominal synchrony[46]
Cardiac surgery	Increased end-expiratory lung volume[36] Less escalation of therapy[26]
Postextubation	Improved oxygenation and ventilation[47] Enhanced comfort[6,7] Less displacement of interface[47] Less escalation of therapy to noninvasive ventilation or intubation[47]
Do-not-intubate patients	Improved oxygenation and respiratory mechanics[48]

It is not possible to articulate the indications for mechanical ventilation in the form of a list of items.

Understanding of pathophysiologic concepts, physical examination, extensive experience and good clinical judgment.

Modified by Tobin M, Principles and Practice of Mechanical Ventilation, 3 e

Ευχαριστώ