Noninvasive Ventilation in 2012: Current Use
Conflicts of interest

• Our clinical research laboratory has received research grants for clinical research projects from the following companies:
  – Maquet (NAVA)
  – Covidien (PAV+)
  – Dräger (SmartCare)
  – General Electric (FRC)
  – Respironics (NIV)
  – Fisher Paykel (Optiflow)
TRAITEMENT
PAR VENTILATION INSTRUMENTALE DE 100 CAS
D'INSUFFISANCE RESPIRATOIRE AIGUE SEVERE
(PaCO₂ égale ou supérieure à 70 mmHg)
CHEZ DES PULMONAIRES CHRONIQUES

P. Sadoul, M.-C. Aug, R. Gay
NIV and exacerbations of COPD

Brochard et al. 1995

Mortality 24 vs 9%

7,511,267 admissions for acute exacerbations occurred from 1998-2008

Chandra et al. AJRCCM 2012
1st, 2nd, 3rd International Studies of Mechanical Ventilation

Countries: 37
ICUs: 1,267
Patients: 18,321
Use of Mechanical ventilation

1998
Incidence study
361 ICU 20 countries
Esteban et al, JAMA 2002

2004
Incidence study
353 ICU 26 countries
Esteban et al, AJRCCM 2008

2010
Incidence study
553 ICU 39 countries
Esteban et al
NIV as first attempt

NIV %

1998
2004
2010
Use of NIV 1998 - 2010

- COPD
- CHF
- ARF

Results of the 3\textsuperscript{rd} NIV incidence study (France and Belgium)

A Demoule, S Jaber, A Kouatchet, J Lambert, F Meziani, S Perbet, L Camous, R Janssen-Langenstein, M Alves, B Zuber, F Collet, J Messika, X Favre, O Guisset, B Misset, A Lafabrie, L Brochard, E Azoulay

For the oVNI group
Methods

Survey 2010 - 2011

• Prospective longitudinal study

• 54 ICUs

• 2 months (Nov 2010- April 2011)

• 2653 patients included

• 2445 invasive ventilatory assistance or NIV
Results 1 Incidence
NIV 23 vs. 31% - pre 23% - post-extub 8%
Results 2 Indications

CPE: 53 vs. 37% - « de novo »: 16 vs. 22%
Results 3 success
overall success rate: 68 vs. 56%
Conclusion

Compared to 2002

• The global NIV rate is stable
  – Increase for post-extubation

• Variations across indications
  – Increase for CPE
  – Stable in exacerbations of CRF
  – Decrease in « de novo » ARF

• Success rate is increasing
Results of noninvasive ventilation in very old patients
Schortgen F et al

![Bar chart showing hospital mortality rates for different groups and stages of care.](chart.jpg)
Results of noninvasive ventilation in very old patients
Schortgen F et al
Table 2 Living conditions of the 30 survivors at phone interview (> 6 months)

<table>
<thead>
<tr>
<th></th>
<th>Before ICU (n = 30)</th>
<th>After ICU (n = 30)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Living</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At home, n (%)</td>
<td>27 (90)</td>
<td>22 (73)</td>
<td>0.2</td>
</tr>
<tr>
<td>Home care, n (%)</td>
<td>3 (10)</td>
<td>8 (17)</td>
<td></td>
</tr>
<tr>
<td><strong>Global functional status, n (%)</strong></td>
<td></td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td>Full function (ADL 6)</td>
<td>18 (60)</td>
<td>13 (43)</td>
<td></td>
</tr>
<tr>
<td>Moderate impairment (ADL 4-5)</td>
<td>8 (27)</td>
<td>9 (30)</td>
<td></td>
</tr>
<tr>
<td>Severe impairment (ADL &lt; 2)</td>
<td>2 (7)</td>
<td>5 (17)</td>
<td></td>
</tr>
<tr>
<td><strong>Chronic respiratory support, n (%)</strong></td>
<td></td>
<td></td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>No</td>
<td>28 (93)</td>
<td>18 (60)</td>
<td></td>
</tr>
<tr>
<td>NIV dependency</td>
<td>0</td>
<td>8 (27)</td>
<td></td>
</tr>
<tr>
<td>O₂ dependency</td>
<td>2 (7)</td>
<td>4 (13)</td>
<td></td>
</tr>
</tbody>
</table>

ADL, activities of daily living; ICU, intensive care unit; NIV, noninvasive ventilation.
Noninvasive positive pressure ventilation in critical and palliative care settings: Understanding the goals of therapy

J. Randall Curtis, MD, MPH; Deborah J. Cook, MD; Tasnim Sinuff, MD, PhD; Douglas B. White, MD; Nicholas Hill, MD; Sean P. Keenan, MD, MSc(Epid); Joshua O. Benditt, MD; Robert Kacmarek, PhD, RRT; Karin T. Kirchhoff, RN, PhD, FAAN; Mitchell M. Levy, MD; the Society of Critical Care Medicine Palliative Noninvasive Positive Pressure Ventilation Task Force

Table 1. Overview of the three-category approach to using noninvasive positive pressure ventilation (NPPV) for acute respiratory failure

<table>
<thead>
<tr>
<th>Approach</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>Life Support Without Preset Limits</td>
<td>Life Support With Preset Limit (Do Not Intubate)</td>
<td>Comfort Measures Only</td>
</tr>
<tr>
<td>Primary goals of care</td>
<td>Assist ventilation and/or oxygenation</td>
<td>Includes same as category 1 except intubation declined</td>
<td>Palliation of symptoms (relief of dyspnea)</td>
</tr>
<tr>
<td></td>
<td>Alleviate dyspnea</td>
<td>Also could include briefly prolonging life for a specific purpose (e.g., arrival of family member)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Achieve comfort</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduce risk of intubation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduce risk of mortality</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avoidance of intubation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main goals to communicate with patient and family</td>
<td>Goal is to restore health and use intubation if necessary and indicated</td>
<td>Goal is to restore health without using endotracheal intubation and without causing unacceptable discomfort</td>
<td>Goal is to maximize comfort while minimizing adverse effects of opiates</td>
</tr>
</tbody>
</table>
2653 patients required mechanical ventilation in 54 ICUs

1450 patients received mechanical ventilation for acute respiratory failure

780 patients received noninvasive mechanical ventilation (NIV)

72 (9.2%) patients received palliative NIV (comfort care, SCCM class 3)
All died before day-90

708 patients received curative NIV

574 (81%) patients had no treatment limitation decisions

134 (19%) patients had a Do-Not-Intubate status

ICU survivors 529 (92.2%) 97 (72.4%)
Hospital survivors 505 (88%) 75 (56%)
D-90 survivors 474 (82.6%) 53 (39.6%)
Patients interviewed on D-90 120/237 (50.6%) 34/53 (64.2%)
Relatives interviewed on D-90 122/264 (42.5%) 53/134 (39.6%)

Azoulay E et al ICM 2012 In press
Azoulay E et al. ICM 2012 In press.
Azoulay E et al ICM 2012 In press
Azoulay E et al ICM 2012 In press
Azoulay E et al ICM 2012 In press
Thank you!

http://mechanicalventilation.wordpress.com/
Research
Very old patients admitted to intensive care in Australia and New Zealand: a multi-centre cohort analysis
Sean M Bagshaw1,2, Steve AR Webb3,4, Anthony Delaney5, Carol George6, David Pilcher7, Graeme K Hart1 and Rinaldo Bellomo8

The number of very old patients is increasing

Available online http://ocforum.com/content/13/2/R45

Trend in proportion over time, p=0.002

120,123 admissions for ≥ 24 hrs
57 ICUs
2000-2005
15,640 very old patients (13.0%)
Results of noninvasive ventilation in very old patients
Schortgen F et al

98 patients ≥ 80 years managed with NIV

59 without Do Not Intubate Order

46 No need for endotracheal intubation

Hospital mortality 7/46 (15%)

6 month mortality 14/46 (30%)

Mortality at phone interview 22/46 (48%)

13 Need for endotracheal intubation

Hospital mortality 10/13 (77%)

6 month mortality 10/13 (77%)

Mortality at phone interview 11/13 (85%)

39 with Do Not Intubate Order

Hospital mortality 22/39 (56%)

6 month mortality 26/39 (67%)

Mortality at phone interview 35/39 (90%)
Results of noninvasive ventilation in very old patients

Frederique Schortgen1,2*, Arnaud Follin1, Lucilla Piccar1, Ferran Roche-Campo1, Guillaume Carteaux1, Elodie Taillandier-Heriche3, Sebastien Krupciak3, Arnaud W Thille1, Elena Paillaud3,4 and Laurent Brochard2,4,5
## Baseline Demographics

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>2004</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 5183</td>
<td>n = 4986</td>
<td>n = 8313</td>
</tr>
<tr>
<td>Age, mean (SD)</td>
<td>59 (17)</td>
<td>59 /17</td>
<td>61/17</td>
</tr>
<tr>
<td>Gender, female (%)</td>
<td>39 %</td>
<td>40 %</td>
<td>38 %</td>
</tr>
<tr>
<td>SAPS II, mean (SD)</td>
<td>44 (17)</td>
<td>42 (18)</td>
<td>45 (18)</td>
</tr>
<tr>
<td>BMI. mean (SD)</td>
<td>27 (6)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Non-Invasive Ventilation

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>2004</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIV rate (%)</td>
<td>4.4 (0.001)</td>
<td>8.7</td>
<td>14.6%</td>
</tr>
<tr>
<td>SAPS II</td>
<td>39.5 (16)</td>
<td>39.0 (15)</td>
<td>38.5 (15)</td>
</tr>
<tr>
<td>Failure (intubation) (%)</td>
<td>31 (0.39)</td>
<td>37 %</td>
<td>30.5%</td>
</tr>
<tr>
<td>Mortality in NIV failure</td>
<td>47% (0.94)</td>
<td>48%</td>
<td>49%</td>
</tr>
<tr>
<td>Mortality in NIV success</td>
<td>21% (0.36)</td>
<td>15%</td>
<td>9 %</td>
</tr>
</tbody>
</table>

### NIV POSTEXTUBATION
- For prevention: 5.9%
- For treatment: 5.2%
2653 patients required mechanical ventilation in 54 ICUs

1450 patients required mechanical ventilation for Acute Respiratory Failure

780 patients with acute respirator failure received noninvasive mechanical ventilation

574 Patients with no Treatment-Limitation Decisions
134 Do-Not-Intubate Patients
72 Comfort Care Only Patients

<table>
<thead>
<tr>
<th></th>
<th>No TLD (74%)</th>
<th>DNI (17%)</th>
<th>Comfort (9%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU / Hosp / D90 survivors</td>
<td>92% / 88% / 83%</td>
<td>72% / 56% / 40%</td>
<td>17% / 6% / 0%</td>
</tr>
<tr>
<td>Pts / relatives interviewed D90</td>
<td>51% / 43%</td>
<td>64% / 40%</td>
<td>- / 28%</td>
</tr>
</tbody>
</table>

Chandra et al. AJRCCM 2012