STATE OF THE ART.
USE OF NIV IN BRONCHIOLITIS

Dr. Martí PONS . PICU DEPARTMENT
CONFLICTS OF INTEREST

- Speaker for:
  - MAQUET
  - Dräger
  - Fisher & Paykel
Hospital Sant Joan de Déu
OUR DATA

N >1500 TREATMENTS

Hospital Sant Joan de Déu

NIV
NIV postextub
OVERVIEW

- BRONCHIOLITIS, IS CPAP YOUR CEILING?
- NIV IS FAILING IN YOUNGER INFANTS
  - NIV-specific ventilators
  - Conventional ventilators with NIV option
  - NIV NAVA
- STRATEGY IN HOSPITAL SANT JOAN DE DÉU
- TAKE HOME MESSAGES
OVERVIEW

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Use in France....ten years ago

467 patients Season 2005-2006

36% mechanical ventilation
35% Non-invasive ventilation
Infants with severe respiratory syncytial virus needed less ventilator time with nasal continuous airways pressure then invasive mechanical ventilation

Ilse Borckink, Sandrine Essouri, Marie Laurent, Marcel JU Albers, Johannes GM Burgerhof, Pierre Tissières, Martin CJ Kneyber (m.c.j.kneyber@umcg.nl)

- Hospital Kremlin-Bicetre. Paris
  - 89 patients on CPAP. 97% avoided intubation
- Hospital Beatrix. Groningen
  - 46 patients on MV
BRONCHIOLITIS, IS CPAP YOUR CEILING?

Increase in use of non-invasive ventilation for infants with severe bronchiolitis is associated with decline in intubation rates over a decade.

Fig. 2 Trends in modes of ventilation over 10 years. The percentage of ventilation modes over 10 years in bronchiolitis patients: open box non-invasive ventilation, closed box invasive ventilation. There is a statistically significant increase in NIV support of 2.8% per year and a significant decline of 1.4% per year in invasive support, $p < 0.05$ over the study period.

NIV Success
237 (83.2%)
NIV in the PICU is evidence-based

A prospective, randomized, controlled trial of noninvasive ventilation in pediatric acute respiratory failure

Leticia J. Yañez, MD; Mauricio Yunge, MD; Marcos Emilfork, MD; Michelangelo Lapadula, MD; Alex Alcántara, MD; Carlos Fernández, MD; Flora Hernández, RN; Cristian Catalán, PT; Luis Conto, MD; Carlos Arevalo, MD; José Landeros, PT

<table>
<thead>
<tr>
<th></th>
<th>Control Group (n = 25)</th>
<th>NIV Group (n = 25)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intubation, N (%)</td>
<td>15 (60%)</td>
<td>7 (28%)</td>
<td>0.045</td>
</tr>
<tr>
<td>Days of invasive ventilation (mean days)</td>
<td>3.1</td>
<td>2.6</td>
<td>—</td>
</tr>
<tr>
<td>ICU length of stay (mean days)</td>
<td>5.5 ± 2.7</td>
<td>6.7 ± 5.9</td>
<td>0.19</td>
</tr>
<tr>
<td>Hospital length of stay (mean days)</td>
<td>10.6 ± 4.8</td>
<td>10.4 ± 7.9</td>
<td>0.51</td>
</tr>
</tbody>
</table>
Use of NIV in HSJD

- 1998-2007
  - BiPAP lovers, but only CPAP in infants
- 2007-2010
  - Bilevel in infants with Servo-i/Giulia
- 2010
  - First NIV NAVA experience
**1998 to 2007**

- **BiPAP lovers**

<table>
<thead>
<tr>
<th>Ventilator</th>
<th>n</th>
<th>Age (months)</th>
<th>Weight (Kg)</th>
<th>Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision (3)</td>
<td>261</td>
<td>31</td>
<td>13</td>
<td>71%</td>
</tr>
</tbody>
</table>

All patients younger than 6 months failing on CPAP were intubated.

**Ventilator**

- Vision (3)

**Characteristics**

- **n**: Number of patients
- **Age**: Age in months
- **Weight**: Weight in kg
- **Success**: Percentage of success
2007 to 2010

- BiPAP lovers but.......

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<td>Vision (3)</td>
<td>362</td>
<td>10</td>
<td>13</td>
<td>71%</td>
</tr>
<tr>
<td>Carina (2)</td>
<td>37</td>
<td>29</td>
<td>15</td>
<td>70%</td>
</tr>
<tr>
<td>Giulia (1)</td>
<td>17</td>
<td>1.3</td>
<td>3.2</td>
<td>52%</td>
</tr>
<tr>
<td>Servo-i(5)</td>
<td>154</td>
<td>1.8</td>
<td>4.2</td>
<td>73%</td>
</tr>
</tbody>
</table>
NIV IS FAILING IN YOUNGER INFANTS

- Children younger than 6 months are more prone to NIV failure

Log-rank $p < 0.0001$
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NIV IS FAILING IN YOUNGER INFANTS

NIV-specific ventilator

- Inspiratory asynchrony is a crucial issue in infants
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NIV IS FAILING IN YOUNGER INFANTS

Conventional ventilator with NIV option

2007-2012

• PC
Setting parameters in PC
Setting parameters in PC
Nasopharyngeal tube?
Is a Nasopharyngeal Tube Effective as Interface to Provide Bi-Level Noninvasive Ventilation?

Eneritz Velasco Arnaiz MD, Francisco José Cambra Lasaosa PhD, Lluïsa Hernández Platero MD, Núria Millán García del Real MD, and Martí Pons-Òdena MD PhD
Is a Nasopharyngeal Tube Effective as Interface to Provide Bi-Level Noninvasive Ventilation?

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Success rate 73%
i-NIV 63%
e-NIV 82%
NIV IS FAILING IN YOUNGER INFANTS
Conventional ventilator with NIV option

2013-2014
PS with full face mask
OVERVIEW

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OUR NIV NAVA EXPERIENCE
Our data

Oct 2010- January 2014

30 patients

22 Electively extubated from NAVA to NIV NAVA

Success rate 74%
NAVA OFFERS Information

- Edi trigger 97-99% during first day
- NAVA level 0.9 (range 0.1 to 3 cm H$_2$O/μv)
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STRATEGY IN HOSPITAL SANT JOAN DE DÉU

- **BLPAP**
  - 2 pressure levels

- **Resp failure type II**
  - Resp failure type I severe

**< 3 months**
- Full-face mask
- Nasal as oronasal
- Nasal interface/prongs
- Nasopharyngeal tube < 1 month

**Conv. vent + NIV option**
- Servo-i
  - V60 with Autotrack plus,
  - Giulia, Carina, Vision

**if asynchrony**
- NIV NAVA

**> 3 months**
- Full-face mask
- Nasal as oronasal
- Nasal interface

**NIV ventilator**
- V60, Carina
- Conv. vent +NIV option
OVERVIEW

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  - Clinical algorithms
- TAKE HOME MESSAGES
TAKE HOME MESSAGES

- Between CPAP and intubation there is room for BLPAP
- Interfaces are crucial
  - Nasopharyngeal tube works with Servo-i in PC mode
  - Most ventilators work better with Full face mask
- Use ventilators with the most sensitive inspiratory trigger

- NIV NAVA in a near future may play a relevant role providing bilevel pressure in the most challenging patients: asynchronic ones
Dear colleagues,

The Second International Conference on Pediatric and Neonatal Noninvasive Ventilation will be held again in Barcelona, Spain.

This meeting intends to be in a complimentary event to the Biennial European Conference on Pediatric and Neonatal Ventilation organized by Dr. Rimensberger in Switzerland.

This Conference, focused on NIV, will be offering the latest advances to young pulmonologists, neonatologists, pediatric intensivists, pediatric pulmonologists, and pediatric and neonatal intensive care nurses/respiratory therapists. It is a multidisciplinary forum where everyone will learn from the lecturers of well-known experts in this field.

In addition, to our commitment to education, we will also offer a series of precongress workshops that will focus on very practical bedside tests.

We are inviting you to participate and to make this Second Conference on Pediatric and Neonatal Non-invasive Ventilation a high-standard event and a great success so it could be organized annually. We are looking forward to seeing you in Barcelona in 2015!

Marti Pons, Alberto Medina  
Congress Chairs