Home Mechanical Ventilation: A Global View

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### Disclosures

#### Research Grants

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<th>Company</th>
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<td>Breathe Technologies</td>
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“There’s no place like home.”
Dorothy, *The Wizard of Oz*

- Familiar environment
- Greater comfort
- Less cost
- Greater safety
Outline

- Brief Historical Perspective
- Epidemiology
- Neuromuscular Diseases
- “Stable” COPD
- Obesity Hypoventilation
- Technical points
Brief Historical Perspective
Brief Historical Perspective
Brief Historical Perspective: Cough Assist
Global Epidemiology

HMV is largely a product of the developed world
Epidemiology of HMV in Europe

Lloyd-Owen S et al, ERJ 2005: 25:1025
Epidemiology of HMV in Europe

Lloyd-Owen S et al, ERJ 2005: 25:1025
Epidemiology of HMV in Europe

Lloyd-Owen S et al, ERJ 2005: 25:1025
Epidemiology of NIV in Europe

Epidemiology of Home Mechanical Ventilation in US (MA)

Divo M et al, Respir Care 2010
Epidemiology of Home Mechanical Ventilation in US (MA)

Characteristics of 221 HMV pts

- Age (yrs) <18 (41%), 18-65 (52%), >65 (7%)
- Diseases NMD 69%, COPD 23%, Other (CW) (8%)
- Interface Trache (78), Nasal (13%), Face (8%), Mouth (1%)
- Usage (hrs) <6 (44%), 6-12 (6%), 13-18 (40%), 24 (6%)

Divo M et al, Repair Care 2010
International Patterns of Use of HMV

Users/100,000

- Eurovent 2001 6.6
- Make 1983 (MA) 2.8 (ARRD, 1986)
- Divo 2006 (MA) 3.4
Challenges to Optimal Use of Home Mechanical Ventilation

- Adherence - efficacy
- Technology
- Interfaces – Comfort, Minimal leaks, avoidance of complications
- Ventilators – Multiple capabilities, simple operation, automaticity, alarms, (tele)monitoring, leak tolerant, synchrony
Challenges to Optimal Use of Home Mechanical Ventilation

- Adherence
- Caregiver support
- Family – critical but limited resource
- Outside caregivers – adequately trained, sufficient compensation
Challenges to Optimal Use of Home Mechanical Ventilation

- Financial support
- Personal assets consumed rapidly
- Insurance system variable, leading to impoverishment
- Welfare undergoing cuts, hard to get adequate help
Family Perception last 3 mos of HMV – Italian survey

Good and Bad points

• 72% hospitalized, >50% died in hospital
• Poor symptom control, pain and dyspnea 50%
• High economic burden – esp for caregivers
• Depression and anxiety among caregivers
• Few technical problems with vent

Vitacca et al, ERJ 2009
Reimbursement Challenges in the US

- “The True Measure of Any Society can be found in how it treats weakest members ..” Ghandi
- Affordabe care act health insurance expansion adopted by fewer than half of states, major cuts in Medicaid in those that have not
Respiratory Assist Device v “ventilator” according to CMS

RAD

Ventilator
CMS Guidelines for RAD in COPD

- Symptomatic despite optimal therapy
- Daytime PaCO2 ≥ 52 mm Hg and
- O2sat ≤ 88% for > 5 consec min on usual FIO2
- OSA excluded (clinically OK)
Centers for Medicare and Medicaid Services (CMS) Rules

- Noninvasive positive pressure respiratory assistance "is distinguished from invasive ventilation administered via a securely intubated airway, in a patient for whom interruption or failure of respiratory support leads to death."
Invasive Home Mechanical Ventilation still has a role

- Unable to protect airway
  - Inadequate cough
    - Bulbar, exp muscle weakness
  - Excessive secretions
- Failure of NPPV after adequate trial
- Need for continuous NPPV (relative)
- Unable to fit mask
  - Anatomic abnormalities
- May preclude discharge home
Summary: Home Mechanical Ventilation – Global View

• We’ve made enormous progress in the past 26 years
• Noninvasive has many advantages, but still a place for invasive
• Countries with established home care programs have good data, but epidemiologic data are lacking in most parts of the world
• Many challenges to adequate support of home mechanical ventilation
• Some of biggest hurdles are political