
Improving acute respiratory distress in the emergency setting: The challenges of caring for a patient requiring non-invasive ventilation

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Aim of Presentation

To enhance the emergency nurses' knowledge of Non-Invasive Ventilation (NIV) and highlight the benefits of establishing a nurse-led NIV service

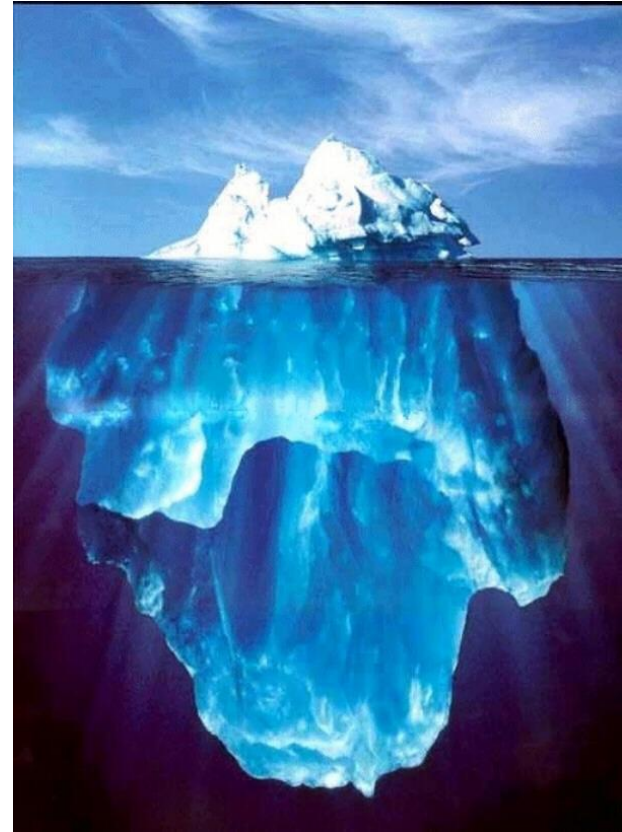
Learning Objectives

- To highlight the prevalence of COPD from a national and international perspective
 - To discuss the complexities of a NIV service within an Emergency Department
 - To discuss the nursing care of a patient on NIV
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COPD

- COPD is a significant personal and public health burden
- The true burden is underestimated
- In the UK, rates of COPD in men have reached a plateau while those of women continue to increase

Fraser *et al.* (2006)



Prevalence

- Expected to be the 3rd leading cause of death by 2020
- Currently the 4th leading cause of death in the USA
- 5th cause of mortality world wide
- The cost and complex needs of patients with COPD will continue to pose challenges to patients, their families and health care providers

Kara, (2005)

An Irish Perspective



- COPD is the third leading cause of respiratory death, accounting for over one fifth (22%) of total respiratory mortality
- COPD accounts for 20% of hospital respiratory inpatient bed days Brennan & O Connor, (2008)
- COPD is one of the top three co-morbidities among inpatients HSE, (2007)

Rationale for NIV Service

Lack of sufficient specialist beds within an appropriate timeframe

Limited resources

Subsequent deterioration in patient's condition

Resources V's Evidence Based Care

Change

Decision made among ED staff that change was required

Nurse initiated (Respiratory CNS based in ED)

BTS, (2002)

Collaborative multidisciplinary participation

ED nurses

ED Unit Manager

ED Consultant

Respiratory Physiotherapist

Resistance

Overcrowding in ED
Daily Statistics

Fear
Ventilated patient care
Not ITU nurses

Lack of training
NIV not included on ED course

Cost

Pilot Study

Start date agreed

Simultaneously:

- trial of 2 machines

- policy development

- resource folder and laminated cards in resuscitation room

Training of nursing and medical staff in ED

Simulation/Demonstrate use with patient

NIPPY 3



NIV Full Face Mask



Audit

Retrospective audit - Six month period

Audit tool developed

- based by the BTS recommendations (2002)



Audit Result

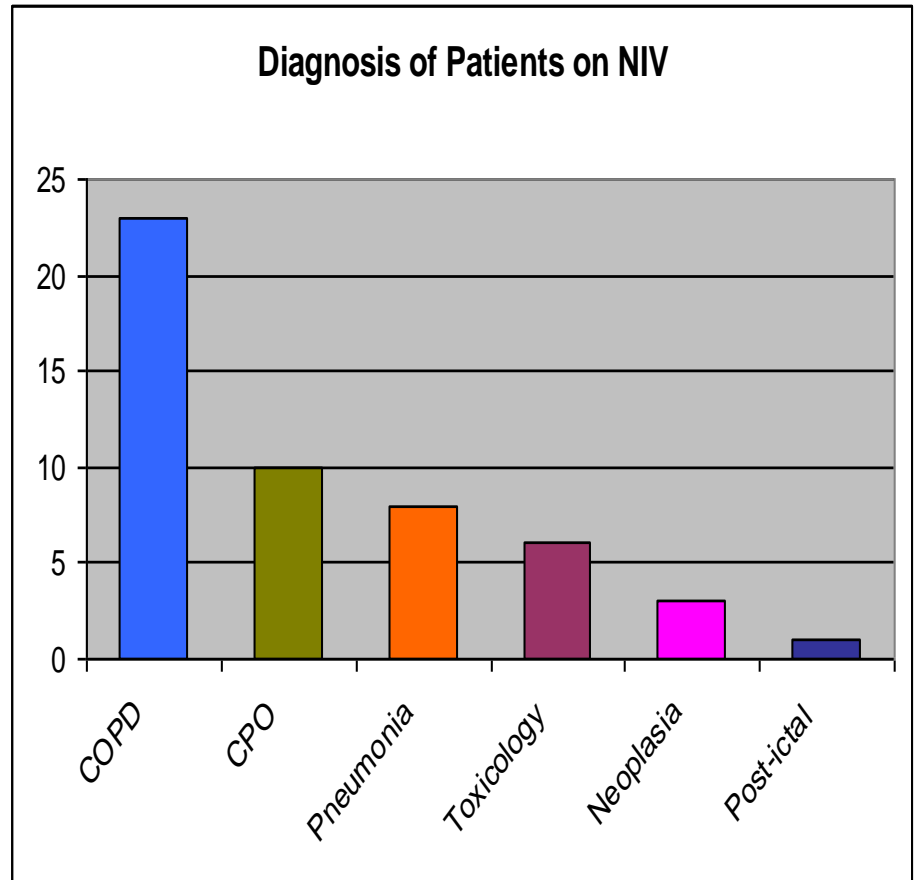
51 patients with the age range
27-91 yrs

41 patients type 11 respiratory
failure

Mean duration of therapy was
5.25 hours

80% had improvement in their
clinical status and parameters
within ED

12% (6 patients) deteriorated
and required intubation



Literature Supporting NIV

Usual medical care V's NIV as an adjunct to usual care in exacerbation of COPD was associated with:

- ❑ Reduce mortality (50%)
- ❑ Greater improvement at 1 hour in pH, PaCO₂, respiratory rate
- ❑ Reduce endotracheal intubation rates (44%) & associated complications
- ❑ Reduced length of stay in hospital (x 3 days)

BTS, (2002), Lightowler *et al.* (2003), Elliott, (2005)

Goals of NIV

- To improve gaseous exchange - O₂ and CO₂
 - To decrease intrapulmonary shunt
 - To assist the patient's spontaneous respiratory effort and alleviate dyspnoea
 - To maximise respiratory muscle rest/reduce the work of breathing/reduced oxygen consumption
 - To avoid the need for intubation and ventilation
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Indications for NIV

- *Type 11 respiratory failure*
- Type 1 respiratory failure
- Hypoventilation syndrome
- Adjunct to physiotherapy
- Treatment ceiling
- Facilitate weaning and extubation
- Neurological disorders (spinal injuries, diaphragmatic paralysis)
- Neuromuscular disease
- Bridge to transplantation
- Chest wall disorders (scoliosis)
- Sleep apnoea/central apnoea

Types 11 Respiratory Failure

Defined as

hypoxia ($\text{PaO}_2 < 8\text{KPa}$)

& hypercapnia ($\text{PCO}_2 > 6.5\text{KPa}$)

$\text{PH} < 7.35\text{mmoles}$ (acidotic)

NIV Contraindications

- No spontaneous respiratory drive i.e. arrest
 - PH < 7.20 mmols
 - History of pneumothorax (caution)
 - Haemodynamic instability
 - Acute sinusitis or otitis media or epistaxis
 - Recent abdominal surgery - tracheal or oesophageal anastomosis
 - Unstable facial fractures/extensive facial lacerations
 - Base of skull fractures/recent cranial trauma or surgery
-

NIV Contraindications

- Laryngeal trauma
- High risk of vomiting - GI bleed or paralytic ileus
- Uncooperative patient/inability to fit mask
- Patient's inability to effectively clear secretions/compromised airway
- Unstable multiple organ failure

NIV may be used despite the presence of these contraindications, if it is to be the "ceiling" of treatment *BTS , (2002)*

Complexities of Consent

Consent required whenever autonomy is at risk

Any touching without consent is considered battery and is unlawful

Elements of Consent

Voluntary

Specific

Competent Person

Usher & Arthur, (1998), Aveyard, (2002)

Consent

Complexities associated with hypoxia and emergency situation

Patient anxiety

Monoculture V's Multiculture

Obtaining Consent:

Involve next of kin and or significant other

Tailor information to the patient and their clinical need

Informed v's Coercion

Usher & Arthur, (1998), Aveyard, (2002)

Humidification

No recommendations in BTS

Patients often complain of dryness and pain in the nasopharynx
when inspiratory gas is dry

Addition of humidification improves compliance

Miyoshi et al. (2005)

Intermittent nebulisation of saline

Elliott, (2005)

Nursing care of a patient on NIV

- Monitor respiratory rate, pattern and effort/use of accessory muscles
 - Monitor saturation readings/assist with ABG
 - Ensure pressure settings are adequate to maintain adequate tidal volume
 - Ensure adequate mask fit and seal
 - Observe for side effects
 - Observe for gastric distension-vomiting/aspiration
-

Nursing care of patient on NIV

- Monitor haemodynamic status (reduced preload)
- Monitor neurological status - tiredness, confusion
- Observe skin for breakdown/redness
- Observe for signs of barotrauma: e.g. pneumothorax, subcutaneous emphysema
- Explain treatment and reassure patient/family - reduce anxiety/improve compliance

BTS, (2002)

Complications of NIV

- Abdominal distension (bloating) - insert NG tube
- Barotrauma - Pneumothorax
- Decreased cardiac output
- Hypoventilation - alter pressures
- Poor synchronisation of patient/machine - increases work of breathing, fails to correct gases

BTS, (2002)

Complications of NIV

- Eye irritation due to mask leak
- Nasal dryness/blockage - use humidification
- Skin breakdown/nasal bridge pain - close monitoring
- Mask intolerance

BTS, (2002)

Acknowledgements

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Thank you for your attention

Any Questions?