



Oxygen Therapy

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objectives

- Discuss indications for oxygen therapy
- outline patient assessment involved for people who are having oxygen therapy
- Explore the difference between FI_{O_2} and oxygen saturations
- Familiarise with different oxygen delivery devices
- Use critical thinking skills in correlating assessment and indications for stopping oxygen therapy

Oxygen

- Most common medication used with patients who have acute health problems.
- Many people who administer it does not recognise it as a medication
- In a North Island Hospital audit, 8% of actual O₂ administered has been prescribed, and of this 75% was unnecessary.



Indication for Oxygen Therapy

- ▶ CPR
- ▶ PaO₂ less than 60 mmHg or SaO₂ less than 90%
- ▶ Patients with symptoms of chronic hypoxemia or increased cardiopulmonary workload
- ▶ Carbon monoxide poisoning
- ▶ Cyanide toxicity
- ▶ Acute myocardial infarction
- ▶ Not indicated for breathlessness



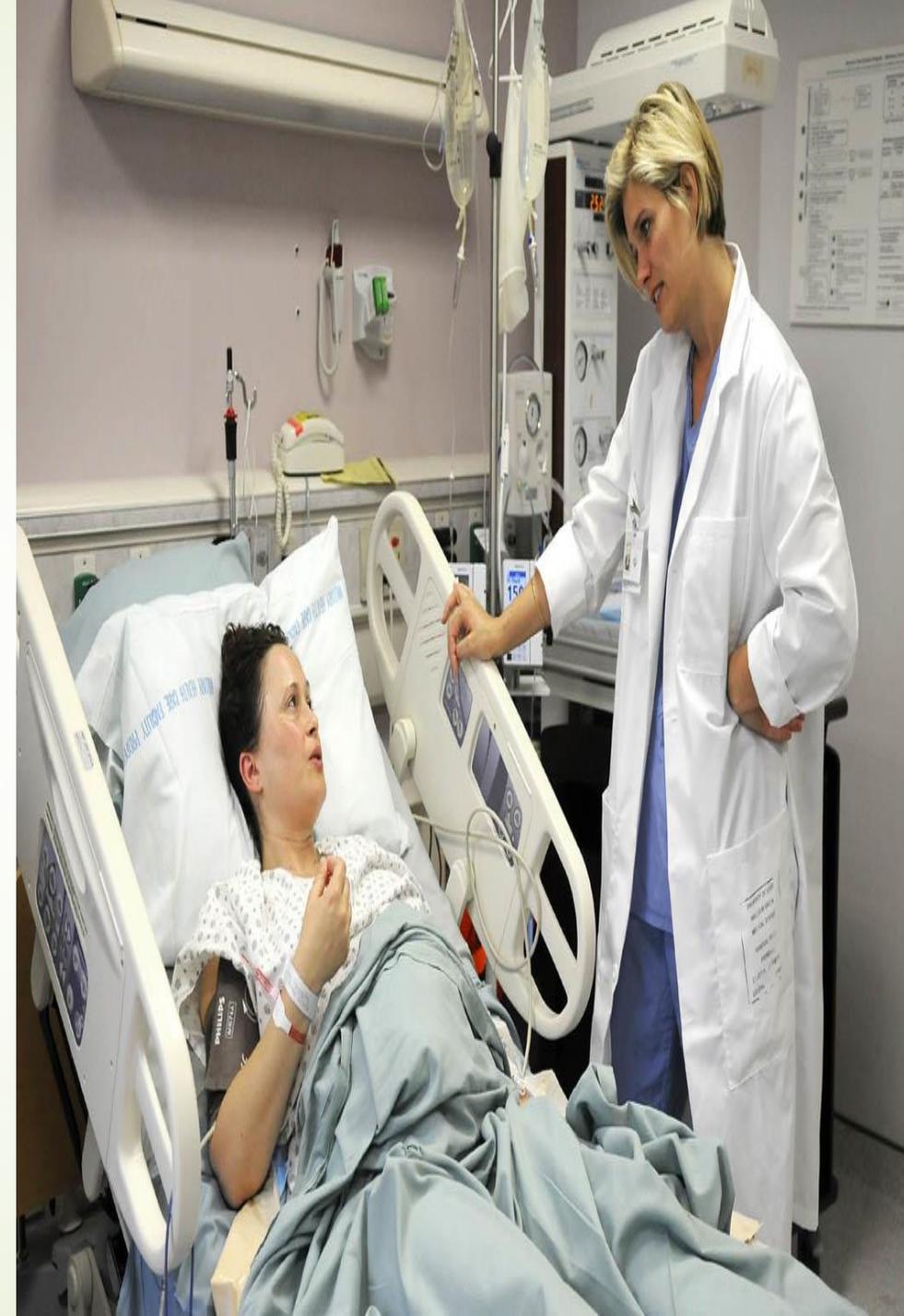
How we measure O₂ levels

- ▶ Pulse oximetry measures SpO₂ percentage of Hb that is bound to oxygen
- ▶ ABG measures PaO₂ the pressure of O₂ dissolved in plasma & SaO₂ O₂ saturation of hemoglobin
- ▶ ABG is the “gold standard” for determining the patients ventilation, tissue oxygenation & acid-base status



Patient assessment

- ▶ Signs and symptoms
 - ▶ Alteration in rate (tachypnea, bradypnea and apnea)
 - ▶ Depth of respirations (hypopnea)
 - ▶ Difficulty of breathing (dyspnea)
 - ▶ Changes in color (pallor or cyanosis)
 - ▶ Irritability /change in level of alertness/chronic headaches in patients with long standing hypoxemia
 - ▶ Heart rate fluctuations
 - ▶ Elevated BP then marked decrease





What the FiO_2 ?????!!!!!!!

This is how O_2 is measured.

- ▶ For example, room air consists of 21% O_2 , so by breathing in room air the fractional concentration in inspired air (FiO_2) is 21%
- ▶ Simply put, if you take the air that someone is breathing and find out how much of it (percentage-wise) is oxygen, you get the FiO_2 .



If Oxygen is a Drug, what are my 7 R's?

➤ What determines the choice of **delivery device**?

➤ **Purpose**

➤ **Patient**

➤ **Performance**

Nasal Prongs



- Indicated for low flow O₂ long or short term
- For flow rates 0.25-4L/min
- FiO₂ 24-36%

Hudson Mask



- Indicated for higher concentration than nasal prongs
- Usually applied short term
- FiO_2 35-60%
- Start at 5L/min can go as high as 15L/min, but 8L/min more practical

Nonrebreathing face mask with reservoir and one-way valve



- ▶ indicated when an $F_{I,O_2} > 40\%$ is required
It may deliver F_{I,O_2} up to 90% at high flow settings.
- ▶ Oxygen flows into the reservoir at 12-15L ·min, washing the patient with a high concentration of oxygen.
- ▶ Its major drawback is that the mask must be tightly sealed on the face, which is uncomfortable. There is also a risk of CO_2 retention

Venturi Mask



- Indicated for precise concentration of O_2
- Flow rates from 2-14L/min
- FiO_2 24-55%
- Often used in patients who retain CO_2
- The only O_2 delivery device that delivers a specific percentage of oxygen

Oxygen Concentrator

- ❑ Home O2
- ❑ Converts nitrogen from air into oxygen
- ❑ Suitable for low flow O2 1-4L.
- ❑ Unable to be used for O2 flow over 5L
- ❑ Remember: requires power, long tubing, falls risk



Humidification

- Why and when to use humidified oxygen??





Oxygen Toxicity

- ▶ High concentrations of oxygen 70-100% may cause damage to alveolar membrane when inhaled for more than 48 hours
- ▶ Recognition of symptoms can be difficult as this can include non specific symptoms such as cough, dyspnoea at rest and muscle fatigue



Approach to hypoxic patient

- ▶ Optimise ABC in emergency situation (airway patency needs to be established)
 - ▶ SPO2 quick measurement
 - ▶ If hypoxia is present, need to provide O2 regardless of underlying cause
 - ▶ Use your assessment skills to determine cause
- 



How much do we give?

- ▶ Acutely hypoxic patient
 - ▶ High concentration o₂ required for all (facemask)
 - ▶ Hypoxia will kill faster than hypercapnia
 - ▶ Titrate once adequate saturation is achieved
- ▶ Chronic hypoxic patient
 - ▶ Ensure titration to a saturation level desired
 - ▶ Utilise most effective means for the patient

Oxygen Resuscitation

- ▶ If the patient is conscious
 - ▶ Start with Hudson mask application
 - ▶ Progress to non-rebreather mask-----then---bag-valve-mask if required
 - ▶ Don't provide ventilation via bag
- ▶ If the patient is unconscious
 - ▶ Ensure airway patency is assessed
 - ▶ ?intubation
 - ▶ Always use the bag-valve-mask





When to stop???

- ▶ Oxygen should be stopped as soon as indication for its use ceases.
- ▶ Weaning should start as soon as the patient stabilises from a physiological perspective.
- ▶ Obs and ABG parameters are stable
- ▶ Reducing the inspired oxygen concentration in increments for a period of time with regular re-evaluation of the patient.



Take Home Messages

- ▶ Oxygen is a drug and should be prescribed appropriately
- ▶ Oxygen is a drug and the 7 R's should be observed
- ▶ Oxygen is most effective if we use the right delivery
- ▶ Main indication for acute oxygen therapy is hypoxemia
- ▶ Oxygen does not help the feeling of breathlessness in non-hypoxemic patients
- ▶ Nurses/Prescribers should be familiar of which system to use in what situation
- ▶ Know when to stop O₂ use



References

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- ▶ Cataletto, M. (2011). Fundamentals of oxygen therapy. *Nursing made Incredibly Easy*, 9(2), 22-24.
- ▶ Smith, S. (2005). Is your patient getting enough oxygen. *LPN*. 1, (2): 10-13