Incentive Spirometry
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Objectives

- Following the presentation, participant should be able to describe proper use of incentive spirometer and therapy rationale according to clinical guidelines.
- Participant will:
  - Identify indications for incentive spirometry therapy.
  - Recognize contraindications and complications for I.S. Therapy.
  - Describe proper technique for use of incentive spirometer.

I. S. Introduction

- I.S. is designed to mimic natural sighing or yawning by encouraging the patient to take long, slow deep breaths.
- Also called SMI (sustained maximal inspiration).
- Involves the use of a device that encourages a patient to make larger-than-normal inspiratory effort and establish a breathing incentive.
Introduction (Cont’d)

- I. S. devices let the patient see their own progress.
- Results in the generation of increased negative transpulmonary pressures and increased Vt, for the primary purpose of opening and stabilizing atelectatic areas of the lung against recurrent atelectasis.
- Primary purpose is to help open closed alveoli, facilitate the cough reflex, help mobilize secretions, and prevent hyperventilation.

Indications for I. S.

- Presence of conditions predisposing to the development of pulmonary atelectasis:
  - Upper-abdominal surgery.
  - Thoracic surgery.
  - Surgery in patients with COPD.
- Presence of pulmonary atelectasis.
- Presence of a restrictive lung defect associated with quadriplegia and/or dysfunctional diaphragm.

Contraindications for I. S.

- Uncooperative or physically disabled pt.
- Patient with mental or CNS disorders (patient is unable to understand or demonstrate proper use of the device).
- Patients that are physically unable to generate large enough Vt (10-15 ml/kg).
Hazards and Complications of I.S.

- Hyperventilation may occur if SMI is performed too rapidly, without rest periods between deep breaths, which may lead to dizziness, light-headedness, a tingling sensation in the extremities, and possible muscle tremors
- Barotrauma in pt. with emphysematous blebs
- Discomfort secondary to inadequate pain control
- Exacerbation of bronchospasm

Procedure for I.S.

- Use patient's height and age to determine baseline volume expectations.
  - Use spirometer’s volume table insert to determine max. Volume predicted.
- If post-op, set realistic, achievable goals initially and increase level by 200 ml until pt. Reaches desired Vt.
- Make sure pt. understands proper use of device and the importance of a slow sustained maximal inspiration.

Procedure (Cont’d)

- Stress importance of achieving goals and coughing to clear secretions
- Splint surgical incisions with pillows, bath blanket or firm stuffed animal
- Nose clips can be used to better facilitate a deep breath through the mouthpiece
- Assess pt., include V.S. and chest auscultation
- Make sure your patient’s pain is adequately controlled
- Explain and demonstrate if necessary
**Procedure (Cont’d)**

- Proper technique includes having pt. inspire slowly and deeply.
- At the end of max. inspiration have patient do breath hold for 5 sec., then passively exhale.
- Repeat 6 - 10 times or as prescribed.
- Instruct in proper cough techniques and provide tissues and disposal bag.
- Reassess patient.
- Document in medical record: cooperation, effort, volume achieved, cough & sputum production, breath sounds and vital signs.

**Procedure (Cont’d)**

- Most effective therapy to prevent/treat atelectasis is performing the incentive spirometry slow maximal inspiration maneuver 6 - 10 times every hour. Alveoli begin to close up after one hour of shallow breathing.

**Turn, Deep Breathe and Cough**

- Repositioning patient promotes lung expansion, secretion mobilization and improves oxygenation of the blood.
- Optimal position for lung expansion and secretion mobilization is oblique side-lying with the bed at any degree of inclination as tolerated by patient.
- Patient should be encouraged to turn, or be turned, at least every two hours while awake.
- Even better than turning is sitting up and getting out of bed.
Turn, **Deep Breathe** and Cough

- If patients can take deep breaths without the I.S. device, encourage them to do so at regular intervals.
  - Instruct in sustained, slow, deep breath.
  - A deep breath is a key component for a normal effective cough.

Turn, Deep Breathe and Cough

- **Standard directed cough:**
  - Take a deep breath, hold. Then cough with a single exhalation.
  - Several relaxed breaths should be taken before the next cough effort.

- **Modified directed cough:**
  - For patients who had have abdominal or thoracic surgery, instruct patient to place hand or pillow over the incisional site and apply gentle pressure.

Turn, Deep Breathe and Cough

- **Huff** directed cough:
  - Take 3 – 5 slow deep breaths, inhaling through nose and exhaling through pursed lips.
  - Take deep breath and hold for 3 – 5 seconds.
  - Squeeze breath out by contracting abdominal and chest wall muscles with the mouth (and glottis) open while whispering the word “huff” several times during exhalation.
  - Repeat maneuver 2 – 3 times.