

AARC Clinical Practice Guideline

Directed Cough

DC 1.0 PROCEDURE:

Directed cough (DC) to clear or mobilize secretions is a component of bronchial hygiene therapy when spontaneous cough is inadequate. Directed Cough is a deliberate maneuver that is taught, supervised, and monitored. Forced expiratory technique (FET, or huff cough) and manually assisted cough are examples of directed cough.

DC 2.0 DEFINITION/DESCRIPTION:

Directed cough seeks to mimic the attributes of an effective spontaneous cough (or series of coughs), to help to provide voluntary control over reflex, and to compensate for physical limitations (eg, by increasing glottic control, inspiratory and expiratory muscle strength, coordination, and airway stability).

A spontaneous effective cough is a reflex mechanism utilizing maximum forced exhalation to clear irritants or secretions from the airway. The forced exhalation is preceded by a maximal inspiratory effort followed by closure of the glottis. Contraction of expiratory muscles produces increased intrathoracic pressures against the closed glottis, which culminates in an explosive release of gas at high velocity as the glottis opens.

Forced Expiratory Technique (FET), also known as "huff coughing," consists of one or two huffs (forced expirations) from mid-to-low lung volumes with the glottis open,(1) followed by a period of relaxed, controlled diaphragmatic breathing. The process is repeated until maximal bronchial clearance is obtained, and can be reinforced by self-compression of the chest wall using a brisk adduction movement of the upper arms.(2) Manually assisted cough is the external application of mechanical pressure to the epigastric region or thoracic cage coordinated with forced exhalation.

DC 3.0 SETTING:

- 3.1** Critical care
- 3.2** Acute care in-patient
- 3.3** Extended care and skilled nursing facilities
- 3.4** Rehabilitation facility
- 3.5** Home care
- 3.6** Pulmonary rehabilitation program
- 3.7** Outpatient, ambulatory care
- 3.8** Pulmonary diagnostic laboratory
- 3.9** Sputum-induction room

DC 4.0 INDICATIONS:

4.1 The need to aid in the removal of retained secretions from central airways(3-6)--(the suggestion that FET at lower lung volumes may be effective in preferentially mobilizing secretions in peripheral airways while larger volumes facilitate movement in the central airways lacks validation).

4.2 The presence of atelectasis(3,7,8)

4.3 As prophylaxis against postoperative pulmonary complications(7)

4.4 As a routine part of bronchial hygiene in patients with cystic fibrosis,(2,4,6,9) bronchiectasis, chronic bronchitis,(3,10,11) necrotizing pulmonary infection, or spinal cord injury(12)

4.5 As an integral part of other bronchial hygiene therapies such as postural drainage therapy (PDT),(2,13) positive expiratory pressure therapy (PEP), and incentive spirometry (IS)

4.6 To obtain sputum specimens for diagnostic analysis

DC 5.0 CONTRAINDICATIONS:

Directed cough is rarely contraindicated. The contraindications listed must be weighed against potential benefit in deciding to eliminate cough from the care of the patient. Listed contraindications are relative.

5.1 Inability to control possible transmission of infection from patients suspected or known to have pathogens transmittable by droplet nuclei (eg,*M tuberculosis*)

5.2 Presence of an elevated intracranial pressure or known intracranial aneurysm

5.3 Presence of reduced coronary artery perfusion, such as in acute myocardial infarction(14)

5.4 Acute unstable head, neck, or spine injury

Manually assisted directed cough with pressure to the epigastrium may be contraindicated in presence of

5.5 increased potential for regurgitation/aspiration (eg, unconscious patient with unprotected airway)

5.6 acute abdominal pathology, abdominal aortic aneurysm, hiatal

hernia, or pregnancy

5.7 a bleeding diathesis

5.8 untreated pneumothorax

Manually assisted directed cough with pressure to the thoracic cage may be contraindicated in presence of

5.9 osteoporosis, flail chest

DC 6.0 HAZARDS/COMPLICATIONS:

6.1 Reduced coronary artery perfusion(14)

6.2 Reduce cerebral perfusion leading to syncope or alterations in consciousness, such as, light-headedness or confusion,(15) vertebral artery dissection

6.3 Incontinence

6.4 Fatigue

6.5 Headache(15)

6.6 Paresthesia or numbness(15)

6.7 Bronchospasm(11)

6.8 Muscular damage or discomfort

6.9 Spontaneous pneumothorax, pneumo-mediastinum, subcutaneous emphysema

6.10 Cough paroxysms

6.11 Chest pain

6.12 Rib or costochondral junction fracture

6.13 Incisional pain, evisceration

6.14 Anorexia, vomiting, and retching

6.15 Visual disturbances including retinal hemorrhage(15)

6.16 Central line displacement(16)

6.17 Gastroesophageal reflux(17)

DC 7.0 LIMITATION OF METHOD:

7.1 Directed cough is of limited value in the obtunded, paralyzed, or uncooperative patient

7.2 The following clinical entities may compromise the effectiveness of a directed cough maneuver:

7.2.1 the presence of severe obstructive airways disease;

7.2.2 severe restrictive disease;

7.2.3 pain exacerbated by coughing (eg, incisional);

7.2.4 fear of pain;

7.2.5 neurologic, muscular, or skeletal abnormalities;(18,19)

7.2.6 systemic dehydration;

7.2.7 antitussives.

7.3 In patients with a bypassed upper airway or other condition that precludes the ability to effectively close the glottis, the effectiveness of the cough may be limited.

7.4 Thick, tenacious sputum may limit the effectiveness of these techniques and may require other supplemental strategies to optimize clearance of secretions.(3)

DC 8.0 ASSESSMENT OF NEED:

8.1 Spontaneous cough that fails to clear secretions from the airway

8.2 Ineffective spontaneous cough as judged by

8.2.1 clinical observation

8.2.2 evidence of atelectasis

8.2.3 results of pulmonary function testing

8.3 Postoperative upper abdominal or thoracic surgery patient(7)

8.4 Long-term care of patients with tendency to retain airway secretions

8.5 Presence of endotracheal or tracheostomy tube

DC 9.0 ASSESSMENT OF OUTCOME:

9.1 The presence of sputum specimen following a cough(4)

9.2 Clinical observation of improvement

9.3 Patient's subjective response to therapy

9.4 Stabilization of pulmonary hygiene in patients with chronic pulmonary disease and a history of secretion retention

DC 10.0 RESOURCES:

10.1 Equipment:

10.1.1 Material (such as tissues or gauze pads to cover mouth during cough and for disposal of expectorated secretions

10.1.2 Support devices for the patient with incisional pain or chest-wall pain during cough (eg, folded blanket, pillow, palmed hands,20or other devices)

10.1.3 Container for collecting expectorated sputum

10.1.4 Gloves, goggles, gown, and mask(21,22) (Mask should be designed to prevent transmission of droplet nuclei, eg, a disposable personal respirator(21))

10.1.5 Teaching materials and models

10.2 Personnel:

10.2.1 Level I personnel may be providers of service after Level II personnel have performed initial assessment of the patient and the first episode of training has been completed. (It is recommended that Level II personnel be credentialed, eg, CRTT, RRT, PT, or RN.)**Level I** personnel must demonstrate

10.2.1.1 proper use and limitation of equipment;

10.2.2.2 ability to assess patient's condition and response to therapy;

10.2.1.3 understanding of the procedures, indications, contraindications, and hazards of cough;

10.2.1.4 understanding of and compliance with Universal Precautions and infection control standards;(20,21)

10.2.1.5 Ability to instruct patient and family or caregiver in techniques and goals of therapy.

10.2.2 The **Level II** provider initially assesses the patient, determines the need for specific coughing techniques, and evaluates response to and effectiveness of cough. Level II personnel have all the skills of Level I providers plus

10.2.2.1 knowledge and understanding of patient's disease, goals, and limitation of cough;

10.2.2.2 ability to assess patient cough technique and perform initial instruction and treatment;

10.2.2.3 ability to make recommendations for changes in the patient's care, as indicated;

10.2.2.4 ability to teach the patient to respond appropriately in the home environment to changes in sputum quantity and quality.

10.2.3 The **subject** (patient) performing cough and FET without supervision should possess knowledge and skills related to

10.2.3.1 proper technique of related procedures;

10.2.3.2 possible hazards and complications;

10.2.3.3 technique modification in response to outcomes of therapy;

10.2.3.4 assessment and documentation of outcomes of cough with regard to sputum quantity, color, and other relevant characteristics;

10.2.3.5 appropriate response (according to established home prescription) to changes in sputum production.

DC 11.0 MONITORING:

Items from the following list should be chosen as appropriate for monitoring a patient's response to cough technique.

11.1 Patient response: pain, discomfort, dyspnea

11.2 Sputum expectorated following cough to note color consistency, odor, volume of sputum produced

11.3 Breath sounds

11.4 Presence of any adverse neurologic signs or symptoms following cough(15)

11.5 Presence of any cardiac dysrhythmias or alterations in hemodynamics following coughing

11.6 Measures of pulmonary mechanics, when indicated, may include vital capacity, peak inspiratory pressure, peak expiratory pressure, peak expiratory flow, and airway resistance

DC 12.0 FREQUENCY:

12.1 Cough procedures should be performed as frequently as needed. No data exist to support a specific frequency.

12.2 Cough should be performed as prophylactic measure by postoperative patients (recommended frequency--every 2-4 hours while awake).

12.3 FET as a therapeutic alternative for postural drainage therapy encompasses multiple maneuvers performed 3 to 4 times daily.

12.4 Cough procedures should be performed in conjunction with other forms of therapy to mobilize and remove secretions, during and at the conclusion of the therapy.

DC 13.0 INFECTION CONTROL ISSUES:

13.1 Cough is a source of droplet nuclei (aerosols) that can remain suspended in the air for hours and are associated with transmission of tuberculosis and other airborne pathogens. Care must be taken to minimize exposure of the health care worker and others.(22)

13.1.1 The single most effective step to reduce transmission of the droplet nuclei is to have the patient cover his or her mouth when coughing.

13.1.2 Local exhaust ventilation and personal protective equipment should be used to minimize exposure to airborne pathogens.(22)

13.1.3 Universal Precautions should be followed.(21)

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