

Respiratory Assessment



Objectives

- Review respiratory anatomy and physiology
- Appreciate components of comprehensive respiratory assessment
- Identify a systematic approach to respiratory assessment and priorities.
- Discuss characteristics respiratory distress and potential red flags
- Discuss diagnostics and monitoring to aid respiratory assessment.

Respiratory Assessment

- Primary Survey
- Clinical History (AMPLE / signs and symptoms)
- Focused respiratory assessment
 - Inspection
 - Palpation
 - Percussion
 - Auscultation

Primary Survey

- Are immediate interventions required?
- Does the patient's condition warrant escalation or transfer to an area of higher acuity within the department?
- Gross signs of respiratory compromise that may be identified during the primary survey requiring immediate intervention include:
 - Evidence of airway obstruction or compromise
 - Increased respiratory effort and marked accessory muscle use
 - Tachypnoea, decreased speech tolerance
 - Pallor or cyanosis
 - Hypoxia despite oxygen therapy
 - Paradoxical chest wall movement
 - Decreased air entry
 - Altered level of consciousness.

Clinical History

Chief Complaint:

- Main reason that patient came to ED in their own words.

AMPLE: Allergies, Medications, Past medical History, Last ate/menstrual period, Events leading to presentation.

Signs and symptoms:

• Dyspnoea:

- Onset and duration: sudden, gradual, episodic or continuous
- Characteristics: related to position, time of day, activity or miscellaneous
- Acuity
- Provoking factors: anxiety, exercise, environment
- Palliative factors
- Associated symptoms: chest pain, cough, diaphoresis, oedema
- Self treatment and effectiveness

Clinical History

- **Chest Pain:**
 - **PQRST:**
 - Palliative and provoking factors
 - Quality of pain
 - Radiation and region of pain
 - Severity of pain
 - Time of onset and length.
 - **Associated symptoms: diaphoresis, nausea etc.**
 - **Self treatment and effectiveness.**

Clinical History

- **Sputum production:**

- Onset and duration
- Characteristics: colour, consistency
- Associated symptoms e.g. vomiting, fever, SOB.
- Self treatment and effectiveness

- **Cough:**

- Onset and duration
- Characteristics: dry vs moist, ?productive, postural influences
- Associated symptoms
- Self treatment and effectiveness.

- **Family History:**

- Illness in parents or siblings: pulmonary, cardiac, cancer

Physical Examination:

- Inspection
- Auscultation
- Palpation
- Percussion

Physical Examination: Inspection

General:

- Level of consciousness
- Agitation / anxiety
- Speech:
 - sentences / phrases / words / unable to speak
 - quality (hoarseness)
- Skin colour:
 - pallor / cyanosis
- Exercise tolerance / body position

Physical Examination: Inspection

Head and neck

- Nasal flaring
- Pursed lip breathing
- Mouth vs. nose breathing
- Evidence of trauma: deformity, bruising, wounds, swelling, burns.
- Tracheal position
- Tracheal tug

Physical Examination: Inspection

Thorax

- Symmetry of chest wall movement
- Accessory muscle use, recession
- Rate, rhythm, pattern of breathing
- Evidence of trauma, wounds, deformity, flail, bruising, scars
- AP vs transverse diameter of chest
- Alignment of spine: presence of kyphosis, scoliosis

Physical Examination: Inspection

Extremities

- Clubbing
- Oedema
- Peripheral cyanosis

Physical Examination: Auscultation

In normal chest, 4 types of sounds are usually heard.

- Vesicular: quiet low pitched, longer inspiratory than expiratory phase, heard in most lung fields.
- Bronchovesicular: medium in pitch, inspiratory and expiratory phase equal in length.
- Bronchial: higher pitched and louder than vesicular, expiratory is longer than inspiratory phase, heard around 2nd and 3rd intercostal space anteriorly.
- Tracheal: loud, high pitched, approx. equal inspiratory and expiratory phase, heard over trachea.

Physical Examination: Auscultation

Abnormal Breath Sounds:

- **Crackles:** discontinuous sounds, soft, high-pitched, popping sounds most common during inspiration.
 - **Come from fluid in airways or from opening of collapsed alveoli.**
- **Wheezes:** continuous musical sounds and persist through respiratory cycle.
 - **Caused by air movement through narrowed or partially obstructed airway, e.g. asthma, COPD, bronchitis.**

Physical Examination: Auscultation

Abnormal Breath Sounds:

- Rhonchi: continuous breath sound, low-pitched rumbling noises
 - Indicates presence of secretions in large airways. Conditions include bronchitis
 - These sounds may clear with coughing.
- Friction rub: crackling grating sound heard more often with inspiration than expiration
 - Can be present with pleural effusion, pleurisy, pneumothorax.

Physical Examination: Palpation

Palpate structures in the neck and thorax to locate abnormalities.

- Neck
 - position of the trachea
 - subcutaneous emphysema.

Physical Examination: Palpation

Chest:

- Palpate thorax systematically, comparing left from right.
- Identify:
 - Areas of bony or soft tissue tenderness, crepitus, depressions, bulges, pulsations, paradoxical movement and subcutaneous emphysema.
 - Subcutaneous emphysema
 - Assess respiratory excursion (expansion).
 - Identify tactile fremitus.

Physical Examination: Percussion

Percussion is used to help assess underlying structures of the chest wall.

- Usual sound is resonant or hollow.
- Dull note: medium in intensity and pitch, heard if atelectasis or consolidation present.
- Tympanic sound: high pitched heard if large pneumothorax or asthma present.
- Flat note: large pleural effusion.

Base Line Observations:

- Include: GCS, Respiratory Rate, BP, Heart Rate, SaO₂, Temperature Spirometry/peak flow. BSL on known diabetics and those on steroids.
- Monitoring: SaO₂, Cardiac.
 - SaO₂ required on admission for people with respiratory distress.
 - If cardiac involvement is queried, ECG monitoring should also be used.
- SaO₂: measures arterial oxygen saturation of haemoglobin.

Diagnostics and Monitoring

Follow local protocols: may incorporate

- ECG
- IVC, Bloods: FBC, EUC, cardiac set if ? Ischaemia origin to dyspnoea.
- An ABG/VBG may be indicated: helps to determine quality and extent of pulmonary gas exchange and acid-base state.
- Spirometry / peak flow
- CXR

Spirometry

- Assesses airflow limitation.
- Enables clinicians to detect and restrictive and obstructive respiratory diseases, and gauge severity of illness.

Restrictive & Obstructive Pulmonary Diseases

Restrictive.

- Lungs not able to expand normally, thereby decreasing volume inspired & expired.
- Examples: ARDS, obesity restricting lung expansion.

Obstructive.

- Gas flow into and out of lungs is obstructed.
- Examples: CAL, asthma
- Asthma: obstruction is in airways
- CAL: obstruction is due to lack of recoil in alveoli.

Spirometry

- Spirometry measures both volume and flow of air.
- 2 important tests are Forced Vital Capacity (FVC) and Forced Expiratory Volume (FEV)
- FVC: measures maximal volume of air that can be exhaled.
- FEV: measures volume of air exhaled during the first second of the exercise.
- Ratio of these measurements (FEV1:FVC) is calculated. Patients with CAL will have decreased readings below the norm.
- A FEV1:FVC ratio of less than 80% of the predicted value is indicative of respiratory disease.
- Predicted value is dependant on age, height, sex.

Spirometry technique

- Get patient to sit up, take deep breath, immediately place mouthpiece between teeth, make firm seal around tube with lips, then exhale as hard and long as possible down the meter.
- Test should be repeated minimum of 3 times.
- Value of more than 80% of predicted value is considered normal

Common Nurse Initiated medications for respiratory presentations:

- Salbutamol
- Ipratropium Bromide

Key Points

- Respiratory deterioration is a common reason for presentation to an Emergency Department
- The aim of respiratory assessment is to determine respiratory status, identify deterioration in patients at risk and to guide and evaluate the effectiveness of treatment.
- A comprehensive respiratory assessment includes a relevant patient history and physical assessment incorporating inspection, percussion, palpation, and auscultation.
- Physical assessment can be further informed by appropriate use of investigations such as pulse oximetry, radiography, peak flows and spirometry.
- Accurate respiratory assessment should inform investigations and plan of care as well as resource and environment allocation to maintain patient safety.

QUESTIONS?

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