

Module B

Respiratory Alterations

NUR 203

Head & Neck Cancer

Patho	Etiology	S/S	Treatment
<p>Disrupts breathing, eating, facial appearance, self-image, speech, communication.</p> <p>Usually squamous cell; slow growing.</p> <p>Untreated – fatal in 2 years. Leukoplakia or Erythroplasia.</p> <p>Degree of Malignancy: Carcinoma in situ, Well differentiated, Moderately differentiated, Poorly differentiated.</p>	<p>Tobacco and alcohol – especially in combo. Others: voice abuse, chronic laryngitis, exposure to chemicals, dusts, and poor oral hygiene. Men > women. > 60.</p>	<p>Pain; Lump in mouth, throat, or neck; Difficulty swallowing; Color Δ in mouth or tongue to red, white, gray, dark brown, or black; oral lesion or sore don't heal in 2 weeks; Persistent or unexplained oral bleeding; Numbness of mouth, lips, or face; Change in fit of dentures; Burning sensation when drinking citrus juices or hot liquids; Persistent, unilateral ear pain; Hoarseness or Δ in voice quality; Persistent or recurrent sore throat; SOB; Anorexia and weight loss</p>	<p>Based on cell type and degree of spread.</p>
			<p style="text-align: center;">Priority Problems</p>
			<p>Potential for respiratory obstruction; Risk for aspiration; Anxiety; Reduced self-concept</p>
			<p style="text-align: center;">SX Post Op</p>
			<p>Maintain airway; Wound, flap, and tissue care; Hemorrhage; Wound breakdown; Pain mgmt; Nutrition; Speech rehab.</p>

Head & Neck Cancer Continued

Procedure	Description	Resulting Voice Quality
Laser Surgery	Tumor reduced or destroyed by laser beam through laryngoscope	Normal/hoarse
Transoral cordectomy	Tumor (early lesion) resected through laryngoscope	Normal/hoarse (high cure rate)
Laryngofissure	No cord removed (early lesion)	Normal (high cure rate)
Supraglottic partial laryngectomy	Hyoid bone, false cords, and epiglottis removed. Neck dissection on affected side performed if nodes involved	Normal/hoarse
Hemilaryngectomy or vertical laryngectomy	One true cord, one false cord, and one half of thyroid cartilage removed	Hoarse
Total laryngectomy	Entire larynx, hyoid bone, strap muscles, one or two tracheal rings removed. Nodal neck dissection if nodes involved.	No natural voice; produces Δ in airflow for breathing and speaking

Head & Neck Cancer Continued
Community Based Care After Laryngectomy

- Assess respiratory rate.
- Assess Condition of wound
- Assess patient's psychosocial status
- Take patient's temperature at each home care visit.
- Assess the patient's understanding of illness and adherence to treatment.
- Assess patient's nutritional status.

Lung Cancer

Patho	Etiology	S/S	Treatment
<p>Leading cause of cancer; Prognosis poor unless entire tumor can be removed surgically; Small cell, epidermoid, adenocarcinoma, and large cell cancers. Mets thru direct extension by blood (hematogenous), & thru invasion; Emboli to bone, liver, brain, & adrenal glands; Staging thru TNM classification</p>	<p>Repeated exposures to inhaled carcinogens; Cigarette smoking; 2nd hand smoke; Exposure to asbestos, beryllium, chromium, coal, cobalt, iron oxide, mustard gas, petroleum distillates, radiation, tar, nickel, and uranium; Air pollution</p>	<p>Hoarse cough; Blood-streaked sputum; Rust-colored or purulent sputum; Wt. Loss; Fatigue; Effusion; Tumor; Δ in Respiratory pattern; Persistent or Δ in cough; Frank hemoptysis; Chest pain or chest tightness; Shoulder, arm, or chest wall pain; Recurring episodes of pleural effusion, pneumonia, or bronchitis; Dyspnea, Fever associated w/one 1 or 2 other signs; Wheezing; Clubbing of the fingers</p>	<p>Lobectomy; Pneumonectomy; Segmental resection; Wedge resection; Thoracentesis; Pleurodesis; Rad./Chemo</p>
			<h3 style="margin: 0;">TX Considerations</h3>

Pulmonary Embolism (PE)

Patho	Etiology	S/S	Treatment
<p>Collection of particulate matter that enters venous circulation and lodges in the pulmonary vessels. Obstructs blood flow → ↓ oxygenation → pulmonary tissue hypoxia → death; usually caused by blood clot; PE is the most common acute pulmonary DZ in hospitalized clients</p>	<p>Prolonged immobility; central venous catheters; Surgery; Obesity; Advancing age; Conditions that ↑ blood clotting; HX of thromboembolism; Smoking; Pregnancy; Estrogen therapy; Heart failure; Cancer; Trousseau's syndrome; Trauma</p>	<p>Dyspnea, sudden onset; Sharp, stabbing chest pain; Apprehension, restlessness; Feeling of impending doom; Cough; Hemoptysis; Tachypnea (↑ RR); Crackles; Pleural friction rub; Tachycardia (↑ HR); S3 or S4 heart sound; ↓ BP; JVD; Bounding Pulses; Diaphoresis; Fever, low-grade; Petechiae over chest and axillae; Decreased arterial O2 Sat</p>	<p>High Fowler's; Reassurance; O2 via Cannula; Telemetry; Assess Resp. status q 30 min. and cardiac status; Examine thorax for petichiae; Anticoag; Handle gently; Assess Bleeding q 2 hrs.; Abd. Girth q 8 hrs.</p>
			<p>Priority Problems</p>
			<p>Hypoxemia; Hypotension; Potential for bleeding; Anxiety</p>

ARDS

Patho	Etiology	S/S	Treatment
Persistent Hypoxemia despite 100% O ₂ ; ↓ pulmonary compliance; Dyspnea; Non-cardiac associated bilateral pulmonary edema; Dense pulmonary infiltrates on CXR	Indirect lung injury; Direct lung injury; Inflammatory response; Shock; Trauma; Serious nervous system injury; Pancreatitis; Fat & amniotic fluid emboli; Pulmonary infections; Sepsis; Inhalation of toxic gases; Pulmonary aspiration; Drug ingestion; Hemolytic disorders; Multiple blood transfusions; Cardiopulmonary bypass; Submersion in water w/water aspiration	1st Stage: Fluid in interstitial space. Early dyspnea & tachypnea; support/O ₂ 2nd Stage: Fluid in alveoli – patchy infiltrates; mech vent 3rd Stage: Day 2 – 10; respond poorly to ↑ O ₂ ; .↑ CO ₂ 50; ↓ PaO ₂ 60; ↓ PH 7.30 & 4th Stage: Starts after 10 days; irreversible; late or chronic ARDS; prevent sepsis, pneumonia, MODS, wean from vent.	Corticosteroids – prednisone, solu-medrol; Antibiotics; Turn patient q 1 -2 hr.

Endotracheal Intubation

- During intubation, the nurse coordinates the response and continuously monitors for changes in vital signs, signs of hypoxia, or hypoxemia, dysrhythmias, and aspiration.
- Ensure that each intubation attempt lasts no longer than 30 seconds preferably less than 15 seconds. After 30 seconds, provide O₂ by means of a mask and manual resuscitation bag to prevent hypoxia and cardiac arrest.
- Check placement by end tidal carbon dioxide levels and by chest x-ray. Check for breath sounds bilaterally, symmetric chest movement, and air emerging from the ET tube.
- Nursing Care – Neck flexion moves the tube away from the carina; neck extension moves the tube closer to the carina.

Mechanical Ventilation

Types	Modes	Settings	Interventions	Weaning
<p>Pressure-cycled – Push air into the lungs until a preset airway pressure is reached.</p> <p>Time-cycled – Push air into the lungs until a preset time has elapsed.</p> <p>Volume-cycled – push air into the lungs until a preset volume is delivered.</p> <p>Microprocessors – are computer-managed positive-pressure</p>	<p>AC (Assist control) – used often as a resting mode. Vent takes over work of breathing for the patient. Does not allow spontaneous breathing.</p> <p>SIMV (Synchronized intermittent mandatory ventilation) – If patient does not breathe, a vent pattern is established by</p>	<p>Tidal Volume (VT) – volume of air received w/each breath. Average setting = 7 – 10 mL/kg of body wt. Adding 0 to wt. in kg is estimate.</p> <p>Rate - # of breaths per minute usually 10 – 14.</p> <p>FiO₂ – O₂ (humidify & warm) delivered to pt. based on ABG's: 21% - 100%.</p>	<p>Mouth care q 8 hrs.; Strict oral care q 2 hours; Monitor VS q 30 min to 1 hr at 1st.</p>	<p>Synchronous Intermittent Mandatory Ventilation; T-Piece Technique; Pressure Support Ventilation</p> <p>Monitor VS after extubation q 5 min. at 1st, and and assess the ventilator pattern for manifestations of respiratory distress. Sit in semi-fowler's position, take deep breaths q half-</p>

ventilators	ventilator. Does allow spontaneous breathing. Weaning. BiPAP – noninvasive pressure support ventilation by nasal mask or face mask.	PIP – pressure used by ventilator to deliver a set tidal volume at a given lung compliance. CPAP – applies positive airway pressure during the entire respiratory cycle for spontaneously breathing pts. 0 vent breaths given PEEP – Positive pressure exerted during expiration. Flow Rate – How fast each breath is delivered and is usually set to 40 L/min.		hour, incentive spirometer q 2 hrs., limit speaking.
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High-Pressure Alarm

Sounds when peak inspiratory pressure (PIP) reaches the set alarm limit (usually set 10-20 mm Hg above the patient's baseline PIP)

An ↑ amount of secretions or a mucus plug is in the airways	Suction as needed.
The patient coughs, gags, or bites on the oral ET tube	Insert oral airway to prevent biting the ET tube
The patient is anxious or fights the ventilator	Provide emotional support to ↓ anxiety; ↑ the flow rate; Explain all procedures; sedation or paralyzing agent per the physician's prescription.
Airway size ↓ related to wheezing or bronchospasm	Auscultate breath sounds
Pneumothorax occurs	Alert the physician or rapid response team for management of bronchospasm; Auscultate breath sounds; Alert the physician or Rapid Response Team about a new onset of ↓ breath sounds or unequal chest excursion, which may be d/t pneumo

<p>Artificial airway is displaced; the ET tube may have slipped into the right mainstem bronchus</p>	<p>Assess the chest for unequal breath sounds and chest excursion; Obtain a CXR as ordered to evaluate the position of the ET tube; After the proper position is verified, tape the tube securely in place</p>
<p>Obstruction in tubing occurs because the patient is lying on the tubing or there is water or a kink in the tubing</p>	<p>Assess the system, moving from the artificial airway toward the ventilator</p>
<p>There is \uparrow PIP associated w/deliverance of a sight</p>	<p>Empty water from the ventilator tubing, and remove any kinks; Coordinate w/respiratory therapist or physician to adjust the pressure alarm.</p>
<p>\downarrow compliance of the lung is noted; a trend of gradually \uparrowing PIP is noted over several hours or a day</p>	<p>Evaluate the reasons for the \downarrow compliance of the lungs; \uparrow PIP occurs in ARDS, pneumonia, or any worsening of pulmonary disease</p>

Low-Pressure Alarm

Low exhaled volume (Low-Pressure Alarm) sounds when there is a disconnection or leak in the ventilator circuit or a leak in the patient's artificial airway cuff

A leak in the ventilator circuit prevents breath from being delivered	Assess all connections and all ventilator tubings for disconnection
The patient stops spontaneous breathing in the SIMV or CPAP mode or on pressure support ventilation	Evaluate the patient's tolerance of the mode
A cuff leak occurs in the ET or tracheostomy tube	Evaluate the patient for a cuff leak. A cuff leak is suspected when the patient can talk (air escapes from the mouth) or when the pilot balloon on the artificial airway is flat

Chest Trauma

Blunt Chest Trauma	Pulmonary Contusion	Flail Chest
<p>More common, harder to determine extent</p> <p>Cause: Sudden compression or positive pressure to the chest wall MVA, steering wheel, seat belt, falls , bicycle crashes</p> <p>Types: Fractured sternal and ribs, flail chest, pulmonary contusion</p>	<p>Potentially lethal Most common chest injury seen in the US Respiratory failure over time</p> <p>Present with bloody sputum, decreased BS, crackles and wheezes Treat by maintaining O₂ , monitor CVP, restrict fluid intake May need vent support Can lead to ARDS</p>	<p>Inward movement of the chest during inspiration and outward movement during expiration Results from multiple rib fractures Assess for paradoxical chest movement, dyspnea, cyanosis, tachycardia, and hypotension</p>

Chest Trauma Continued

Pneumothorax	Tension Pneumothorax	Hemothorax
<p>Chest injury that allows air to enter the pleural space Often seen with blunt chest trauma Can be open or closed</p> <p>Assessment: ↓ BS, Hyperresonance, Prominence of involved side, Deviation of trachea, Subcutaneous emphysema</p>	<p>Life-threatening complication of blunt chest trauma</p> <p>Assessment: Asymmetry of thorax, Tracheal deviation toward the unaffected side, Respiratory distress, Absence of BS on one side, Distended neck veins, Cyanosis, Hypertympanic sound on percussion on affected side</p> <p>Treat with needle decompression and CT insertion</p>	<p>Simple—blood loss <1500 mL into the chest Massive—blood loss >1500 mL into the chest</p> <p>Caused by blunt or penetrating chest trauma</p> <p>Assessment findings depend on size of hemothorax</p> <p>Treat with CT insertion or open thoracotomy</p>

Pleural Effusion

Patho	S/S	Treatment
<p>Collection of fluid in the pleural space, usually secondary to other disease</p> <p>Causes:</p> <p>Heart failure, TB, neoplastic tumors, PE, connective tissue diseases</p> <p>Clear, bloody, or purulent transudate vs. exudate</p>	<p>Dyspnea</p> <p>Pleuritic chest pain</p> <p>Decreased or absent breath sounds</p> <p>Confirm with CXR</p> <p>Pleural biopsy with fluid analysis</p>	<p>Nonsurgical:</p> <p>Thoracentesis</p> <p>Pleurodesis</p> <p>CT insertions</p> <p>Surgical:</p> <p>Pleurectomy with catheter insertion</p> <p>Pleuroperitoneal shunt</p>
		<p>Pain Management</p>
		<p>PCA pump</p> <p>Thoracic epidural block</p> <p>Intercostal nerve block</p> <p>Intermittent analgesics</p> <p>Intrapleural administration of opioids</p>

Pulmonary Edema

Patho	S/S	Interventions
<p>Complication of Heart Failure</p> <p>Life-threatening event</p> <p>LV cannot eject enough volume and pressure increases in the lungs due to increased volume</p> <p>Increased pressure causes fluid to leak across the capillaries and into lung tissue</p>	<p>Early s/s:</p> <p>Crackles in the bases</p> <p>Dyspnea @ rest</p> <p>Disorientation</p> <p>Anxiety</p> <p>Tachycardia</p> <p>Increased work of breathing</p> <p>Pink, frothy sputum with progression</p>	<p>Positioning</p> <p>High-flow oxygen to keep SaO₂ >90%</p> <p>NTG sl q5m X 3</p> <p>Diuretics—furosemide is the drug of choice</p> <p>MS</p> <p>Other medications</p> <p>Monitor VS</p> <p>Ultrafiltration</p>

Respiratory Medications

Bronchodilators	Spasmolytic Bronchodilator	Anticholinergic Bronchodilator
<p style="text-align: center;">albuterol</p> <p>Uses: asthma, acute bronchospasm, bronchitis, and emphysema</p> <p>Side Effects: tremors, anxiety, dizziness, palpitations, flushing, and nausea</p>	<p style="text-align: center;">aminophylline & theophylline: relaxes smooth muscle of respiratory system</p> <p>Uses: bronchial asthma, bronchospasm associated with chronic bronchitis, and emphysema</p> <p>Side Effects: anxiety, restlessness, insomnia, dizziness, seizures, dysrhythmias</p> <p>MONITOR DRUG LEVELS</p> <p>Drug Levels: Therapeutic dose – 10-20 mcg/mL; Toxic Level - > 20 mcg/mL</p>	<p style="text-align: center;">ipratropium</p> <p>Inhibits interaction of acetylcholine at receptor sites on the bronchial smooth muscle; resulting in bronchodilation</p> <p>Uses: COPD</p> <p>Side Effects: anxiety, dizziness, headache, palpitations, no pee, no spit, DRY, constipation</p>

Respiratory Medications Continued

Anti-Inflammatories	Diuretics	Anticoagulants	Anticoagulant & Antithrombotic
<p>prednisone Uses: severe inflammation, immunosuppression, Side Effects: flushing, hypertension, thrombophlebitis, embolism, GI hemorrhage, increased appetite</p> <p>corticosteroids Uses: prevention of chronic asthma Side Effects: fever, bronchospasm, nervousness</p>	<p>furosemide Loop Diuretic: inhibits reabsorption of sodium and chloride at proximal and distal tubule and in the Loop of Henle Uses: pulmonary edema, edema in heart failure, hypertension Side Effects: Circulatory collapse, renal failure, loss of hearing</p>	<p>warfarin Uses: pulmonary emboli, DVT, atrial fibrillation, valve replacement Side Effects: hematuria, hemorrhage</p>	<p>heparin Uses: prevention of DVT, pulmonary emboli, MI, open heart surgery, atrial fibrillation Side effects: hematuria, hemorrhage</p>

Respiratory Labs

PT & INR	PTT	D-Dimer
<p>Used to monitor adequacy of anticoagulation in pt. receiving Coumadin</p> <p>Measures how long blood takes to clot: Reflects how much of the clotting factors II, V, VII, and X are present</p> <p>Normal: 11.0 – 12.5 sec.</p> <p>Therapy is considered appropriate when PT is prolonged by 1 ½ to 2 times the client's normal PT value</p> <p>INR: International Normalized Ratio</p> <p>Calculated by dividing the pt. PT by established standard PT</p> <p>Normal: 0.7 – 1.8</p> <p>Using INR to monitor Coumadin therapy: goal is maintain the pt. INR @ 2.0 and 3.0 regardless of the actual PT</p>	<p>PTT- used to monitor Heparin therapy</p> <p>Used to assess the intrinsic system and the common pathway of clot formation; evaluates factors I, II, V, VIII, IX, X, XI, and XII</p> <p>Normal: 25-35 seconds ; anticoagulant therapy: 1.5-2.5 times control value</p> <p>Critical value: >70 seconds (if not on anticoagulant therapy)</p>	<p>Normal finding: negative</p> <p>Provides a simple and confirmatory test for DIC (disseminated intravascular coagulation)</p> <p>Levels of D-dimer also increase with thrombotic problems such as: DVT and pulmonary embolism</p>

Arterial Blood Gases

Used for DX & management of patient's oxygenation status and acid-base balance.

Acidotic State	Alkalotic State	Acid-Base Balance
Decrease the force of cardiac contractions Decrease the vascular response to catecholamines Diminish response to effects of some medications	Interferes with tissue oxygenation Interferes with normal neurological and muscular function	Maintained by: Respiratory buffer response: increase or decrease in the rate and depth of respirations until appropriate amount of CO ₂ in blood-compensation begins in 1-3 minutes Renal Buffer response: regulates pH by excreting or retaining bicarbonate (HCO ₃)-may take hours or days to correct imbalance

Components of Arterial Blood Gases

pH	PaO ₂	SaO ₂	PaCO ₂	HCO ₃	B.E.
measurement of acidity and alkalinity based on the hydrogen ion concentration normal range is 7.35-7.45	partial pressure of oxygen that is dissolved in arterial blood normal range is 80 to 100mm Hg	arterial oxygen saturation normal range is 95%-100%	amount of carbon dioxide dissolved in arterial blood normal range; 35-45mm Hg	amount of bicarbonate in the blood stream normal range; 22-26 mEq/liter	base excess indicates the amt. of excess or insufficient level of bicarbonate in the system normal range; -2 to +2 mEq/liter

ABG Disorders

Respiratory Acidosis	Respiratory Alkalosis
pH less than 7.35 and a PaCO ₂ greater than 45 mm Hg; caused by any condition that results in hypoventilation - sleeping	pH greater than 7.45 and a PaCO ₂ less than 35 mm Hg; caused by an condition that causes hyperventilation – Anxiety, Renal Failure
Metabolic Acidosis (ass/diarrhea)	Metabolic Alkalosis (↑ pee/vomit)
pH of less than 7.35 and a bicarbonate level of less than 22 mEq/L; caused by either a deficit of base in the blood stream or an excess of acids, other than CO ₂	pH greater than 7.45 and bicarbonate greater than 26 mEq/L; caused by an excess of base or a loss of acid within the body

Causes of Acid-Base Balance

Metabolic Acidosis

- Diabetic ketoacidosis**
- Diarrhea**
- Renal failure**
- Shock**
- Aspirin overdose**
- Sepsis**

Metabolic Alkalosis

- Loss of gastric secretions**
- Overuse of antacids**
- K⁺ wasting diuretics**

Respiratory Acidosis

- Hypoventilation**
- COPD**
- Airway obstruction**
- Drug overdose**
- Chest trauma**
- Pulmonary edema**
- Neuromuscular disease**

Respiratory Alkalosis

- Hyperventilation**
- Hypoxia**
- Anxiety**
- High altitude**
- Pregnancy**
- Fever**

ABG's

Marching Band Suit

Match PH w/Resp. or Metab.

ROME

Respiratory Opposite
Metabolic Equal

PH Normal = Fully
Compensated
All Values Abnormal =
Partially Compensated

	A	B
PH	7.35	7.45
	B	A
PcO2	35	45 Resp
	A	B
HcO3	22	26 Metab.

Common Conversions

1 tsp	=	5 mL
1 Tbsp	=	3 tsp or 15 mL
1 oz	=	30 mL
8 oz	=	1 cup or 240 mL
1 pint	=	1 lb or 16 oz
1 kg	=	1000 g
1 g	=	1000 mg
1 mg	=	1000 mcg
1 L	=	1000 mL

Labs	Normal	Labs	Normal
Na+ (Sodium)	135-145	K+	3.5-5.0
Cl+	98-106	Ca+	9.0-10.5
Albumin (Liver)	3.5-5.0	Crea (Kidney)	0.7-1.3
BUN (Kidney)	8-25	Glucose	70-110
WBC	5,000-10,000	RBC	(M)4.7-6.1 (F)4.2-5.4
Hgb	(M)14-18(F)12-16	Hct	(M)42-52(F)37-47
PLTS (ASA)	150,000-400,000 (↑Clot; ↓Bleed)	Mag	1.6-2.6
PT (Heparin)	11-15	PTT (Heparin)	30-60
INR (Coumadin)	0.9-1.2	ALT (Liver)	(M)10-40(F)7-35
ALT (Liver)	(M)10-40(F)7-35	AST (Liver)	12-31
SG (Kidney)	1.005-1.03 (SIADH↑;DI↓)	Amylase	25-151
Ammonia	10-80	T3	70-205
T4	4-12	TSH	0.3-5 (Hypo↑;Hyper↓)

Platelets

Platelets = 150,000 – 400,000

Platelets \uparrow = Clot

Platelets \downarrow = Bleed

PT used for Heparin

H/H = 1/3 ratio = **HgB**: 15

HCT: 45