

NURS 821 Alterations in Respiration and Ventilation

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Lecture 7
Part 1 Alterations in Ventilation

Smoking: Number 1 Risk Factor for Heart and Lung Disease

- Lung Disease-Emphysema, Chronic Bronchitis, Asthma, Interstitial Lung Diseases (Asbestosis, Silicosis, Coal Miners' Lung, etc.)
- Heart Disease-Coronary Artery Disease, Atherosclerosis, Peripheral Vascular Disease

Smoking Issues

- Chronic adolescent smoking associated w anxiety disorders in adulthood.
 - Effect might be mediated through effect on respiration



Johnson, J. et al. (2000). Association between cigarette smoking and anxiety disorders during adolescence and early adulthood. *JAMA*, 284, 2348-2351.

Air Pollution and Lung Function in Children

- 10 year study conducted in Southern California
- Studied lung function of 3,000 children
- Found as children grow, those with exposure to greater smog, tended to lag in lung function
- Effects most evident in those aged 10-14; stronger in children who spend more time outdoors
- Ozone not a major role. Offenders were nitrogen dioxide, acid vapors, and particulate matter. (NIEHS, 2000)

Ventilation

Definition-Inhalation of O_2 and exhalation of CO_2

Perfusion

Definition-Blood delivery of nutrients

Diffusion

Definition-Exchange
of O_2 and CO_2 across
alveolar capillary
interface

Alterations in Ventilation

Clinical conditions

Impaired Neurological Control of Respiration

- Examples-?

Impaired Neurological Control of Ventilation

- Respiratory depression-CO₂ narcosis, sedatives, anesthetics, overdoses
- Neurological and musculoskeletal diseases-
- Guillain Barre, Myasthenia Gravis, Muscular Dystrophy, etc.

Chest Wall Restriction

- Examples-?

Ventilation

- Structural chest wall restriction
 - Scoliosis
 - kyphoscoliosis



Upper Airway Obstruction

Upper Airway Obstruction

- Foreign body aspiration-popcorn, hot dogs, grapes
- URI, especially in young children who have narrower airways and looser tissues
- Croup, laryngeal tracheobronchitis, tracheitis
 - Usually follow a viral URI, exacerbate at night and alleviated by cold, moist, air

Respiratory Syncytial Virus (RSV)

- Common UR virus causing URI in adults
- Prevalence-increased in winter months
- Newborns-deadly due to inflammation and airway obstruction
- Course-prolonged; treatment symptomatic
- May increase asthma incidence in children

Sleep Apnea

- Excess somnolence leads to apnea
- M>F until menopause
- Progesterone is a respiratory stimulant and may protect Females until post-menopause
- Characteristics:
 - Periodic breathing and apneic episodes in stages I, II, and REM sleep; associated with decreased O₂ sat. and increased arousal; frequent arousal interrupts sleep cycle

Sleep Apnea Types

- **Central apnea**-altered chemosensitivity and cerebral respiratory cycle
- **Obstructive apnea**-partial or complete obstruction of upper airways (kids-usually tonsillitis)
- **Mixed apnea**-both central and obstructive, may be more life threatening
- **Manifestations**-excess snoring, thrashing, somnolence, personality changes, depression
- **Compensatory**-polycythemia
- **Complications**-HTN, RHF

Sudden Infant Death Syndrome (SIDS)

- Decreased incidence with the national "back to sleep" program
- Highest incidence associated with accidental suffocation of infant by soft bedclothes, comforters, blankets, etc.
- Etiology-unknown
- Increased incidence in preemies, multiple births, infants with URIs or recent immunizations.



SIDS (cont'd)

- Increased incidence-1 week-1 year
 - Increased 2-4 mos., to 6 mos.
 - M>F
 - Risk-winter flu season, URI
 - Increased incidence-poor, young unmarried mothers, low birth weight, sibling w SIDS

SIDS Physiological Abnormalities

- | | |
|---|---|
| • Hypoventilation | • Excessive peiodic breathing |
| • Decreased ventilatory response to CO ₂ | • Manifestations-asphyxia, pallor, cyanosis, bradycardia, gasping respiratory efforts, limp, unresponsive |
| • Prolonged sleep apnea | |
| • Frequent short apneic episodes | |
