Monograph On Regulation Of Respiration

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2. Sensory receptors and reflexes: There are three major types of sensory receptors located in the tracheobronchial tree that respond to a variety of different stimuli and result in changes in the lungs's mechanical properties, alteration in the respiratory pattern and the development of respiratory symptoms.

Irritant receptors: They are present in the airway and trachea. Afferent: myelinated vagal fibres. Results in increased airway resistance, cough, apnea. They are otherwise known as rapidly adapting pulmonary stretch receptors.

Slowly adapting stretch receptors: It responds to mechanical stimuli, activated by lung inflation. Afferent: myelinated vagal fibers. Response: delays the onset of next inspiratory effort. It is seen in COPD.

J-Receptors: It is present in the interstitium. They respond to chemical or mechanical stimuli in the interstitium. Afferent: unmyelinated C fibers. It is responsible for dyspnea.

Somatic receptors: Present in the intercostal muscles rib joint etc.

ABNORMALITIES IN CONTROL OF BREATHING:

1. Physiological: during sleep.
2. Pathological : Sleep apnea syndrome – OSA (obstructive sleep apnea), Central sleep apnea syndrome (Ondine's curse and SIDS).
3. Cheyne – stokes breathing : it occurs due to cerebral trauma where the respiratory pattern varies in tidal volume and ventilator frequency.
4. Apneusticbreathing : abnormal breathing pattern characterized by sustained periods of inspiration separated by brief periods of exhalation due to loss in inspiratory inhibitory activities resulting in the augmented respiratory drive. It is seen in CNS injury.

REGULATION OF RESPIRATION DURING EXERCISE:

In strenuous exercise, oxygen consumption and carbondi oxide formation can increase as much as 20 fold. Alveolar ventilation also increases with the increased level of oxygen metabolism. Arterial PO_2, PCO_2, and pH remain almost exactly normal.

Causes: the brain on transmitting motor impulses to the exercising muscles, is believed to transmit at the same time collateral impulses in to the brain stem to excite the respiratory center.

The presumed reason that the ventilation forges ahead of buildup of blood CO_2 is that the brain provides an "anticipatory" stimulation of respiration at the onset of exercise causing extra alveolar ventilation even before it is necessary.

OTHER FACTORS THAT AFFECT RESPIRATION:

- Brain edema – it depresses the respiratory center
- Anaesthesia
- Drugs.