THE RESPIRATORY SYSTEM-PART 2

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In this second presentation on the respiratory system, we're going to be covering diagnostic procedures and treatments used to study and treat the diseases of the respiratory system.

SOME DIAGNOSTIC PROCEDURES

1) **PHYSICAL EXAM**: the doctor may use a **NASAL SPECULUM** to dilate the nares and a **HEAD MIRROR**-worn on the head, to reflect light onto the nose and throat and have a look inside.

2) **SINUS X-RAY**: is useful to diagnose sinusitis.

3) **RHINOSCOPY**: is an endoscopic procedure where a thin lighted flexible tube with a camera on its tip is inserted through the nostril and used to examine the nasal cavity. If the endoscopist continues to pass the tube, its tip will reach the throat, continue down and then the vocal chords can be seen in which case the study is now called a **LARYNGOSCOPY**. The instrument used to do this study is called a **LARYNGOSCOPE**. When the tube is passed down into the bronchi it is then called a **BRONCHOSCOPY**. The doctor sees the images on a monitor screen.

4) **CHEST X-RAY**: is generally the first study used in the work-up of a patient with a cough.

5) **TUBERCULIN TEST aka PPD**: is used to diagnose latent tuberculosis. A solution containing a small amount of TB protein is injected into the skin of the forearm. Seventy-two hours later the patient returns to the office and if he has developed a bump at the injection site that measures 10 mm or more it is considered a positive test and the patient will need some treatment.

6) **SPUTUM SMEAR**: For this study, the patient is asked to cough and the lung secretions that he spits up (called the sputum) are stained with **GRAM STAIN** or other stain and then viewed under the microscope. Useful to detect bacteria or other microorganisms.

7) **CULTURE**: In this case, sputum or a sample of pleural fluid (obtained by placing a needle in the pleural cavity and drawing a sample—a procedure known as a **THORACENTESIS**) is put into a petri dish that contains a growth medium. If germs grow in the medium then the culture is deemed positive. An **antibiogram** is usually also done to test the sensitivity of the germs to antibiotics. This information is useful to
determine which antibiotics to use to treat the infection. Cultures can be done on other body fluids like blood, urine, etc. Cultures are done to diagnose which bacteria or yeast is causing an infection.

There are studies that help the doctors know how well the lungs are working these are:

8) **PULMONARY FUNCTION TESTS**: the most common is called **SPIROMETRY**. The patient is asked to *blow into a mouthpiece* that's plugged into a computer. It measures *AIRFLOW*. The patterns of airflow change when there's lung disease.

9) **PULSE OXIMETER**: is a device that is *placed on a finger* which uses beams of light to detect *how much oxygen the blood is carrying*. If a patient lungs are not working well, the blood oxygen levels will fall. (It also informs the patient's *heart rate*).

10) **ARTERIAL BLOOD GAS**: is done by *drawing blood* not from a vein but *from an artery* like the femoral artery in the *groin* or the radial artery in the *wrist*, to *measure the levels* of O2, CO2 and blood *PH*.

11) **LUNG SCAN**: is an *imaging study* of lung ventilation or blood flow. The patient is *injected* with or *inhales* a *radioactive material* to perform the study. Useful for diagnosing *pulmonary embolism*.

**SOME TREATMENTS**

1) **OXYGEN THERAPY**: when a patient's oxygen levels are low, *supplemental oxygen* can be provided through a *mask* or *NASAL CANNULA*.

2) **DECONGESTANTS**: these medicines come in the form of a *nasal spray* and are used to *relieve nasal congestion* like **OXYMETAZOLINE**. Work by causing vasoconstriction, shrinking the membranes, opening up the nasal passages. Due to the vasoconstriction they cause, these drugs are *not recommended for patients who have high blood pressure*.

3) **BRONCHODILATORS**: like **ALBUTEROL** are administered via *INHALERS* or through a *NEBULIZER* during an *acute asthma attack* to *open the bronchi up* and reduce wheezing. Another bronchodilator that comes in a *pill* is **THEOPHYLLINE** useful in COPD and asthma.

4) **ASMA MAINTENANCE TREATMENT**: this refers to the use of certain drugs to try to prevent or reduce the number of asthma attacks like **ZAFIRLUKAST** which blocks the effect of certain natural substances in the body called *leukotrienes* that cause bronchoconstriction.

5) **EXPECTORANTS/ MUCOLYTICS**: are drugs that aim at *relieving chest congestion*, thinning *mucus*, making it *easier to eliminate* it with the cough, *clearing the airways*. **GUAIFENESIN** is an example of this drug group.
6) **COUGH SUPPRESSANTS**: generally come in the form of a **SYRUP**. Examples are **DEXTROMETHORPHAN** and **CODEINE**.

7) **INHALED CORTICOSTEROIDS**: as we know, there is inflammation in the airways in asthma so inhaled corticosteroids like **BECLOMETHASONE** and **BUDESONIDE** are also prescribed.

8) **BROAD SPECTRUM ANTIBIOTICS**: refers to antibiotics that are effective against a wide range of different types of bacteria like **CEPHALOSPORINS** for example, and please remember: antibiotics are not effective against viruses reason why most doctors will not prescribe an antibiotic unless there are certain indicators that a bacteria is involved. Most upper respiratory tract infections and bronchitis are caused by viruses.

9) **ANTI-TB DRUGS**: TB treatment is based on **COMBINATION THERAPY** using several drugs to prevent resistance like **ISONIAZID** and **RIFAMPIN** for example.

10) **SURGERY**:
   - **THORACOTOMY** is the cutting of the chest wall to perform surgery on the lung or other organs. “otomy”= “incision” When a patient has open heart surgery they undergo a thoracotomy for example.
   - A **LOBECTOMY** is the removal of one of the lung's lobes which is done in lung cancer for example.
   - **THORACOSTOMY**: “ostomy”= “opening” in this case a small incision is made between the ribs to place a **CHEST TUBE** to drain fluid or remove air from the pleural cavity so the lung can expand. This improves the patient's breathing. One end of the tube is in the pleural cavity and the other is put below in a recipient with water sort of like when you are siphoning out water from a fish tank!
   - **TRACHEOTOMY**: consists in making an incision in the front of the neck creating a direct airway through the incision in the trachea.

11) **VACCINES**: there are vaccines available against the bug that most frequently causes pneumonia the **PNEUMOCOCCAL VACCINE** as well as against the flu (**INFLUENZA VACCINE**). There is also a vaccine for TB which is not used in the US called : **BCG**

The doctors who specialize in treating diseases of the upper respiratory tract are called **OTOLARYNGOLOGISTS** but are commonly called “**ENT doctors**” (ENT stands for ears, nose and throat). The medical specialty is called **OTOLARYNGOLOGY**.

On the other hand the specialists who treat diseases of the lower respiratory tract are called **PULMONOLOGISTS** and their specialty is **PULMONOLOGY**. ENT doctors operate but pulmonologists do not so they refer their patients to a **THORACIC SURGEON** when surgery is
needed. Thoracic surgeons also operate the esophagus which is located in the chest but is not a part of the respiratory system.

In this presentation we have gone over many terms related to OTOLARYNGOLOGY and PULMONOLOGY while we discussed some diagnostic procedures and treatments used to diagnose and treat diseases of the RESPIRATORY SYSTEM. I hope you've enjoyed this lesson and come away with a better understanding of the fields of OTOLARYNGOLOGY and PULMONOLOGY and the terms related to these fields of medicine.

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