RESPIRATORY DISORDER

Respiratory disease is a medical term that encompasses pathological conditions affecting the organs and tissues that make gas exchange possible in higher organisms, and includes conditions of the upper respiratory tract, trachea,bronchi, bronchioles, alveoli, pleura and pleural cavity, and the nerves and muscles of breathing.

The study of respiratory disease is known as pulmonology.

Common Respiratory Disorders Include:

Chronic Obstructive Pulmonary Disease (COPD) - Irritation of the lungs can lead to asthma, emphysema, and chronic bronchitis and people can develop two or three of these together.

Chronic Bronchitis - Any irritant reaching the bronchi and bronchioles will stimulate an increased secretion of mucus. In chronic bronchitis the air passages become clogged with mucus, and this leads to a persistent cough.

Emphysema - The delicate walls of the alveoli break down, reducing the gas exchange area of the lungs. The condition develops slowly and is seldom a direct cause of death.

Asthma - Periodic constriction of the bronchi and bronchioles makes it more difficult to breathe.

Pneumonia - An infection of the alveoli. It can be caused by many kinds of both bacteria and viruses. Tissue fluids accumulate in the alveoli reducing the surface area exposed to air. If enough alveoli are affected, the patient may need supplemental oxygen.

Disorders of the respiratory system are usually treated internally by a pulmonologist or respiratory physician.

CYSTIC FIBROSIS

Cystic fibrosis is a hereditary disorder affecting the exocrine glands. It causes the production of abnormally thick mucus, leading to the blockage of the pancreatic ducts, intestines, and bronchi and often resulting in respiratory infection.

Cystic fibrosis causes various effects on the body, but mainly affects the digestive system and lungs. The degree of cystic fibrosis involvement differs from person to person. However, the persistence and ongoing infection in the lungs, with destruction of lungs and loss of lung function, eventually causes death in the majority of people who have cystic fibrosis.

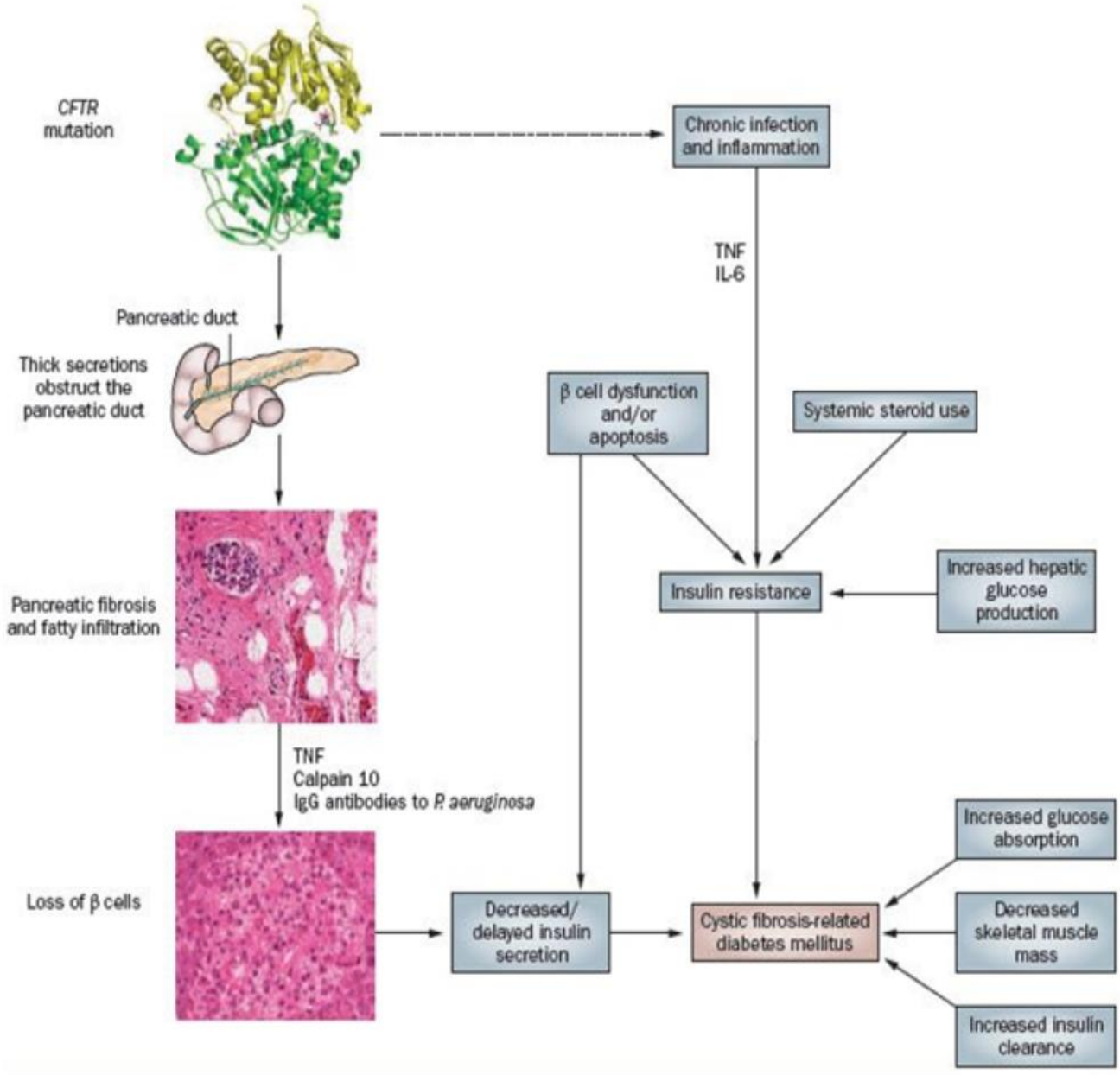
Typical complications caused by cystic fibrosis are difficulty in digesting fats and proteins; vitamin deficiencies due to loss of pancreatic enzymes; and progressive loss of lung function.

Causes of Cystic Fibrosis

Cystic fibrosis is a genetic disease that occurs when a child inherits two abnormal genes, one from each parent. Approximately, one in 25 Canadians carry an abnormal version of the gene responsible for cystic fibrosis. Carriers do not have cystic fibrosis, nor do they exhibit any of the symptoms of the disease.

When two parents who are carriers have a child, there is a 25 percent chance that the child will be born with cystic fibrosis. There is also a 50 percent chance that the child will be a carrier; and a 25 percent chance that the child will neither be a carrier nor have cystic fibrosis.

Pathophysiology of Cystic fibrosis



Symptoms of cystic fibrosis

Cystic fibrosis is a multi-system disorder that produces a variety of symptoms including:

- Persistent cough with productive thick mucous
- Wheezing and shortness of breath
- Frequent chest infections, which may include pneumonia
- Bowel disturbances, such as intestinal obstruction or frequent, oily stools
- Weight loss or failure to gain weight despite possible increased appetite
- Salty tasting sweat
- Infertility (men) and decreased fertility (women)

DIAGNOSING CYSTIC FIBROSIS

If a doctor suspects a patient has cystic fibrosis, a 'sweat test' may be administered. This simple and painless test measures the amount of salt content present in sweat. If the test comes back positive, it means the sweat content collected contains more salt than usual and validates a diagnosis of cystic fibrosis. In addition, a test for the presence of enzymes in the intestine can be performed.

TUBERCULOSIS

What is Tuberculosis?

Tuberculosis, commonly known as TB, is a bacterial infection that can spread through the lymph nodes and bloodstream to any organ in your body. It is most often found in the lungs. Most people who are exposed to TB never develop symptoms because the bacteria can live in an inactive form in the body. TB bacteria cause death of tissue in the organs they infect. Active TB disease can be fatal if left untreated.

Because the bacteria that cause tuberculosis are transmitted through the air, the disease can be contagious. Infection is most likely to occur if you are exposed to someone with TB on a day-to-day basis, such as by living or working in close quarters with someone who has the active disease. Even then, because the bacteria generally stay latent (inactive) after they invade the body, only a small number of people infected with TB will ever have the active disease. The remaining will have what's called latent TB infection -- they show no signs of infection and won't be able to spread the disease to others, unless their disease becomes active.

TB was once a widespread disease. It was virtually wiped out with the help of antibiotics developed in the 1950s, but the disease has resurfaced in potent new forms -- multidrug-resistant TB and extensively drug-resistant TB. Today, these new and dangerous forms of the disease -- resistant to some of the commonly used drug treatments -- have created a public health crisis in many large cities worldwide. If you have TB -- in its active or latent state -- you must seek medical treatment.

Causes

The main cause of TB is *Mycobacterium tuberculosis*, a small, aerobic, nonmotile bacillus. The high lipid content of this pathogen accounts for many of its unique clinical characteristics. It divides every 16 to 20 hours, which is an extremely slow rate compared with other bacteria, which usually divide in less than an hour. Mycobacteria have an outer membranelipid bilayer. If a Gram stain is performed, MTB either stains very weakly "Gram-positive" or does not retain dye as a result of the high lipid and mycolic acid content of its cell wall. MTB can withstand weak disinfectants and survive in a dry statefor weeks. In nature, the bacterium can grow only within the cells of a host organism, but *M. tuberculosis* can be cultured in the laboratory.

The *M. tuberculosis* complex (MTBC) includes four other TB-causing mycobacteria: *M. bovis*, *M. africanum*, *M. canetti*, and*M. microti*. *M. africanum* is not widespread, but it is a significant cause of tuberculosis in parts of Africa. *M. bovis* was once a common cause of tuberculosis.

Risk of TB

People with compromised immune systems are most at risk of developing active tuberculosis. HIV suppresses the immune system, making it harder for the body to control TB bacteria. People who are infected with both HIV and TB are around 20-30% more likely to develop active TB than those who do not have HIV.

Tobacco use has also been found to increase the risk of developing active TB. Over 20% of TB cases worldwide are related to smoking.

Symptoms of tuberculosis

While latent TB is symptomless, the symptoms of active TB include the following:

- Coughing, sometimes with mucus or blood
- Chills
- Fatigue
- Fever
- Loss of weight
- Loss of appetite
- Night sweats.

Tuberculosis usually affects the lungs, but can also affect other parts of the body. When TB occurs outside of the lungs, the symptoms can vary accordingly. Without treatment, TB can spread to other parts of the body through the bloodstream:

- TB infecting the bones can lead to spinal pain and joint destruction
- TB infecting the brain can cause meningitis
- TB infecting the liver and kidneys can impair their waste filtration functions and lead to blood in the urine

- TB infecting the heart can impair the heart's ability to pump blood, resulting in a condition called cardiac tamponade that can be fatal.

Diagnosis of tuberculosis

To check for TB, a health care provider will use a stethoscope to listen to the lungs and will check for swelling in the lymph nodes. They will also ask about symptoms and medical history as well as assessing a person's risk of exposure to TB.

The most common diagnostic test for TB is a skin test where a small injection of PPD tuberculin, an extract of the TB bacterium, is made just below the inside forearm.

The injection site should be checked after 2-3 days, and if a hard, red bump has swollen up then it is likely that TB is present.

There are other tests that are available to diagnose TB. Blood tests, chest X-rays and sputum tests can all be used to test for the presence of TB bacteria, and may be used alongside a skin test.

MDR-TB is more difficult to diagnose than regular TB. It is also difficult to diagnose regular TB in children

Treatments for tuberculosis

The majority of TB cases can be cured when the right medication is available and administered correctly.

The precise type and length of antibiotic treatment depends on a person's age, overall health, potential resistance to drugs, whether the TB is latent or active, and the location of infection (i.e. the lungs, brain, kidneys).

People with latent TB may need just one kind of TB antibiotics, whereas people with active TB (particularly MDR-TB) will often require a prescription of multiple drugs.

Antibiotics are usually required to be taken for a relatively long time. The standard length of time for a course of TB antibiotics is about 6 months.

All TB medication is toxic to the liver, and although side effects are uncommon, when they do occur, they can be quite serious. Potential side effects should be reported to a health care provider and include:

- Fever
- Jaundice
- Loss of appetite
- Nausea and vomiting.

It is important for any course of treatment to be completed fully, even if the TB symptoms have gone away. Any bacteria that have survived the treatment could become resistant to the medication that has been prescribed, and could lead to developing MDR-TB in the future.

Directly observed therapy (DOT) can be recommended. It involves a health care worker administering the TB medication to ensure that the course of treatment is completed.

Prevention of tuberculosis

Avoiding other people by not going to school or work, or sleeping in the same room as someone, will help to minimize the risk of germs from reaching anyone else. Wearing a mask, covering the mouth and ventilating rooms can also limit the spread of bacteria.

In some countries, BCG injections are given to children in order to vaccinate them against tuberculosis. It is not recommended for general use in the US because it is not effective in adults, and it can adversely influence the results of skin testing diagnoses.

The most important thing to do is to finish entire courses of medication when they are prescribed. MDR-TB bacteria are far deadlier than regular TB bacteria. Some cases of MDR-TB require extensive courses of chemotherapy, which can be expensive and cause severe adverse drug reactions in patients.