

Lung Diseases And Treatments



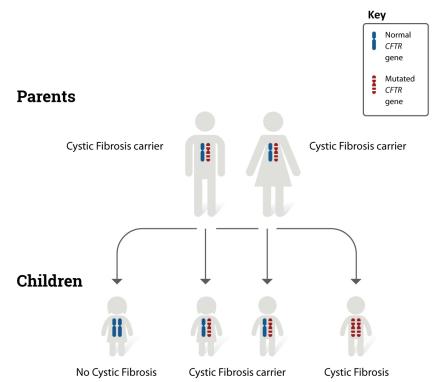
By Soleil

Cystic Fibrosis:

Cystic Fibrosis is an inherited, progressive disease that affects cells that produce mucus and other body fluids such as sweat and digestive fluids. These liquid substances are supposed to lubricate parts of the body but for people with Cystic Fibrosis these fluids become thick and clog passageways. People with Cystic Fibrosis need daily care and can have challenging lives due to the effects of the disease.

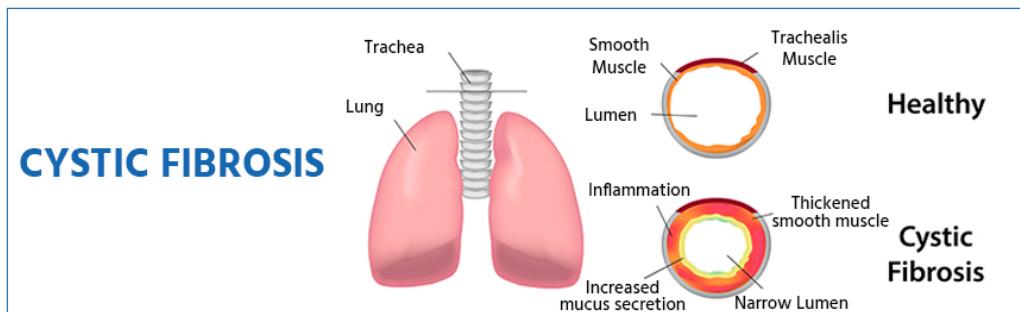
Causes:

Cystic Fibrosis is hereditary. The disease is caused by a mutation in the cystic fibrosis transmembrane (CFTR) which is located in all mucus producing parts of the body. The mutation of the gene affects how the protein is made and how it works. All humans have two CFTR genes from each parent. If a person has cystic fibrosis then both of their parents are carriers of a mutated CFTR gene. If both genes inherited by the parents are mutated then they will have cystic fibrosis. If only one gene is mutated then the person will be a cystic fibrosis carrier and if both genes are normal then the person will not carry cystic fibrosis. There are over 1,700 types of mutations found so far that cause cystic fibrosis. The most commonly presented one is F508del which is a mutation in protein processing.



Symptoms:

Symptoms of cystic fibrosis can start soon after birth or even in early adulthood depending on the person. A common symptom for CF is frequent chest infections; this is because the mucus present in the lungs from the disease is an optimal breeding ground for bacteria to thrive and multiply. A habitual wet cough is also a tell tale sign for cystic fibrosis. This cough is produced by the mucus coating the trachea. Other symptoms include shortness of breath, trouble weight gaining and excessive sweating.



Diagnosis:

Cystic fibrosis is most often diagnosed when the person is prenatal or as a newborn. For prenatal testing both parents of the child are tested for mutations in the CFTR gene to determine whether they are carriers of cystic fibrosis therefore determining the likelihood of their child to have the disease. After the child is born they will be screened for CF using the heel prick test. The heel prick test involves the heel of the child being pricked to draw blood which is placed on a card for lab analysis. The blood is tested for mutations to diagnose the child. The heel prick test diagnoses 95% of babies with CF. A sweat test is also a common way to test for the disease. The sweat of the person being tested is analysed for its level of chloride. If chloride levels of the sweat are high this could indicate that the person is positive for cystic fibrosis.



Current Treatments:

Unfortunately at this point in time cystic fibrosis has no cure. However there are many ways patients manage their symptoms to improve their quality of life. Early intervention is highly important to have the best possible outcome for people dealing with CF.

Medication:

There are many medications scripted for people to ease the symptoms of cystic fibrosis. These include Anti inflammatory and antibiotic drugs to reduce side effects such as swelling and infections. Mucus thinning drugs are given to get people to cough up mucus from their lungs and throat. The most efficient medications to date are Gene mutation targeted drugs called Cystic fibrosis transmembrane conductance regulator (CFTR) modulator therapies. These amazing drugs improve the intracellular processing of the mutated protein. Unfortunately these drugs have only been made for certain mutation types so not everybody with CF is able to benefit from them. However this amazing drug has improved the lives of many people who struggle with CF.

Airway Clearance

A major issue for people with CF is the effects of the thickened mucus such as obstruction of breathing and violent coughing. Intervention techniques allow for patients to have relief from these symptoms. Vest therapy is an effective treatment. The therapy includes a vest that the patient wears that vibrates in order to loosen the mucus in the lungs and throat to be coughed up. The vibration also moves the mucus up the airway to assist in removal. Every five minutes the patient will stop the vest vibrating to cough mucus. On the negative side, studies have shown that people undergoing the vest treatment are more prone to infections.



Surgery And Procedures:

There are multiple interventions that can help with the effects of cystic fibrosis both surgical and procedural.

- A doctor may recommend sinus surgery to remove obstructions caused by CF.
- Organ transplants could be needed for people with highly severe cystic fibrosis in order to replace damaged organs.
- Non-invasive ventilation may be provided for CF patients, it uses a face mask to assist breathing ability.
- Oxygen therapy may be used on patients who have low oxygen levels, patients breathe pure oxygen to prevent hypertension.

Prevention:

Sadly there currently is no way to prevent Cystic Fibrosis but with the advancement of the medical world, management and relief of symptoms is better than ever. In the future it is possible that with drugs like the CFTR modulator, the CFTR gene could be stopped from mutating.



Pneumonia

Pneumonia is an infection of the lungs that can vary from mild to life threatening. For young children and elderly pneumonia can be very serious. The infection causes the person's alveoli in their lungs to swell up and fill with fluid and or pus.

Causes:

Pneumonia is caused by bacteria entering the lungs, often the infection appears after a person has a cold or flu. The bacteria takes over the immune system causing white blood cells to multiply rapidly along with the bacteria, filling the lungs alveoli. There are many different types of bacteria that lead to pneumonia examples include;

Streptococcus Pneumoniae~

Many people carry this bacteria without becoming ill although a minority of the bacteria lead to Pneumonia, it is the most common cause of the illness. The bacteria is spread from inhaling droplets or direct exposure.



Klebsiella Pneumoniae~

Studies show that Klebsiella bacteria is one of the most common causes of pneumonia recorded in hospitals, It is spread through person to person contact and on rare occasions contact with environment.



Haemophilus influenzae~

This bacteria commonly causes many things from ear aches to bloodstream infections and pneumonia. It is spread through the inhalation of respiratory droplets.



Pseudomonas aeruginosa~

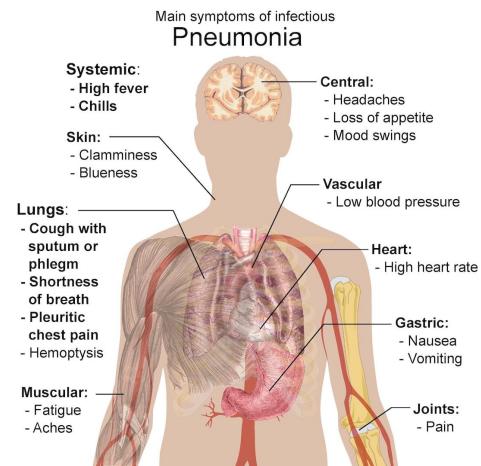
This bacteria is known to cause serious issues in immunocompromised people. It is extremely versatile and known to be antibiotic resistant. It is transmitted through contaminated environments, equipment, food and water often in hospitals. This type of pneumonia is highly lethal due to hosts often being immunocompromised.



Symptoms:

Symptoms of Pneumonia include;

- violent coughing often paired with mucus
- difficulty breathing due to inflammation of lungs and fluid.
- A fast heartbeat
- fever
- Loss of appetite
- Sore chest
- Fatigue and confusion
- Blue / grey colouring of skin



Diagnosis:

Chest X-Ray~

Doctors may perform a chest X-ray to diagnose Pneumonia. When looking at the X-ray doctors will look for white spots named infiltrates to diagnose the illness. Infiltrates are shown on the x-ray as a substance denser than air, meaning pus or blood, a symptom of pneumonia.

Blood Test~

A blood test may be needed for diagnosis. The blood test will inform doctors of the amount of blood cells present in the patient's blood. A high number of white blood cells indicates an infection such as pneumonia in the body.

Pulse Oximetry~

This test shows the level of oxygen present in a patient's blood. If the oxygen level is low this could be a sign of pneumonia because the swelling and fluid present in the lungs of an infected person means blood is struggling to be oxygenated.



Value	Date and Time			Normal Range
	May 30 2205	May 31 0530	May 31 1455	
WBC count ($\times 10^3/\text{mm}^3$)	14.8	13.6	6.0	4.3–11.3
RBC count ($\times 10^3/\text{mm}^3$)	4.56	4.51	3.95	4.30–5.90
Hb (g/dL)	14.8	14.3	12.6	13.9–16.3
Hct (%)	43.3	43.2	38.6	39.0–55.0
Mean cell volume (fl)	95.0	95.8	97.7	80.0–100.0
Mean cell Hb (pg)	32.5	31.7	31.9	25.0–35.0
Mean cell Hb concentration (%)	34.2	33.1	32.6	32.0–36.0
Platelet count ($\times 10^3/\text{mm}^3$)	245	256	214	150–375
RBC distribution width (%)	12.9	13.0	13.1	11.5–14.5



Treatments:

Pneumonia is treated with antibiotics, depending on the seriousness of the illness the medicine will be taken orally or through an injection. Antibiotics work by killing the bacteria and aiding the body's immune system. Most patients' symptoms will fade after a few days or weeks. The most common types of antibiotics include;

Azithromycin~

Azithromycin is an antibiotic used to treat less severe cases of pneumonia in adults. It is commonly used because of its high tissue concentration and short treatment time.



Erythromycin~

Erythromycin is similar to Azithromycin but has more side effects. This drug is used on bacteria that are penicillin resistant such as many cases of streptococcus pneumoniae.



Amoxicillin~

Amoxicillin is mostly used on children who are suffering with pneumonia. It is often prescribed when pneumonia is suspected.



Prevention:

To prevent Pneumonia you should have good hygiene and keep your immune system strong with a healthy lifestyle. There are two types of vaccines that prevent pneumonia; Pneumococcal conjugate vaccines (PCV13, PCV15, and PCV20) and Pneumococcal polysaccharide vaccine (PPSV23). These vaccines only work to stop infections from streptococcus pneumoniae.

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