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Causes of Pulmonary Edema, Cardiogenic Pulmonary Edema, Non Cardiogenic Pulmonary Edema, Signs and Symptoms of Pulmonary Edema, Diagnosis of Pulmonary Edema, Name of the Test to be conducted to Diagnose Pulmonary Edema, Treatment of Pulmonary Edema and Prevention of Pulmonary Edema

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ABSTRACT

In most of the cases, heart problems are related to the pulmonary edema. Both pulmonary edema and pneumonia are related to a build-up of fluid in your lungs. An infection leads to the occurrence of pneumonia. The infection may be bacterial, viral or fungi. Pulmonary edema is generally related to heart diseases, but it shows other possible reasons namely blood transfusion reactions as well as kidney failure. Primary pulmonary edema is divided two groups such as cardiogenic (heart related) group and non-cardiogenic (non heart-related) group. High altitude pulmonary edema (HAPE) is observed, if you especially at high altitude or if you are rapidly going up a mountain. Negative pulmonary edema is seen especially after a blockage in your upper airways. Pulmonary edema is classified is classified into sudden (acute) as well as long - term (chronic) types. Blood chemistries, cardiac cauterization, chest X ray. Complete blood count (CBC), ECG and pulse oximetry are helpful in diagnosing pulmonary edema. Treatment is also based on iv diuretics, iv inotropes, nitrates and oxygen. Treatment is dependent upon the machines and medications. Antibiotics, steroids, ventilators or respirators are useful in treating pulmonary edema. Prevention of pulmonary edema is based on routine vaccinations, healthy diet along with low salt and regulation of body weight.

Keywords: *Diaphoresis, dyspnea, chest X ray, oxygen, diuretics, iv nitrates, reduced ejection fraction, cardiogenic pulmonary edema, pericardial effusion, hypertension, adult respiratory syndrome (ARDS), neurogenic pulmonary edema, high altitude pulmonary edema (HAPE), chest tightness, dyspnea, wheezing, swelling in the lungs, tiredness, cardiac catherization, CBC, ECG, pulse oximetry, ECG cardiac markers, chronic obstructive pulmonary edema (COPD), echocardiography. Acute coronary syndrome, thrombolysis, vasodilator, ventricular tachycardia, IV dobutaminre, intra - aortic ballon pump*

INTRODUCTION

A condition manifested by enormous fluid in the lungs. This fluid accumulates in the lungs, making it difficult related to breathing. In many cases heart problems are responsible for the occurrence pulmonary edema.

Pulmonary edema is acute, severe left ventricular failure along with pulmonary hypertension as well as alveolar flooding. Findings are diaphoresis, severe dyspnea and a very few times blood -tinged frothy sputum. Diagnosis is performed on a clinical basis and with the help of a chest X ray. In individuals with heart failure and a low ejection fraction, treatment with oxygen, diuretics, and intravenous nitrates is also recommended, a very few times short -term IV positive inotropes and assisted ventilation (*i.e.* endo tracheal intubation along with mechanical ventilation or bi-level positive air way pressure ventilation).[1-3]

CAUSES[4-10]

Pulmonary edema is often manifested by congestive heart failure. If the heart is not able to pump in an efficient manner, blood can back up into the veins that take blood through the lungs. As the amount of pressure in these blood arteries rises, fluid is largely forced into the alveoli of the lungs. In a number of cases, heart problems result in pulmonary edema. But fluid can accumulate especially in the lungs for other reasons. These include contact with certain toxins, medications, trauma to chest wall as well as travelling to or exercising at high altitudes. Both pulmonary edema and pneumonia are linked to a buildup of fluid on your lungs. An infection results in pneumonia. The infection may be bacterial, viral or fungal. These organisms are responsible for causing infected fluid to fill your air sacs. Pulmonary edema is normally linked to heart disease, but it exhibits other possible causes such as blood transfusion reactions and kidney failure. Pulmonary edema that happens in sudden manner (acute pulmonary edema) is a medical emergency that requires immediate care. Pulmonary edema can sometimes lead to the occurrence of death. Prompt treatment is very very essential. Primarily pulmonary edema is categorized into two groups namely cardiogenic (heart –related) group and non-cardiogenic (non heart - related) group.

Cardiogenic Group

Cardiogenic pulmonary edema is related to the fluid backs up in your lungs particularly from a diseased heart. The most common cause of cardiogenic pulmonary edema is congestive heart failure. If the left side of your heart prevents pumping blood in a correct manner, the blood backs up into the blood vessels in your lungs. The fluid is propelled into the air sacs in your lungs because of an enhancement of pressure in your blood vessels. Congestive heart failure results in pulmonary edema and this edema is seen in the following conditions

- Abnormal heart rhythm – arrhythmia.
- Fluid in the pericardium a lining around your heart (peri cardial effusion)
- Heart valves that are leaky or narrowed.
- High blood pressure (Hypertension)
- Heart attack
- Inflammation of your heart muscle

Non Cardiogenic Group

It is not manifested by an enhanced blood flow in your lungs because of a backup especially from heart problems. Instead, the blood vessels in your lungs show inflammation. The blood vessels then become leaky and fluid gains an entry into your air sacs.

Adult respiratory syndrome (ARDS) is another common synonym for non-cardiogenic pulmonary edema. In ARDS, inflammation is the major problem along with causes that include.

- Bleeding or swelling in your brain (neurogenic pulmonary edema)
- Drugs
- Pancreatitis

- Pneumonia
- Sepsis (severe infection)
- Trauma

High Altitude Pulmonary Edema (HAPE)

HAPE happens, if you are especially at high altitudes or if you are rapidly going up a mountain. HAPE is a severe form of altitude sickness, which happens due to low levels of oxygen at higher altitudes. HAPE leads to the occurrence of tiredness, weakness as well as short of breath. HAPE results in coughing as well as chest tightness. HAPE is treated as a medical emergency and can be life threatening. If you exhibit HAPE, you require to go down in an immediate manner and medical treatment is very essential.

Negative pressure pulmonary edema can happen particularly after a blockage in your upper airway. Straining to breath if this obstruction occurs and causes damage to your pulmonary blood vessels and they leak especially into your air sacs. In high altitude pulmonary edema (HAPE), your pulmonary blood vessels show construction and become leaky.

Signs and Symptoms of Pulmonary Edema

Pulmonary edema is categorized into sudden (acute) and long- term (chronic) types.

Sudden (acute) pulmonary edema

- Chest tightness or pain.
- Coughing up blood or frothy mucus.
- Felling especially for air.
- Shortness of breath (dyspnea) particularly during movement or lying down.
- Wheezing.

Long- term (chronic) pulmonary edema

- Shortness of breath if lying flat
- Feeling of breath lessness that awakens you
- Swelling particularly in your lungs
- Tiredness

Diagnosis

Your doctor will conduct a physical exam to observe if you consist of fluid particularly in lungs. Your doctor will listen to your heart and lungs with the help of a stethoscope. Your doctor will be examining you for

- Abnormal heart sound.
- Cracking sounds or wheezing sounds in your lungs.
- Gray or bluish skin.
- Increased or reduced heart rate or blood pressure.
- Increased respiratory rate.

NAME OF THE TESTS TO BE CONDUCTED TO DIAGNOSE PULMONARY EDEMA[11,12]

- Blood chemistries
- Cardiac catheterization, to check for obstruction especially in your coronary arteries.
- Chest X ray, to observe if there is fluid in your lungs.
- Complete blood count (CBC)
- Electrocardiogram (ECG) to examine particularly for a heart attack or heart rhythm problems.
- Echo cardiogram, an ultrasound of your heart to examine especially for abnormal heart activity.
- Pulse oximetry, especially to examine your blood oxygen levels.

TREATMENT

The condition of pulmonary edoema is critical. If you show signs of sudden (acute) pulmonary edoema, you need medical attention very once. You could need to receive care at the intensive care unit (ICU) or the emergency department (ER).

A very few treatment options include.

- Machines that use a face mask to help blow air into your lungs.
- Medications that strengthen your heart or helps you excrete fluids or eliminate urine to the fullest extent possible.
- Oxygen delivered with the help of prongs in your nose.
- If the condition known as congestive heart failure is not the cause of your pulmonary Edema, other drugs, such as antibiotics and steroids, may be prescribed.
- Respirators or ventilators that deliver air by means of a tube that is put into your windpipe.

PREVENTION[13,14]

If you are exposed to pulmonary edema particularly at a higher risk, you can follow the steeps to take care of yourself. These steps are

- Get routine vaccinations.
- Do not smoke.
- Eat a healthy diet particularly low in salt.
- Control healthy weight.
- Consult your doctor in a regular manner and if you exhibit problems regarding breathing.
- Consult your doctor if you have planning activities (like mountain climbimg) that lead to the occurrence of pulmonary edema.

WHEN SHOULD I JOIN IN THE EMERGENCY ROOM (er)?

Acute pulmonary edoema that develops suddenly might be fatal. Join the ER or dial 208/911 for emergency assistance. If you display any of the symptoms listed below.

- Anxiety or restlessness
- Bluish or greyish skin
- Coughing up blood or bloody froth
- Difficult breathing
- Dizziness or weakness
- Excessive sweating
- Feeling like you are suffocating
- Rapid heart beat
- Shortness of breath
- Wheezing or gasping.

DIAGNOSIS OF PULMONARY EDEMA[15]

- Chest X ray.
- Clinical evaluation exhibiting severe dyspnea as well as pulmonary crackles.
- ECG cardiac markers and other tests for etiology based on necessity.
- Sometimes, serum brain natriuretic peptide (BNP) or N-terminal -pro BNP or N-terminal -pro BNP (NT - pro-BNP)
- COPD (chronic obstructive pulmonary disease)

Exacerbation

This condition can mimic pulmonary edema due to left ventricular failure or even that due to bi Ventricular failure if cor pulmonale is observed. Pulmonary edema may be presenting symptoms in patients without a history of cardiac disorders, but COPD patients with severe symptoms generally show a history of COPD, even though they may be too dyspneic to relate it.

An initial chest X-ray is typically diagnostic, showing prominent interstitial edoema. In addition, if the diagnosis is uncertain, measuring serum BNP/NT-pro BNP levels (raised in pulmonart edoema, normal in COPD exacerbation) are helpful. ECG, pulse oximetry and blood tests, cardiac markers, electrolytes, BUN, creatine and for heavily ill patients, arterial blood gas (ABG) measurements are performed. Echocardiography is more useful in determining the cause of pulmonary edema (eg. Hypertensive heart diseases, dilated cardio myopathy, myocardial infarction and valvular dysfunction) and may influence the choice of drug also.

TREATMENT

- IV diuretics.
- IV inotropes.
- Nitrates.
- Oxygen
- Treatment of cause.
- Ventilatory assistance.

Specific additional treatment is based on etiology

- For acute myocardial infarction or another acute coronary syndrome, thrombolysis or direct percutaneous coronary angioplasty with or without stent placement.
- For rapid atrial fibrillation, cardioversion is important. To reduce the ventricular rate, an IV beta blocker, IV digoxin or cautious use of IV calcium channel- blocker.
- For severe hypertension, an IV vasodilator.
- For supra ventricular or ventricular tachycardia, direct-current cardio version is preferred.

Diuretics are less helpful in people with acute decomposition of chronic heart failure and may cause hypotension since fluid status before to the start of pulmonary edoema is typically normal in those with acute myocardial infarction. An intra-aortic balloon pump and IV dobutamine may be required if the patient's systolic blood pressure falls below 100 mm Hg or if shock sets in.[16]

CONCLUSION

Contra indications of pulmonary function tests (PFTs) are linked to the four factors such as

- Generation of maximum pressure in thorax
- Expansion of the chest wall
- Large swings in blood pressure are responsible for the occurrence of stress on the tissues in the body.
- Spread of infections (Eg: hepatitis B, HIV and tuberculosis.
- The above factors are helpful in obstructing potential complications such as acute coronary syndrome, dehisacence of the surgical wound and rupture of aneuryrysms. Patients with myocardial infarction, unstable heart disease or stroke within the previous three months should not execute provacation testing. Normayy, patients FEV less than 70 % of predicted are generally eliminated from executing beoncoprovation testing.

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