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Review Article

The Narrative Review on Dilated Cardiomyopathy and it's Management

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Abstract

It is a condition in which the heart becomes enlarged and does not able to pump blood effectively. In this heart muscles are affected. This can also be describes as left ventricular or biventricular dilation and impaired contraction that is not explained by abnormal loading conditions. About 1 in 2,500 people are affected by this disease. This is caused due to genetics, diabetes, obesity, arrhythmias, alcohol, cocaine, certain toxins, and inflammation of myocardium due to some infection. It is thought to be an autoimmune disease. Coronary artery disease and high blood pressure may also be some of the causes but the actual cause is still not conformed.

In some cases, the symptoms may not be seen but in cases where symptoms appear and they vary from leg swelling, shortness of breath, chest pain, fainting and feeling tired. This may lead to many complications like irregular heartbeat, heart failure and heart valve disease. This can be diagnosed by different procedures like electrocardiogram, X ray, blood tests, excise stress test, CT or MRI scan, cardiac catheterization, genetic screening, counseling.

The management of dilated cardiomyopathy can be done by non-pharmacological, pharmacological and surgical procedures. The treatment through drugs can be done by the use of ACE inhibitors, diuretics, beta blockers and blood thinners can also be used. Different implantable devices are also used. Some dietary and lifestyle changes should also be done for the prevention of this.

This is a type of disease which is life threatening and is a cause of various other conditions and may even lead to many other life threatening conditions. This condition is extremely unpredictable and therapy is very complex and early diagnosis is needed to avoid further complications and proper treatment is necessary.

Keywords: *Cardiomyopathy; Biventricular Dilation; Irregular Heartbeat; Management*

Introduction

Dilated cardiomyopathy is a condition and a type of heterogeneous group of diseases which causes the heart dysfunction and leads to irregular heart beat. In this the patient remains symptomless for a very long time. Mostly Dilated cardiomyopathy may not even cause symptoms, but for some people it can be life-threatening. The condition affects people of all ages, including infants and children, but is most common in men ages 20 to 50. This when diagnosed at an early age can be treated effectively but long tern diagnosis of disease can lead to irreversible myocardial disease. This can be maintained by the use of drugs but cannot be cured completely. This can be characterized by the progression of heart failure is associated with left ventricular remodeling, which manifests as gradual increases in left ventricular end-diastolic and end-systolic volumes, wall thinning, and a change in chamber geometry to a more spherical, less elongated shape. Dilated cardiomyopathy develops suddenly, and mostly may not initially cause symptoms significant enough to impact on quality of life. A person suffering from dilated cardiomyopathy might have an enlarged heart, with pulmonary edema and an elevated jugular venous pressure and a low pulse pressure. Signs of mitral and tricuspid regurgitation may be present.

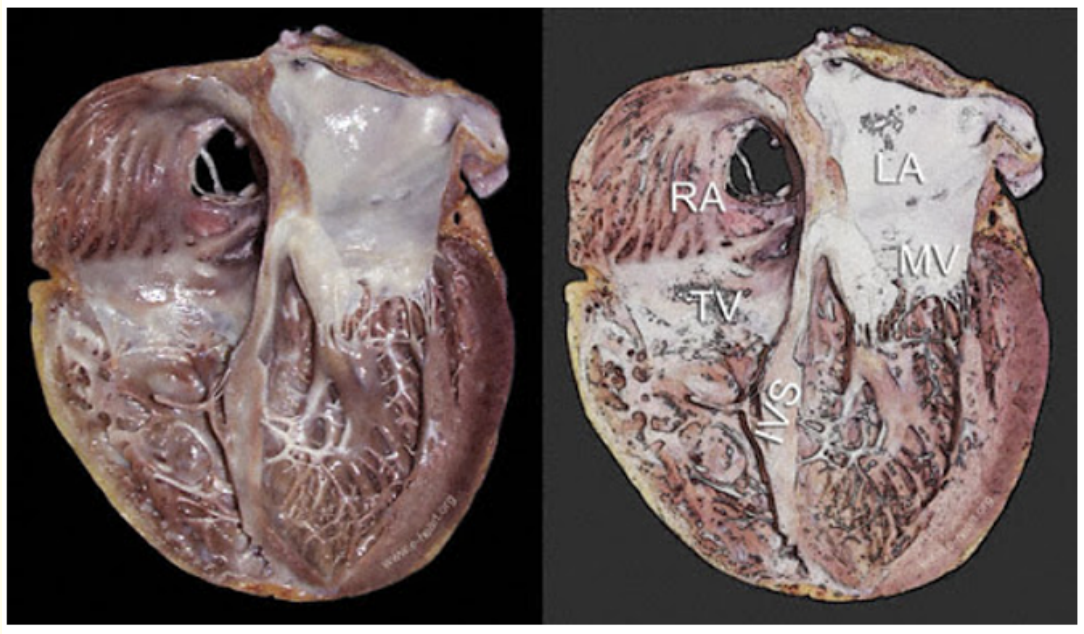

Figure 1: *This shows the difference between the normal heart and dilated cardiomyopathy.*

Signs and symptoms

Many patients remain asymptomatic for a very long period of time but when symptoms appear they vary according to the severity. Some common symptoms are

- Syncope (fainting) angina, but only in the presence of ischemic heart disease
- Fatigue shortness of breath (dyspnea) when you're active or lying down
- Reduced ability to exercise Swelling (edema) in your legs, ankles and feet
- Swelling of your abdomen due to fluid buildup (ascites)
- Chest pain
- Extra or unusual sounds heard when your heart beats (heart murmurs)
- Weight gain, cough and congestion related to fluid retention
- Palpitations or fluttering in the chest due to abnormal heart rhythms (arrhythmia).
- Dizziness or lightheadedness.

Blood clots due to blood flowing more slowly through the body. If a blood clot gets breaks off, it can be carried to the brain (cerebral emboli or stroke), kidney (renal emboli), or limbs (peripheral emboli), lungs (pulmonary emboli).

On physical examination, we need to look for the major signs of heart failure and volume overload. Assess vital signs with specific attention to the following:

- Tachypnea
- Tachycardia
- Hypertension or hypotension

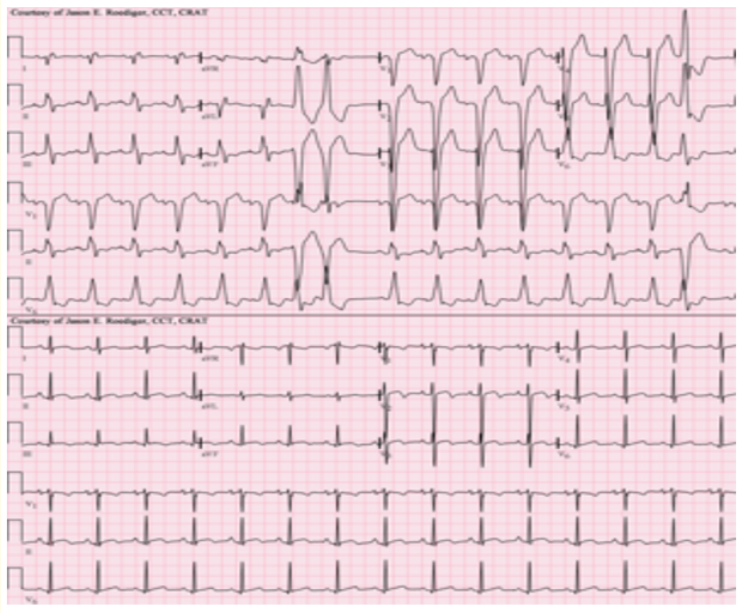

Figure 2

Other pertinent findings include the following (the level of cardiac compensation or decompensation determines which signs are present):

- Signs of hypoxia (e.g. cyanosis, clubbing)
- Jugular venous distension (JVD)
- Pulmonary edema (crackles and/or wheezes)
- S_3 gallop
- Enlarged liver
- Ascites or peripheral edema.

Look for the following on examination of the neck:

- Jugular venous distention (as an estimate of central venous pressure)
- Hepatojugular reflux
- A wave on central venous pressure waveform
- Large cv wave (observed with tricuspid regurgitation)
- Goiter if dysthyroidism is suspected.

Findings on heart includes the following:

- Cardiomegaly
- Murmurs (with appropriate maneuvers)
- Tachycardia
- Irregularly irregular rhythm
- Gallops.

Causes

It is thought to be an autoimmune disorder and although its exact cause is not known but some major causes are follows.

Causes of dilated cardiomyopathy include the following:

- Heredity
- Secondary to other cardiovascular disease: ischemia, hypertension, valvular disease, tachycardia induced.
- Infectious: viral, rickettsial, bacterial, fungal, metazoal, protozoal.
- Probable infectious: Whipple disease, Lyme disease.
- Metabolic: endocrine diseases (e.g. hyperthyroidism, hypothyroidism, acromegaly, myxedema, hypoparathyroidism, hyperparathyroidism), diabetes mellitus, electrolyte imbalance (e.g. potassium, phosphate, magnesium), pheochromocytoma.
- Rheumatologic/connective tissue disorders: scleroderma, rheumatoid arthritis, systemic lupus erythematosus.
- Nutritional: Thiamine deficiency (beriberi), protein deficiency, starvation, carnitine deficiency.
- Toxic: drugs (e.g. antineoplastic/anthracycline agents, vascular endothelial growth factor [VEGF] inhibitors), poisons, foods, anesthetic gases, heavy metals, ethanol.
- Collagen vascular disease.

- Infiltrative: hemochromatosis, amyloidosis, glycogen storage disease.
- Granulomatous (sarcoidosis, giant cell myocarditis).
- Physical agents: extreme temperatures, ionizing radiation, electric shock, nonpenetrating thoracic injury.
- Neuromuscular disorders: muscular dystrophy (limb-girdle [Erb dystrophy], Duchenne dystrophy, fascioscapulohumeral [Landouzy-Dejerine dystrophy]), Friedreich disease, myotonic dystrophy.
- Primary cardiac tumor (myxoma).
- Senile.
- Diabetes.
- Obesity.
- High blood pressure (hypertension).
- Peripartum.
- Immunologic: Postvaccination, serum sickness, transplant rejection.
- Stress-induced cardiomyopathy (Takotsubo cardiomyopathy).

In many cases of dilated cardiomyopathy, the cause remains unexplained. The idiopathic category should continue to diminish as more information explaining pathophysiologic mechanisms, specifically genetic-environmental interactions, becomes available.

Toxins are a significant cause. Almost a third of cases may result from severe ethanol abuse (>90 grams/day, or 7 to 8 drinks per day) for more than 5 years.

Risk factors

Dilated cardiomyopathy most commonly occurs in men, ages 20 to 50. But it can also occur in women. Other risk factors include:

- Heart muscle damage from a heart attack
- Family history of dilated cardiomyopathy
- Inflammation of heart muscle due to immune system disorders
- Neuromuscular disorders, such as muscular dystrophy.

Complications: Complications vary and includes:

- **Heart failure:** Poor blood flow from the left ventricle can lead to heart failure. Heart may not be able to supply body with the blood it needs to function properly.

- **Heart valve regurgitation:** Enlargement of the left ventricle may make it harder for your heart valves to close, causing a backward flow of blood and making your heart pump less effectively.
- **Fluid buildup (edema):** Fluid can build up in the lungs, abdomen, legs and feet (edema).
- **Abnormal heart rhythms (arrhythmias):** Changes in your heart›s structure and changes in pressure on your heart›s chambers can contribute to the development of arrhythmias.
- **Sudden cardiac arrest:** Dilated cardiomyopathy causes your heart to stop beating suddenly.
- **Blood clots (emboli):** Pooling of blood (stasis) in the left ventricle can lead to blood clots, which may enter the bloodstream, cut off the blood supply to vital organs, and cause stroke, heart attack or damage to other organs. Arrhythmias can also cause blood clots.

Diagnosis: The various diagnostic procedures that are followed are

- Complete blood count
- Comprehensive metabolic panel
- Thyroid function tests
- Cardiac biomarkers
- B-type natriuretic peptide assay
- Chest radiography
- Echocardiography
- Cardiac magnetic resonance imaging (MRI)
- Electrocardiography (ECG)
- Endomyocardial biopsy is class II and class III.

In class II Recent onset of rapidly deteriorating cardiac function, Patients receiving chemotherapy with doxorubicin, Patients with systemic diseases with possible cardiac involvement.

Management

Its management is done based on the symptoms that appear and can be treated by the use of drugs, various devices and even by the use of some surgical procedures.

Pharmacological treatment

1. Angiotensin-converting enzyme (ACE) inhibitors

2. Angiotensin II receptor blockers (ARBs)
3. Beta-blockers
4. Aldosterone antagonists
5. Cardiac glycosides
6. Diuretics
7. Nitrates
8. Vasodilators
9. Angiotensin receptor neprilysin inhibitor (ARNI): Sacubitril-valsartan (ARNI)
10. Beta blocker: Ivabradine
11. Antiarrhythmics
12. Human B-type natriuretic peptide
13. Inotropic agents.

Surgical procedures

Various surgeries used for maintaining the normal functioning of heart are:

1. Left ventricular assist devices
2. Cardiac resynchronization therapy (biventricular pacing)
3. Automatic implantable cardioverter-defibrillators
4. Ventricular restoration surgery
5. Heart transplantation.

In cases of severe acute coronary failure, emergency medical services (EMS) personnel may initiate treatment with oxygen, nitrates, and furosemide on the way to the hospital. Cardiac monitoring, continuous pulse oximetry, and electrocardiography (ECG) can also be performed by units with advanced life support (ALS) certification. Further ventilator support or even intubation may be indicated if the patient is in extremis.

Treatment of dilated cardiomyopathy is mostly and necessarily the same as treatment of chronic heart failure (CHF) and pulmonary edema; however, obtaining a complete medical and personal history related to the condition from patients with dilated cardiomyopathy helps determine the etiology. When beginning treatment, administer oxygen, initiate continuous pulse oximetry and cardiac monitoring, and acquire intravenous access.

Mainstays of medical therapy are preload reduction, afterload reduction, diuresis, and airway support. In patients with severe refractory pulmonary edema, attempts of continuous positive airway pressure (CPAP) or bimodal positive airway pressure (BiPAP) may obviate intubation.

Non-pharmacological treatment

Lifestyle changes

- Exercise
- Avoid OTC drugs and drug abuse
- Quit smoking
- Maintain healthy body weight
- Maintain BMI index.

Dietary changes

1. Avoid high consumption of salt lower it to 3 g/day
2. Eat whole grain food
3. Eat lot of fruits and vegetables
4. Saturated fats should be consumed
5. Sesame seeds should be consumed in empty stomach [1-11].

Conclusion

DCM is a disease which is caused due to various factors and many advances are made for the diagnosis and also the treatment of the disease but still it cannot be known completely and the cause of it remain unknown but some parameters are being set by which we can identify the cause. In this the heart muscles get dilated and proper functioning of heart does not occur which results in further complications. This disease can be completely cured by taking proper measures to cure it and by proper treatment plan it can be reversed completely but by regularly maintaining the healthy lifestyle but when it comes to its extreme stage this cannot be cured and becomes a kind of irreversible myocardium. Hence proper treatment plan should be made to cure this if not cured by medical treatment surgical procedure should be taken place so that the life expectancy of the patient should be increased as this is a kind of life-threatening condition. Along with this a proper and healthy lifestyle should be maintained.

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