



# GHADIALI

## General Surgery

### P R E S E N T S

Dr. Mufa T. Ghadiali is skilled in all aspects of General Surgery.  
His General Surgery Services include:

- General Surgery
- Advanced Laparoscopic Surgery
- Surgical Oncology
- Gastrointestinal Surgery
- Hernia Surgery
- Endoscopy

## Heart Failure

Multimedia Health Education

### ***Disclaimer***

The information in this presentation has been intended to help consumers understand the structure and function of anatomical components and take charge of Cardiac health. Also, it explains the risks, complications and provides guidelines for living with surgeries, conditions and procedures.

**Mufa T. Ghadiali, M.D., F.A.C.S**

Diplomate of American Board of Surgery

6405 North Federal Hwy., Suite 402  
Fort Lauderdale, FL 33308

Tel: 954-771-8888

Fax: 954- 491-9485

[www.ghadialisurgery.com](http://www.ghadialisurgery.com)

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## MULTIMEDIA HEALTH EDUCATION MANUAL

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## INTRODUCTION

Heart failure is a condition where the heart fails to pump blood in order to maintain the metabolic needs of the body. In most cases, heart failure is a chronic, long-standing and ongoing condition but it can develop suddenly. Let us find out more about Heart Failure,

The main function of the heart is to deliver the oxygen-rich blood to every cell in the body. The arteries are the passageways through which the blood is delivered and the veins are the passageways through which the blood is collected and returned to the heart. The coronary arteries supply blood to the heart muscle. When the coronary arteries become narrow or blocked, blood flow to the heart is reduced. This decrease in blood flow to the heart deprives the heart muscle of oxygen. Heart attack (also called myocardial infarction) is when part of the heart muscle is damaged or dies because it isn't receiving oxygen.

#### Unit 1:

#### Heart Anatomy

### Heart Anatomy

#### Heart Chambers, Walls

#### Vena Cava

The vena cava is a large vein that brings the deoxygenated (impure) blood back to the heart and empties it into the right atrium.

(Refer fig.1)

#### Atria

There are two atria (Right & Left), which are two of the four muscular chambers of the heart. The right atrium collects the impure blood from the vena cava and delivers it to the right ventricle.

This delivery is regulated by the Tricuspid valve.

The left atrium collects the oxygenated blood from lungs from the pulmonary veins and delivers it to the left ventricle. This delivery is regulated by the Mitral valve.

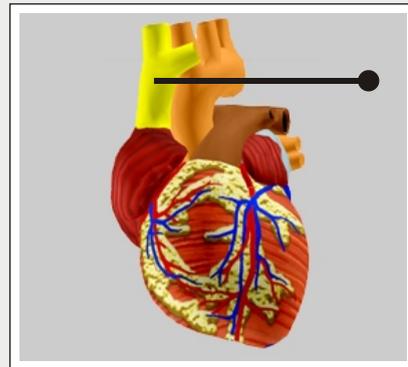
(Refer fig.2)

#### Ventricles

There are two ventricles (Right & Left), which are two of the four muscular chambers of the heart. The right ventricle collects the impure blood from right atrium and delivers it to the lungs for purification. This delivery is regulated by the pulmonary valve.

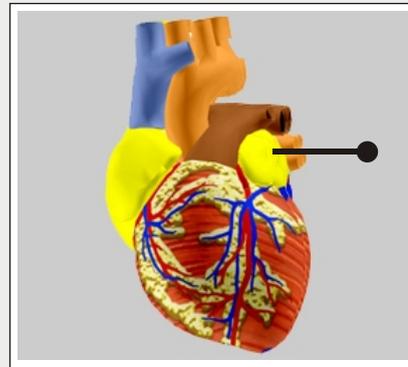
The left ventricle collects the pure blood from left atrium and delivers to the Aorta (main artery) from where it is pumped to the rest of the body. This delivery is regulated by the Aortic valve.

(Refer fig.3)



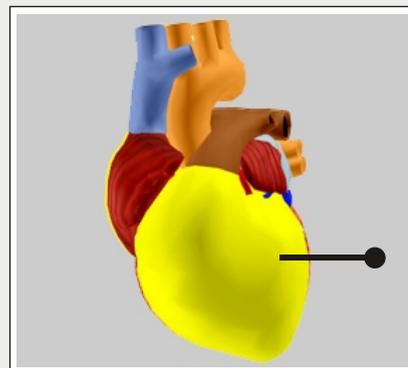
**Vena Cava**

**(Fig.1)**



**Atria**

**(Fig.2)**



**Ventricles**

**(Fig.3)**

## Pulmonary Arteries

As part of the pulmonary circulation, pulmonary arteries carry the de-oxygenated blood from the right ventricle to the lungs for oxygenation.

*(Refer fig.4)*

## Pulmonary Veins

Blood, after oxygenation in the lungs, is brought back to the heart by pulmonary veins and delivered to left atrium.

*(Refer fig.5)*

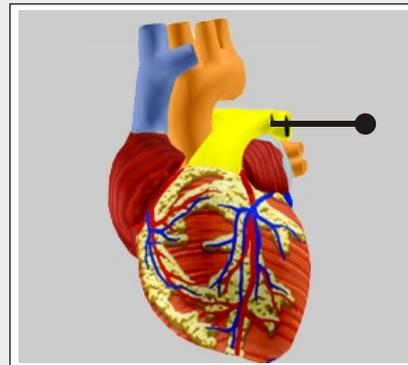
## Aorta

The Aorta, the largest artery in the body, collects blood pumped from the left ventricle to branch and deliver the oxygen rich blood to various organs and tissues in the human body.

*(Refer fig. 6)*

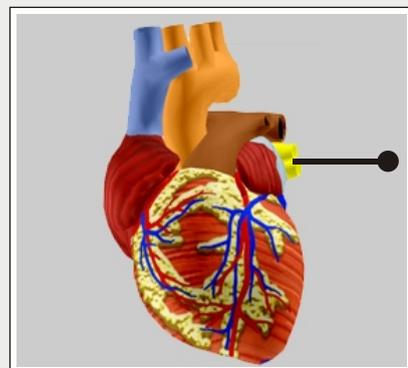
## Coronary Circulation

The coronary circulation consists of the blood vessels that supply and remove blood to the heart tissue. Coronary arteries supply oxygen rich blood to the heart and the coronary veins remove the deoxygenated blood from the heart. Serious heart damage may occur when the coronary circulation is blocked.



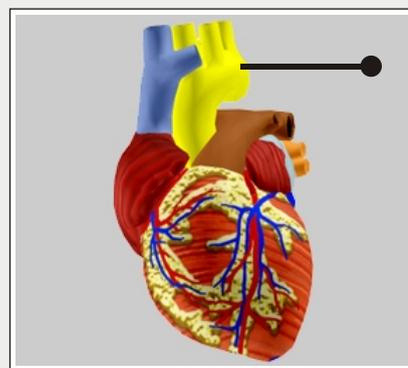
**Pulmonary Arteries**

**(Fig.4)**



**Pulmonary Veins**

**(Fig.5)**



**Aorta**

**(Fig.6)**

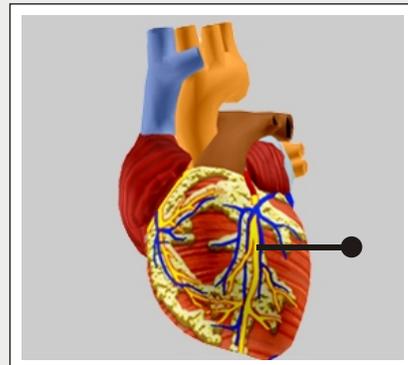
#### Unit 1:

#### Heart Anatomy

### Coronary Arteries

Blood is supplied to the heart via the coronary arteries. Two main coronary arteries are branched from the aorta, and branch into several small arteries to supply oxygen rich blood to the heart.

(Refer fig. 5)



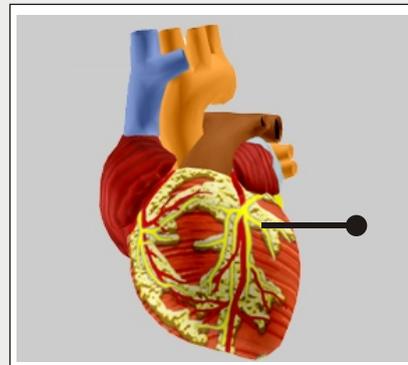
**Coronary Arteries**

(Fig. 5)

### Coronary Veins

The deoxygenated blood from the heart muscle is collected by the coronary veins and drained into the right atria.

(Refer fig. 6)



**Coronary Veins**

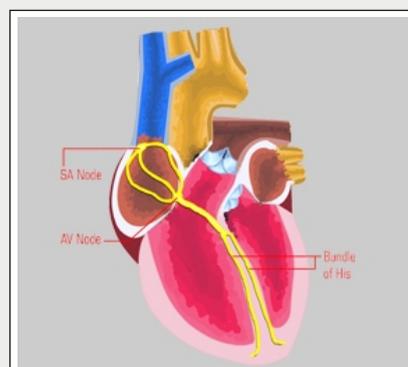
(Fig. 6)

### Conduction System

The heart's pumping energy comes from a built-in electrical conduction system. The sinoatrial node, SA node, is the heart's natural pacemaker which causes the atria to contract when the electrical impulse is released.

The signal is then passed on to the atrioventricular node, AV node, and then to the conduction pathways (bundle of His) to provide electrical stimulus to the ventricles.

(Refer fig. 7)



(Fig. 7)

## Causes

Heart failure results when the over worked heart muscle does not work as efficiently as it used to. Any factor that increases the heart workload may initiate heart failure. It is most commonly seen in old age and the common causes are:

- **Coronary Artery Disease** - causes narrowed arteries that decrease the blood supply to the heart muscle
- **Previous heart attack** - interferes with the heart muscle's normal functioning
- **High blood pressure** - causes the heart to work harder than usual

Other causes of heart failure include:

- Valvular heart disease, e.g. Aortic Stenosis
- Congenital heart defects
- Cardiomyopathy - disease of the heart muscle
- Lung disease
- Arrhythmias - irregular heartbeat
- Alcoholism

## How will you feel?

The "failing" heart keeps working but not as efficiently as it should. People with heart failure can't exert themselves because they become short of breath and tired.

Symptoms include:

- Fatigue
- Breathlessness and difficulty in breathing
- Weight gain due to fluid retention
- Inability to lie flat in bed due to fluid retention in lungs
- Swelling in legs (edema)

It is useful to consult a doctor if you feel fatigue or sudden weight gain.

## Aggravating factors

Any factor that increases the heart workload may aggravate existing heart failure or initiate heart failure. Some aggravating factors are:

- Arrhythmias (irregular heart beat)
- Anemia (decreased hemoglobin in blood)
- Hormonal factors, e.g. increased thyroid hormone
- Pregnancy

## Compensatory Mechanisms

The heart is a vital organ that helps pump blood to every organ in the body. When the heart fails considerable changes occur in the heart as well as other organs as fluid starts accumulating.

Some major changes are:

**Heart** - the heart tries to compensate by increasing the blood flow from the heart and the heart size may increase

**Lungs** - swelling and fluid accumulation in the lungs (Pulmonary edema) and hence difficulty in breathing

**Kidney** - kidneys begin to lose their normal ability to excrete salt (sodium) and water. As a result, the kidneys may begin to fail

**Liver** - fluid accumulation in the liver impairs its ability to excrete toxins from the body and produce essential proteins

Over time, untreated heart failure will affect virtually every organ in the body.

## Diagnosis

Your doctor diagnoses heart failure, by medical history alone but may ask you to undergo a series of diagnostic tests.

## Medical History

Which includes:

- Physical examination
- Questions about your symptoms, risk factors, personal history and family history of any heart disease.

(Refer fig. 8)



(Fig. 8)

## Chest X-ray

A chest x-ray can show if your heart is enlarged and if you have fluid in and around your lungs.

(Refer fig. 9)

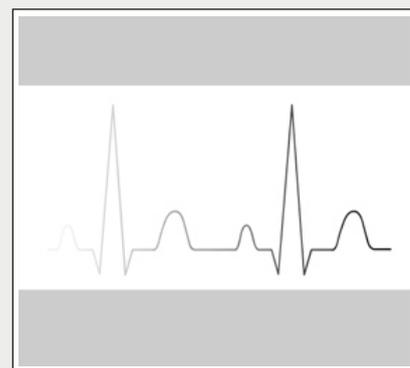


(Fig. 9)

## EKG or ECG (Electrocardiogram):

EKG is a test to measure the electrical activity of the heart and provides your doctor with information about your heart rate, rhythm, size of the heart chambers and previous damage to the heart. It is non-invasive and painless and is performed by attaching electrodes to various parts of the body.

(Refer fig. 10)



(Fig. 10)

### Echocardiogram

Echocardiogram is a test that uses sound waves to create a moving picture of the heart. The picture is much more detailed than x-ray images and involves no radiation exposure. These ultrasound images help identify abnormalities in the heart muscle and valves, and find any fluid that may surround the heart. You can see your ventricles squeeze and relax, and watch the valves open and close in rhythm with your heartbeat.

(Refer fig. 11)

### Nuclear Heart Scans

This test shows blood flow to the heart and any damage to the heart muscle. A radioactive dye is injected into your bloodstream. A special camera can see the dye and find areas where blood flow is reduced.

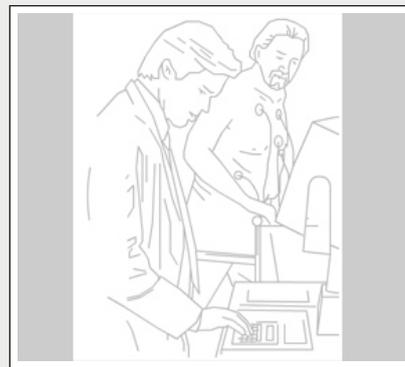
(Refer fig. 12)

### Angiography (Cardiac Catheterization):

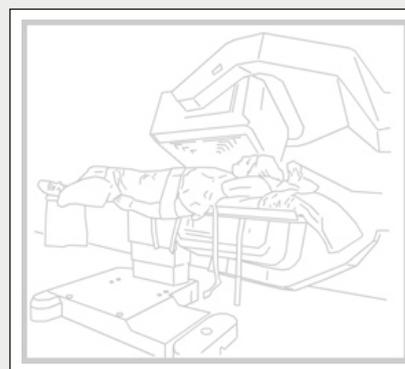
Angiography is a test that enables your doctor to take x-ray images of the inside of your blood vessels. This procedure is performed by a cardiologist and involves threading a tiny catheter through a small incision into a large artery, usually in your groin.

Once the catheter reaches the site of the blood vessel to be viewed, a dye is injected and x-ray images are taken. Angiography enables your doctor to view how blood circulates in the vessels in specific areas of the body.

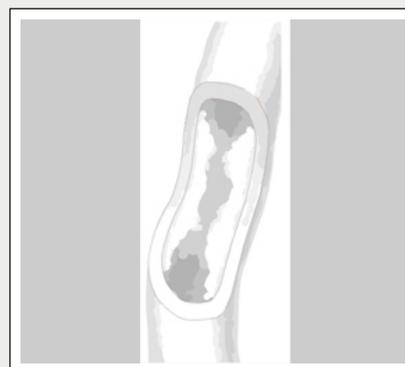
(Refer fig. 13)



(Fig. 11)



(Fig. 12)



(Fig. 13)

## Management

Heart failure management should start after diagnosis and includes the following:

### General Management

- Reduction of physical activity - to reduce demand on the heart
- Dietary modifications - low salt diet
- Losing weight- if overweight
- Quitting smoking
- Alcohol restriction

## Medications

Heart failure drugs include:

**Diuretics** - promote salt and water excretion by the kidneys thereby reducing the heart workload and symptoms of fluid retention. They help relieve shortness of breath and leg swelling.

**Beta blockers** - work by slowing down the heart rate and decreasing the force of the heart muscle. This reduces the heart's need for oxygen and improves the supply of blood to the heart muscle.

**ACE inhibitors** - these medications open up blood vessels and decrease the work load of the heart.

**Digoxin (Digitalis Glycosides)** - increase the ability of the heart muscle to contract properly and prevent heart arrhythmias.

## Surgery

**Cardiac Transplantation** Cardiac transplantation is the process of removing a person's failing heart and replacing it with a suitable donor heart. The donor heart is usually from a person who has been declared clinically brain dead.

It is recommended in younger patients with severe heart failure and life expectancy less than 6 months.

## Prevention

The following life style modifications can help to prevent or lower your risk for heart disease and heart failure and improve your health:

Understand all about heart failure, symptoms, related conditions, etc.

Healthy Diet Choices - eating a low fat, low salt, low cholesterol diet.

Don't Smoke - If you do smoke, talk to your doctor about available options to help you quit. You will immediately lower your risk of heart disease as soon as you quit.

Exercise - increasing your physical activity is a great way to reduce stress, improve sleep, lose weight, and improve your overall sense of well being. Always discuss with your doctor before beginning any new exercise program.

Weight Loss - being overweight puts extra strain on your heart. Discuss weight loss options with your doctor and follow his advice.

Treat related conditions - such as high cholesterol, high blood pressure, diabetes, obesity, and being overweight.

Regular health screenings and following your doctor's advice.

## Disclaimer

Heart disease is preventable and the actions you take to reduce your risk of heart disease by making lifestyle changes will increase your chances for a long and healthy life.

**YOUR SURGERY DATE**

**READ YOUR BOOK AND MATERIAL**

**VIEW YOUR VIDEO /CD / DVD / WEBSITE**

**PRE - HABILITATION**

**ARRANGE FOR BLOOD**

**MEDICAL CHECK UP**

**ADVANCE MEDICAL DIRECTIVE**

**PRE - ADMISSION TESTING**

**FAMILY SUPPORT REVIEW**

**Physician's Name :** \_\_\_\_\_

**Patient's Name :** \_\_\_\_\_

**Physician's Signature:** \_\_\_\_\_

**Patient's Signature:** \_\_\_\_\_

**Date :** \_\_\_\_\_

**Date :** \_\_\_\_\_