

## Anjali Sancha

## Abstract

Interventional cardiology is a branch of medical specialty of cardiology that deals specifically with the catheter based treatment of structural heart disease. Various procedures named: angioplasty, ELANA, MIDCAB, TECAB etc has evolved, which involves the extraction of clots from occluded coronary arteries, deployment of stents and balloons through a small hole made into major artery, leaving no scars, leading to increased life span of people suffering from cardiovascular problems.

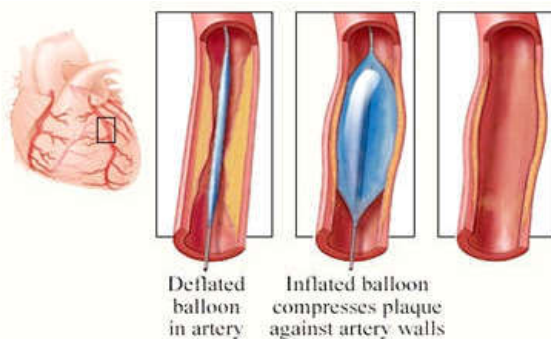
**Keywords:** Cardiology ; Interventional Cardiology; Angioplasty.

## Introduction

Advancement in science and imaging technology has given rise to variant modalities of treatment. Among these, interventional cardiology is one of them.

*Interventional Cardiology* is also one of the branches in cardiology which mainly deals with the catheter based treatment of structural cardiac diseases.

The main advantages of using this innovation are the avoidance of the scars, pain, and long postoperative hospitalization & recovery associated with surgery.

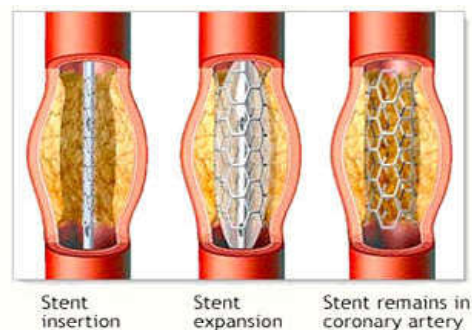


## For Coronary Heart Disease

Coronary artery disease is mainly caused by hypertension, diabetes, sedentary lifestyle, smoking, high cholesterol levels, diets rich in fats, and other cardiovascular disease which lead to blockage of the arteries.

- *Angioplasty*

It is a technique used to dilate an area of arterial blockage with the help of a catheter, which is introduced through the skin of the groin or arm. Percutaneous Transluminal Coronary Angioplasty (PTCA) is among one of them.



- *Vascular bypass*

There are various types of bypass surgeries, like femoral popliteal bypass surgery and cerebral artery bypass surgery.

**Excimer Laser Assisted Nonocclusive Anastomosis (Elana)**

Excimer laser assisted nonocclusive anastomosis

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(ELANA) is a new technique in vascular surgery and neurosurgery in which bypass is created without interrupting blood flow in the recipient blood vessels. Therefore, chances of stroke or rupture of an aneurysm are less.

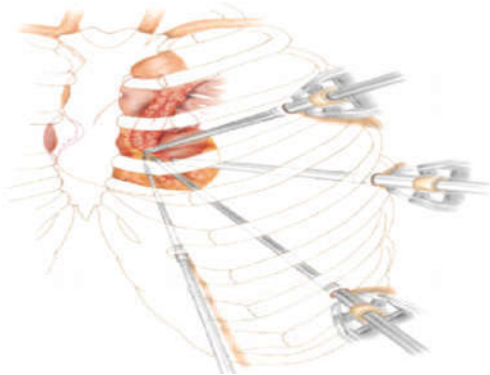
#### ***Minimally Invasive Direct Coronary Artery Bypass (Midcab)***

Another name of for MIDCAB is “keyhole” surgery because it involves operation through a keyhole. It is a form of off-pump coronary artery bypass surgery (OPCAB).

“Off-pump” indicates that the heart-lung machine is not used. MIDCAB differs from OPCAB in the type of incision used for the surgery, i.e. in MIDCAB, mini-thoracotomy is done whereas median sternotomy is done for CABG & OPCAB.

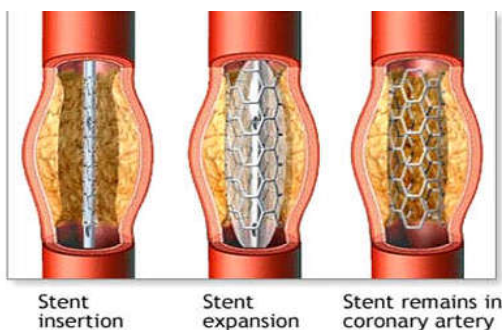
#### ***Totally Endoscopic Coronary Artery Bypass Surgery (TECAB)***

TECAB is an absolute endoscopic robotic surgery used to treat CAD. It is an advanced form of MIDCAB.

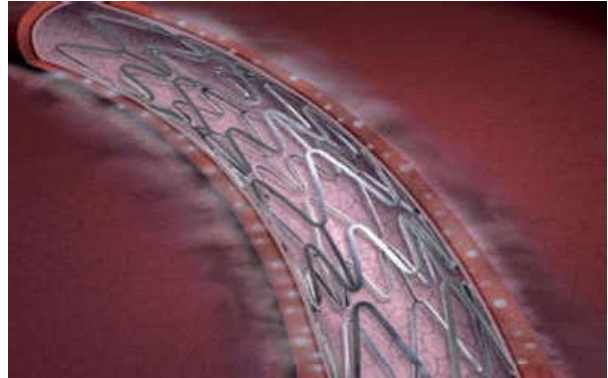


#### ***Coronary Stent & Drug-Eluting Stents***

These were designed to overcome, some of the shortcomings of the angioplasty. These are made up of stainless tube having slots. It is kept in collapsed state over a balloon-catheter and when balloon gets inflated, stent expands and pushes itself against the inner wall of the coronary artery.



Drug-eluting stent slowly releases a drug and it has been found that there are reduce incidence of reoccurrence of plaque or blockage. Sirolimus is the drug which gets released from the stent and is cytostatic in nature.



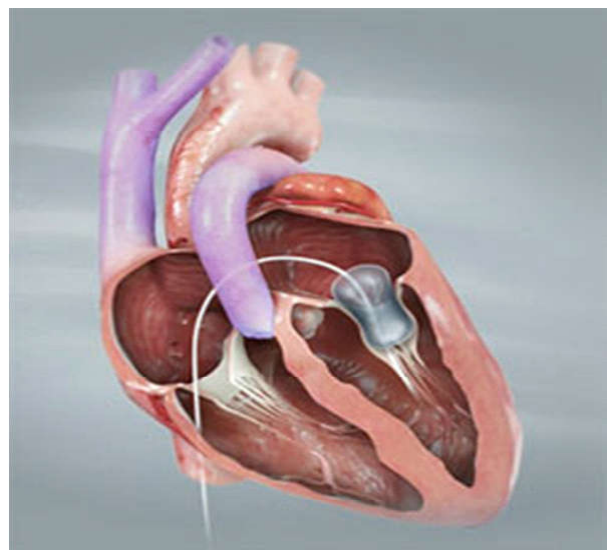
#### ***For Valvular Heart Disease***

Valvular heart diseases may be congenital or acquired. Treatment modalities may include medication along with valve repair or replacement.

#### ***Heart Valve Repair***

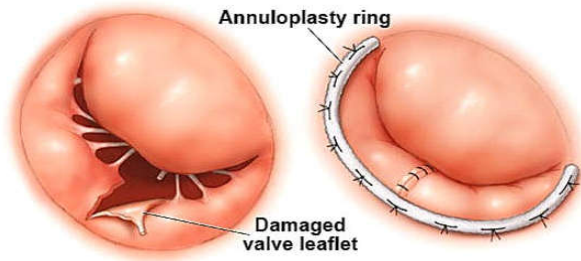
Heart valve repair includes Valvuloplasty, Valvulotomy, Mitral valve repair, Aortic valve repair, Tricuspid valve repair.

- *Valvuloplasty* is the widening of a stenotic valve using a balloon catheter. It can be aortic valvuloplasty or mitral valvuloplasty.



- *Valvulotomy* is also called as commissurotomy of cardiac valves. This surgery consists of making one or more incision at the edges of the commissure formed.
- *Mitral valve repair* is mainly used to treat stenosis

or regurgitation of the mitral valve. Repair includes annuloplasty, quadrangular resection, and Gore-Tex cord.



- *Aortic valve repair* is used to correct some aortic valve disorder but is less performed and technically more difficult than mitral valve repair. Aortic valve repair involves 2 surgical techniques:
- The Reimplantation-Technique (David-Procedure)
- The Remodeling-Technique (Yacoub-Procedure)
- *Tricuspid valve repair* is used to correct tricuspid regurgitation.

#### Heart Valve Replacement

Valve replacement is other treatment modalities in which replacement of one or more heart valves is done either by an artificial valve or bioprosthesis (homograft or xenograft).

It includes following procedures:

- Aortic valve replacement
- Mitral valve replacement
- Tricuspid valve replacement
- Pulmonary valve replacement

#### Types of Heart Valves

There are two basic types of an artificial heart valve: mechanical valves and tissue valves.



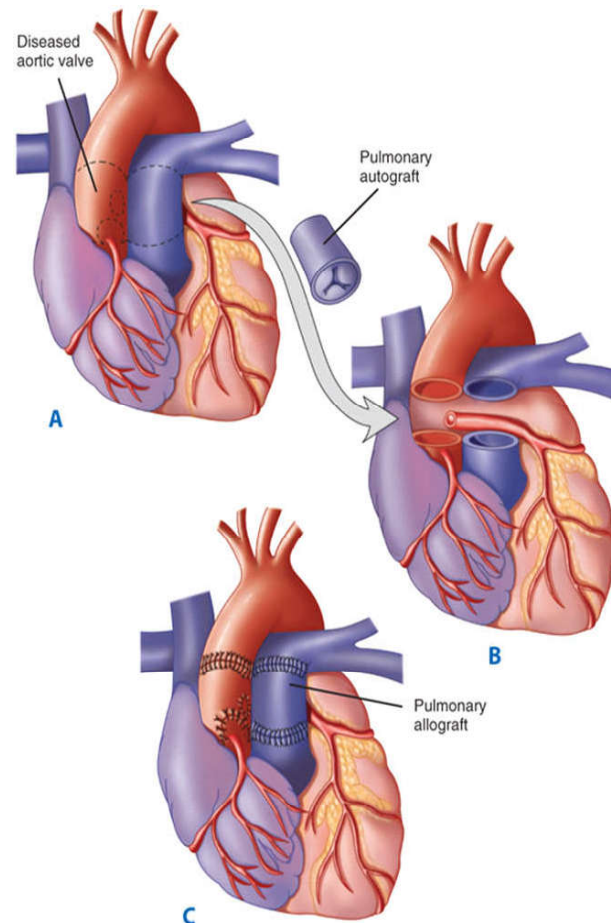
#### Mechanical Valves

These are long lasting & generally one surgery is required but there is an increased risk for blood clot formation. Therefore, the recipient of mechanical valve must take an anticoagulant for the lifetime, which makes the patient more prone to bleeding.

#### Tissue Valves

Tissue heart valves are usually made from animal tissues. Homograft is also used.

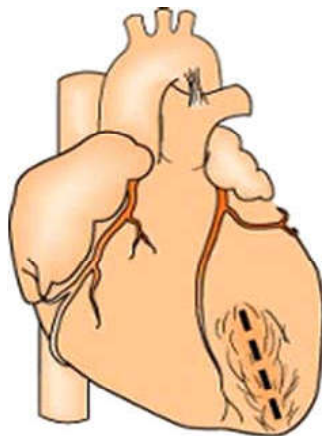
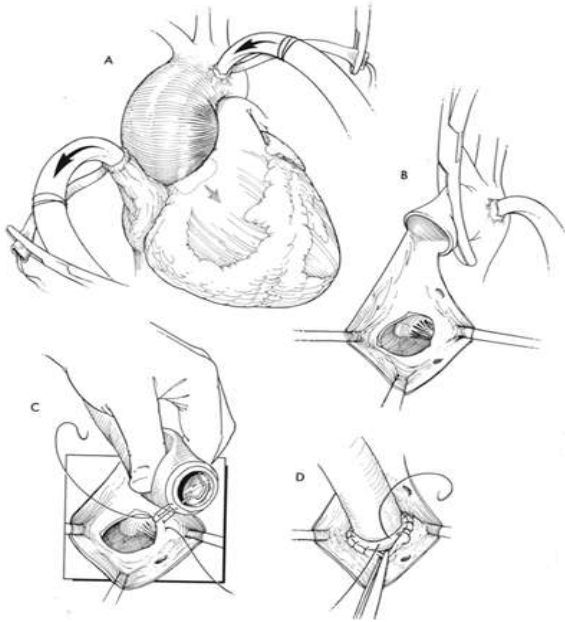
*Ross procedure* is also called as pulmonary autograft where a diseased aortic valve is replaced with the person's own pulmonary valve. a pulmonary homograft (valve from a cadaver) is then used to replace the patient own pulmonary valve.



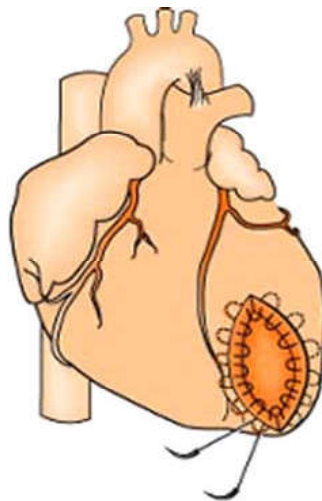
#### For Great Vessels

- *Bentall Procedure*

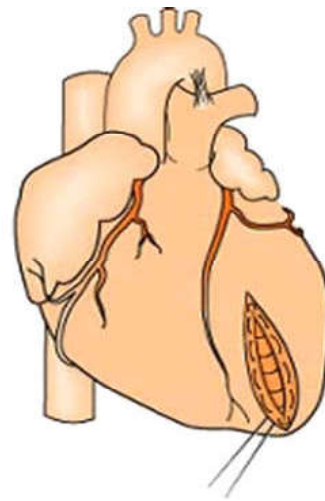
It is used to treat combined aortic valve and ascending aorta disease including lesion associated with Marfan Syndrome.



Incision line through  
dead scarred tissue



Purse-string stitches  
around the dead  
tissue



Pulling of purse string  
and closing of left  
ventricle

- *Pulmonary thromboendarterectomy (PTE)*

PTE involves removal of the blood clot (thrombus) from the pulmonary arteries. It is usually done for the treatment of the thrombotic pulmonary hypertension.

*For Myocardium*

1. **Cardiomyoplasty:** It is a surgical procedure in which healthy muscle from another part of the body is wrapped around the heart to provide support. Latissimus dorsi muscle is the most often used and a special pacemaker is implanted to make the skeletal muscle contract.
2. **Dor procedure:** the another name of Dor procedure is endoventricular circular patch plasty (EVCPP), which is used to restore a dilated left ventricle to its normal, elliptical geometry. A circular suture and a Dacron patch is used to LV aneurysm & exclude scarred parts of the septum and ventricular wall.

3. **Ventricular reduction:** Ventricular reduction is a type of surgery is done to reduce enlargement of the heart from cardiomyopathy or ischemic aneurysm formation.
4. **Septal myectomy:** It is a cardiac surgery used in the treatment of hypertrophic cardiomyopathy (HCM). The surgery involves removing a portion of the septum that is blocking the blood flow from the left ventricle to aorta.
5. **Alcohol septal ablation:** This is a percutaneous, minimally-invasive treatment done to relieve symptoms and improve functional status in severely symptomatic patient with hypertrophic cardiomyopathy (HCM), who meets strict clinical

anatomic and physiologic selection criteria. This technique creates a small controlled heart attack, killing the area of heart muscle responsible for the obstruction, and eventually causing it to become less thick.

### Conclusion

In today's era, interventional cardiology has proved itself to be a boon for the patient suffering from cardiac disorders. It results in increasing the life span of people as well as they have better prognosis. There is an increase in the incidences of

cardiac disorders for the past few decades, which is mainly due to the change in lifestyle. By the advancement of imaging technology, diagnosis and treatment of the cardiac disorders has been made easier and accessible with reduced risk.

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