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Angioplasty and Need of Restenosis

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Abstract:
Angioplasty is an invasive procedure to treat blockages or narrowing in the blood vessels, typically in the heart's coronary arteries. Angioplasty is also used in other parts of the body that have narrow or blocked arteries, such as your neck, arms and legs, kidneys and pelvis. There are three main types of stents used in Angioplasty procedures bare-metal stents (BMS), drug-eluting Stents (DES), and bio absorbable stents. Angioplasty can be repeated multiple times, up to six times. However, the effectiveness of angioplasty decreases after a second restenosis.

Keywords: Angioplasty, Types of Stent, Procedure, Benefits.

Introduction:
Angioplasty is a minimally invasive procedure that opens blocked or narrowed arteries using a balloon. It's often performed on the coronary arteries, which supply blood to the heart. Angiography is performed before Angioplasty

Differentiating points between Angiography and Angioplasty:

Sr no	Angiography	Angioplasty
1	It is a diagnostic procedure	It is an invasive procedure
2	It uses X-rays and a contrast dye to examine the body's blood vessels, including the heart, brain, kidneys, and legs	It is to treat blockages or narrowing in the blood vessels, typically in the heart's coronary arteries.
3	Angiography helps doctors to identify the location and severity of the blockage,	Angiography helps doctors to treat the location and severity of the blockage,
4	If angiography is being performed, contrast dye gets injected through the catheter, and X-ray images are taken once dye flows through the blood vessels.	If angioplasty is performed, a balloon attached to the catheter is inflated to widen the narrowed artery, and a stent may be placed to keep the artery open.

Types of angioplasty

- **Coronary angioplasty:** A procedure to open blocked or narrowed coronary arteries. It's also known as percutaneous transluminal coronary angioplasty (PTCA).
- **Laser angioplasty:** In this procedure a laser is used to break down blood clots and create heat that va-

porizes blockages.

- **Fractional Flow Reserve (FFR) guided angioplasty:** The Technique Uses a pressure-sensitive wire to measure blood flow and pressure to determine the severity of blockages.

Procedure of Angioplasty

It consist of,

- A catheter with a balloon at the tip is inserted into an artery.
- The catheter is guided to the blocked artery using X-ray pictures.
- The balloon is inflated to open the artery.
- The balloon is deflated and removed.
- A stent may be inserted to keep the artery open.

Treatment Process of Angiography and Angioplasty

The treatment process for angioplasty and angiography typically involves the following steps:

1. **Preparation:** Patients will be given instructions on preparing for the procedure, such as not eating or drinking anything for a certain period before the procedure. They may also need to stop taking certain medications prior to the procedure.
2. **Anesthesia:** Local anesthesia numbs the area of catheter insertion. Patients are also given a sedative to help them relax during the procedure.
3. **Insertion of catheter:** A thin, flexible tube called a catheter is inserted in the groin or arm and guided through the blood vessels to the examined or treated area.
4. **Angiography:** If angiography is being performed, contrast dye gets injected through the catheter, and X-ray images are taken once dye flows through the blood vessels.
5. **Angioplasty:** If angioplasty is performed, a balloon attached to the catheter is inflated to widen the narrowed artery, and a stent may be placed to keep the artery open.
6. **Recovery:** After the procedure, patients are usually monitored for a few hours before being discharged. They will be given instructions on caring for the insertion site and any needed medications.

The process usually takes one to two hours, and patients can generally go home the same day.

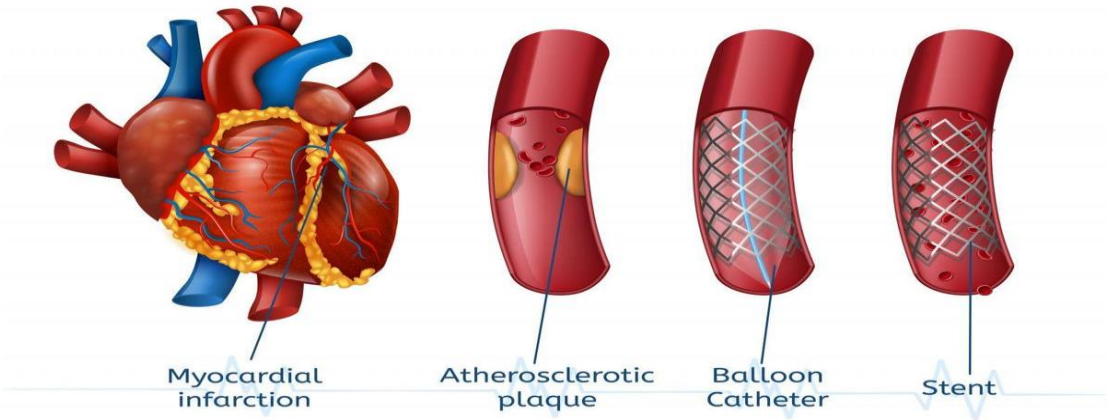

Fig No 1 angioplasty a) balloon catheter b) stent

Angioplasty is used in treatment of following,

1. **Atherosclerosis**; - it is a collection of plaque made of fat and cholesterol in our arteries in several different places in our body.
2. **Coronary artery disease**: - These diseases are treated by Coronary angioplasty (percutaneous coronary intervention) thus it can help us to treat a narrow or blocked coronary artery.
3. **Peripheral artery disease**:- In these diseases angioplasty treats atherosclerosis in the major arteries in our arms, legs and pelvis.
4. **Carotid artery disease:-**Here Angioplasty can help with blocked arteries in our neck, if Left untreated, they can lead to a stroke if our brain which do not getting enough oxygen.
5. **Chronic kidney disease**:-When plaque collects in the arteries in our kidneys, it affects oxygen supply to our kidneys. Sometimes a renal artery angioplasty can help.

Benefits of Angiography and Angioplasty

The benefits of Angiography and Angioplasty include the following:

1. **Improved diagnosis**: Angiography helps doctors accurately diagnose blockages or narrowing in the blood vessels, allowing for appropriate treatment.
2. **Minimally invasive**: Both angiography and angioplasty are minimally invasive procedures, meaning they involve small incisions and lower risk of complications than traditional surgery.
3. **Shorter recovery time**: Because they are minimally invasive, both angiography and angioplasty have shorter recovery times than traditional surgery.Angioplasty is a highly effective treatment for coronary artery disease and other blockages in the blood vessels.
4. **Reduced risk of heart attack and stroke**: By identifying and treating blockages in the blood vessels, angiography, and angioplasty can help reduce the risk of heart attack and stroke.

Types of Stents

The type of Stent depend on the severity of blockage, age, medical history, and other factors of Patient.
There are three main types of stents used in Angioplasty procedures:

1. Bare-metal stents (BMS),
2. Drug-eluting Stents (DES), and
3. Bio absorbable stents.

Bare-Metal Stents (BMS): These stents are made from stainless steel or cobalt chrome and offer a permanent, physical support to the artery wall. They can reduce symptoms associated with heart disease but may cause scarring, which can lead to future blockage.

Drug -Eluting Stents (DES): These stents are coated with drugs that help to prevent scar tissue formation and future blockages of the artery. In addition, they also release medications over time, which help reduce inflammation and improve blood flow in the area.

Bio Absorbable Stent: This is made of magnesium alloy. Gets dissolved in 2 years. However, it is not suitable for elderly people with calcium.

Medication after Stent Placement

The medications prescribed after the procedure prevent complications and ensure a successful recovery. Some of the commonly prescribed medications include:

- Antiplatelet Drugs: These medications, such as aspirin and clopidogrel, help prevent blood clots by reducing the stickiness of platelets in the blood.
- Statins: Statins are used to lower cholesterol levels and prevent the buildup of fatty deposits in the arteries.
- Beta-blockers: Beta-blockers help regulate heart rate and reduce the workload on the heart, promoting healing after angioplasty.
- ACE Inhibitors or ARBs: These drugs help lower blood pressure and reduce strain on the heart.
- Nitroglycerin: Nitroglycerin helps relieve chest pain and discomfort.
- Aspirin: A low-dose aspirin is usually taken for life
- Clopidogrel (Plavix): An antiplatelet medication that works with aspirin to prevent blood clots

Other tips to prevent repeated restenosis:

1. Eat a heart-healthy diet
2. Exercise regularly
3. Stop smoking
4. Reduce stress
5. Reduce your salt intake
6. Avoid sugary foods.

Need of Restenosis are:

1) Scar tissue can form under the stent, causing the artery to narrow again.
2) In-stent restenosis: This is when the artery narrows again in the area that was treated with a stent.

Summary

Angioplasty is a minimally invasive procedure that opens blocked or narrowed arteries using a balloon but even after a successful angioplasty and stent placement, it's important to live a healthy lifestyle. This includes eating a healthy diet, exercising and not using tobacco products. Be sure to keep taking medicines prescribed and go to all of your follow-up appointments. Restenosis is needed when there is formation of scar tissue under a stent causing the artery to narrow again. Also in case of in-stent restenosis i.e. when the artery narrows again in the area that was treated with a stent.

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