

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



( وَمَا تَوْفِيقِي إِلَّا بِاللَّهِ عَلَيْهِ تَوَكَّلْتُ وَإِلَيْهِ أُنِيبُ )

## Coronary Assessment by Angiogram



BY

**HESHAM REZK**

CATH. LAB. TECHNICIAN

ISMAILIA SUEZ CANAL AUTHORITY HOSPITAL

## INTRODUCTION

- **Coronary Angiogram is the most accurate examination which detect coronary artery diseases and less in misdiagnosis.**



To avoid misdiagnosis we should have

- **Good machine**
- **Good radiology technician**
- **Selective cannulation for LMCA & RCA**
- **Adequate amount of contrast media**



To avoid misdiagnosis we should have

- **Show image pre & post dye injection**
- **Adequate number of projections**




## Good machine


- Shows accepted quality of images.
- Free of major defects e.g. x ray tube errors or fluoroscopy, heat up, difficulty of table or C-arm movements.
- Respect patient weight with system capabilities.



## Good radiology technician

- Able to adjusting system parameters “ K.V, mAs, frame rate, P.W, filters....
  - Aware with machine problems and able to solve it as much as possible.
  - Able to deal with machine in emergencies.
  - Applying ALARA principle.
  - Aware with standard projections.
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## Selective cannulation for LMCA & RCA

- In case of non selective cannulation; we may not accurately evaluative CHD; because of filling defect of contrast media in the coronaries ; resulting in false impression about the image and then incorrect diagnosis.
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## Adequate amount of contrast media

- Powerful contrast media injection at short time or weak injection at long time; both resulting in filling defect in coronaries.
- According to AHA the best rate of CA dye injection which appears good image are:



## Adequate amount of contrast media

- In RCA: from 2-3 ml for 2-3 seconds with total volume 6 ml of dye.
- In LMCA: from 2-4 ml for 2-3 seconds with total volume 8 ml of dye.



## Show image pre & post dye injection

- Show image pre dye injection; shows calcifications / previous stent / important for catheter calibration in QCA.
- Show image after dye injection ; shows the efficiency of dye drainage of arteries and venous return.



## Adequate number of **projections**

Why ?

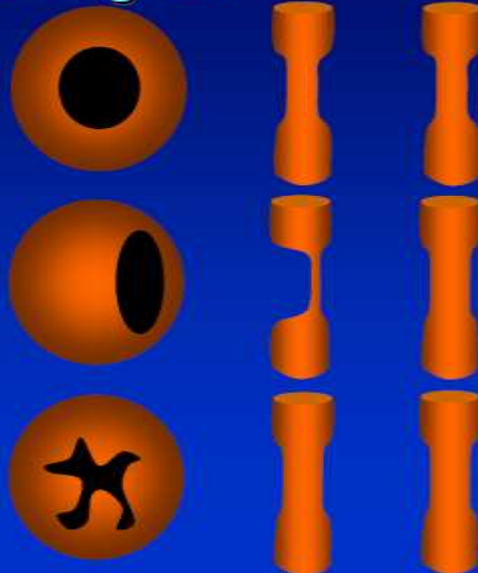
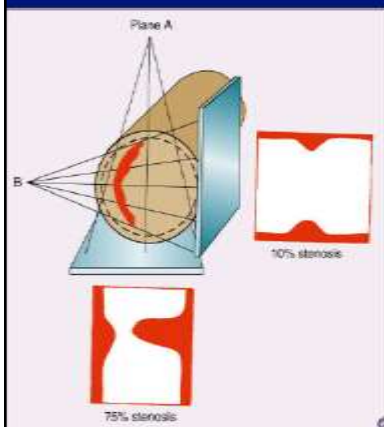


## Adequate number of **projections**

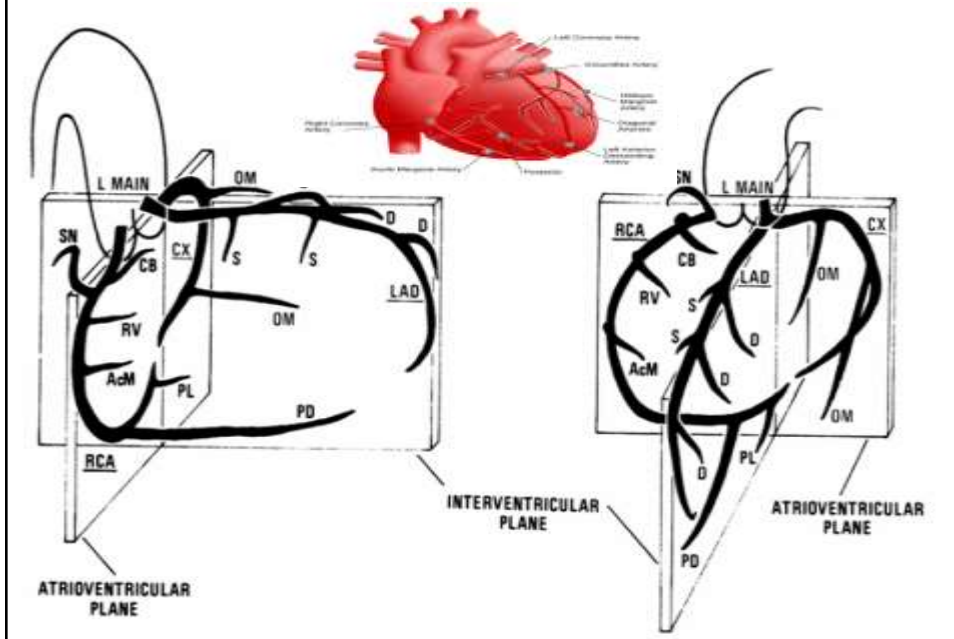
- To visualize all parts and sides of coronaries.
- To can evaluate percentage of stenosis.
- To can measure distance of lesions.
- To avoid overlapping arteries.
- To focus on specific or anastomotic area.



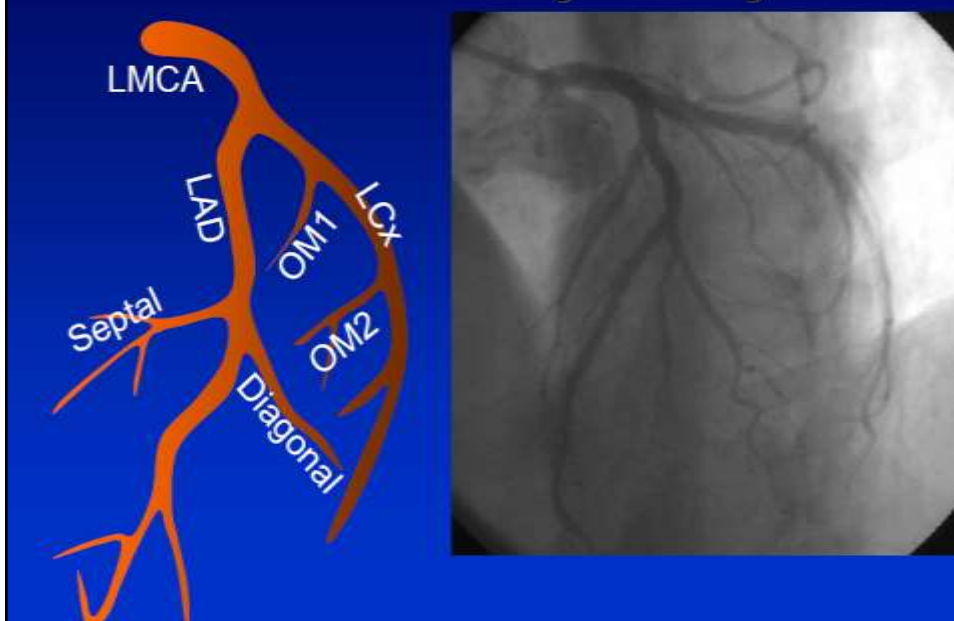
## Pitfalls of Coronary Angiography Lumen-o-gram



## Atrioventricular and Interventricular Planes



## Left Coronary Artery





## Standard Angiographic Views

### Left Coronary Artery

LAO-Caudal    PA projection

RAO-Caudal    PA-Caudal

RAO-Cranial    PA-Cranial

LAO-Cranial    Left lateral

### Right Coronary Artery

LAO 30

RAO 30

PA Cranial



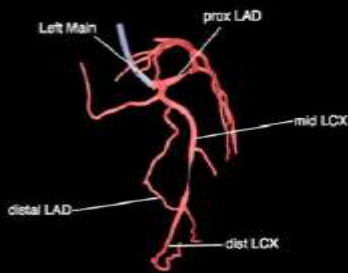
## Standard Angiographic Views

### Left Coronary Artery

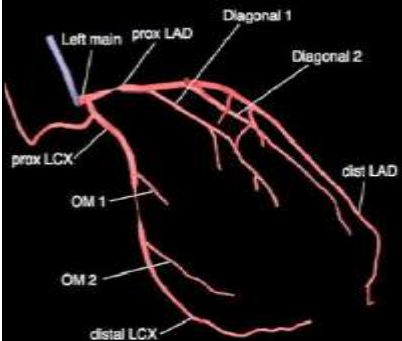
- ◆ LAO-Caudal view: 40° to 60° LAO and 10° to 30° caudal
  - ◆ Best for visualizing left main, proximal LAD and proximal LCx
- ◆ RAO-Caudal view: 10° to 20° RAO and 15° to 20° caudal
  - ◆ Best for visualizing left main bifurcation, proximal LAD and the proximal to mid LCx



# LAO Caudal (Spider)



# RAO Caudal



# Standard Angiographic Views

## Left Coronary Artery

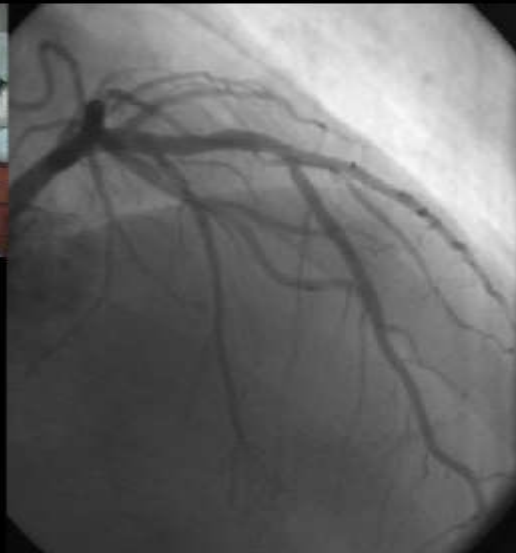
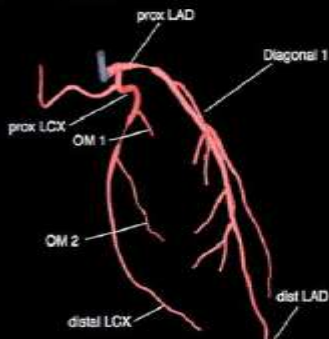
- ◆ **Shallow RAO-Cranial view**: 0° to 10° RAO and 25° to 40° cranial
  - ◆ Best for visualizing mid and distal LAD and the distal LCx (LPDA and LPL)
- ◆ **LAO-Cranial view**: 30° to 60° LAO and 15° to 30° cranial
  - ◆ Best for visualizing mid and distal LAD, and the distal LCx in a left dominant system



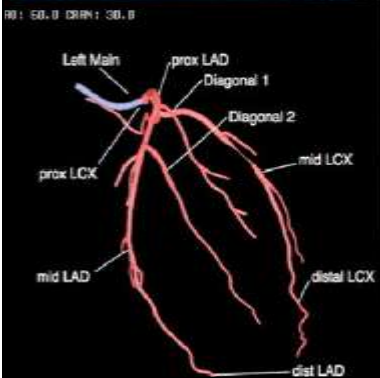
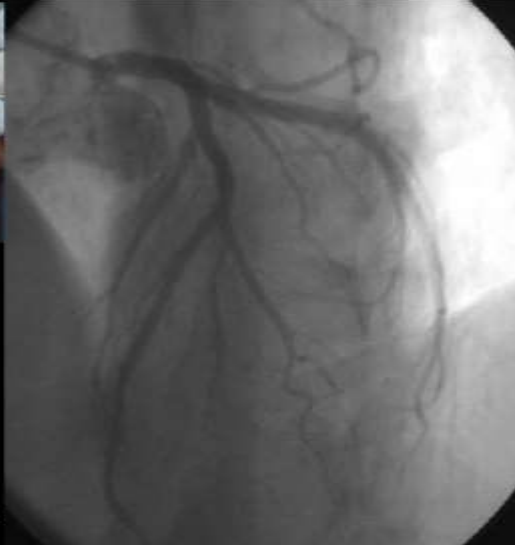
## RAO Cranial



190: 30.0 CRAN: 30.0



# LAO Cranial



## Standard Angiographic Views

### Left Coronary Artery (other views)

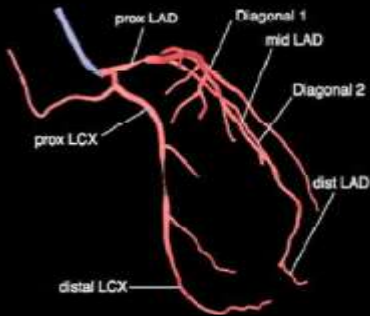
- ◆ PA projection:  $0^{\circ}$  lateral and  $0^{\circ}$  cranio-caudal
  - ◆ Best for visualizing ostium of the left main
- ◆ PA-Caudal view:  $0^{\circ}$  lateral and  $20^{\circ}$  to  $30^{\circ}$  caudal
  - ◆ Best for visualizing distal left main bifurcation as well as the proximal LAD and the proximal to mid LCx



# AP Caudal



III: 8.0 CRUI: 30.0



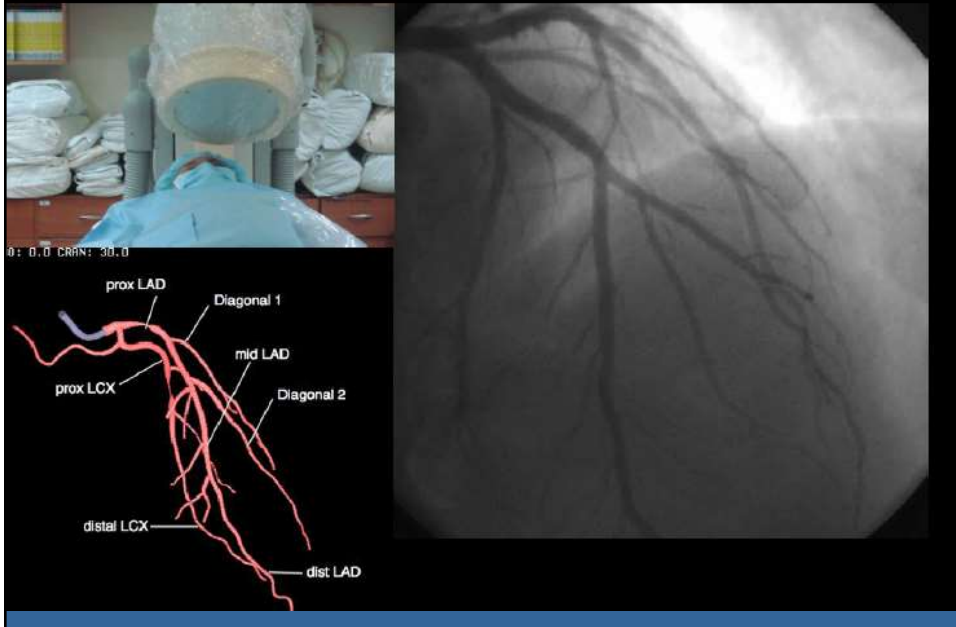
## Standard Angiographic Views

### Left Coronary Artery (other views)

- ◆ PA-Cranial view:  $0^{\circ}$  lateral and  $30^{\circ}$  cranial
  - ◆ Best for visualizing proximal and mid LAD
- ◆ Left lateral view:
  - ◆ Best for visualizing proximal LCx, proximal and distal LAD
  - ◆ Also good for visualizing LIMA to LAD anastomotic site



# AP Cranial



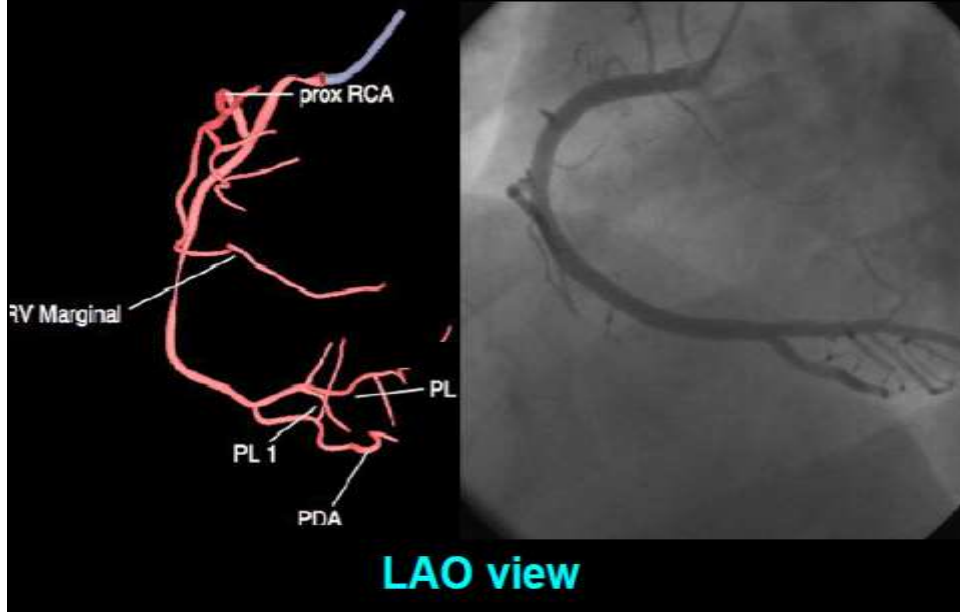
## Standard Angiographic Views

### Right Coronary Artery

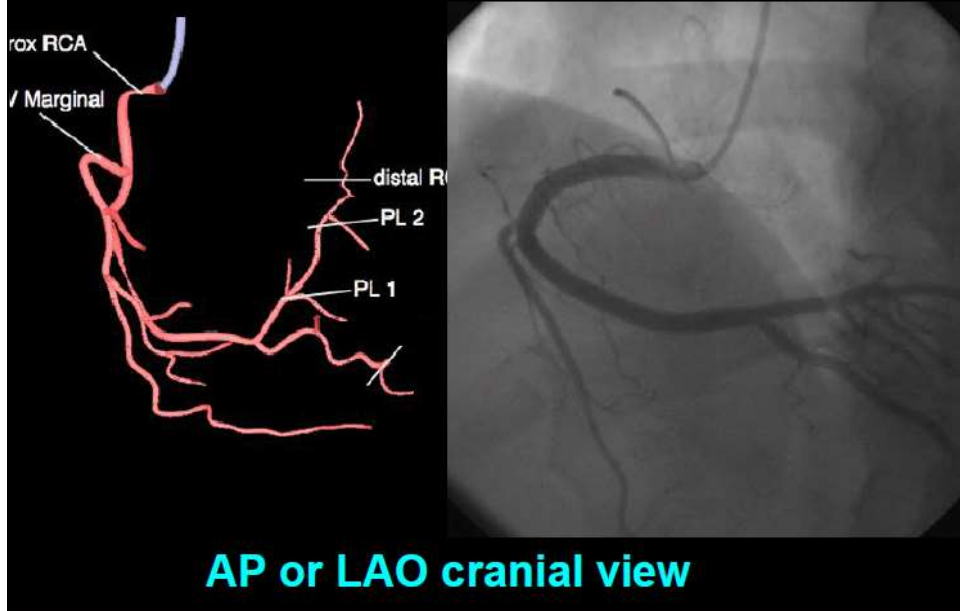
- ◆ **LAO 30: 30° LAO**
  - ◆ **Best for visualizing ostial and proximal RCA**
- ◆ **RAO 30: 30° RAO**
  - ◆ **Best for visualizing mid RCA and PDA**
- ◆ **PA Cranial: PA and 30° cranial**
  - ◆ **Best for visualizing distal RCA bifurcation and the PDA**



# Right Coronary Angiogram



# Right Coronary Angiogram

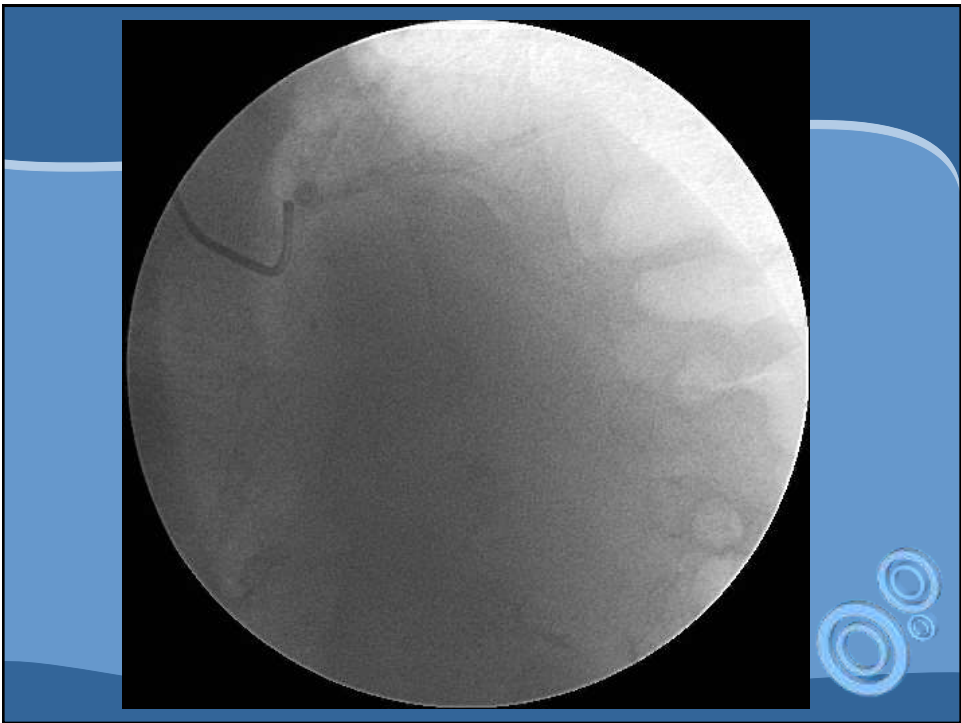
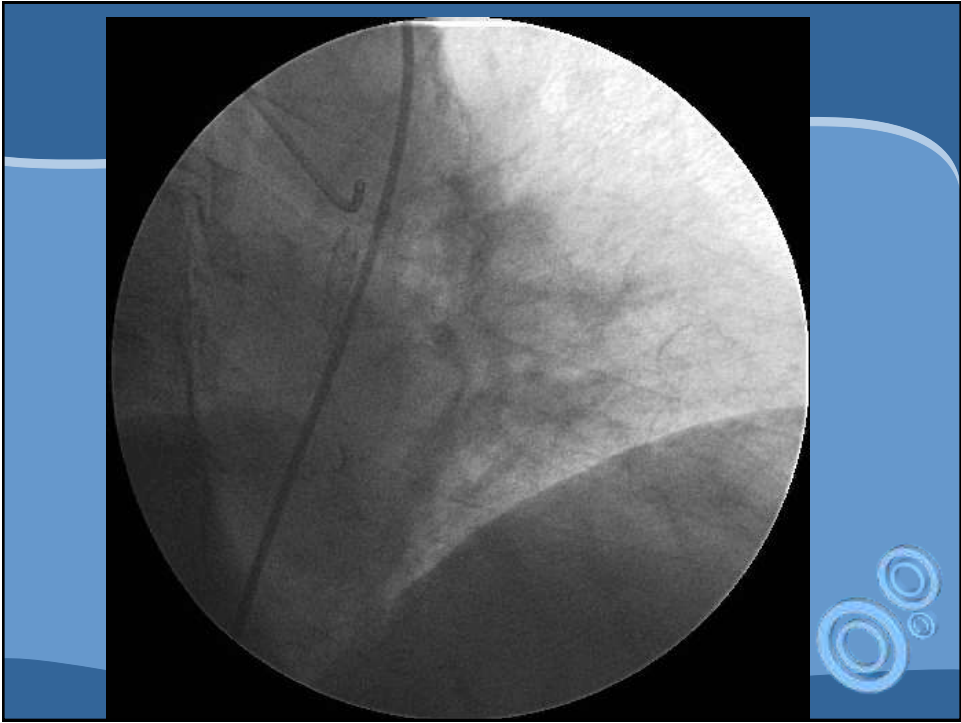


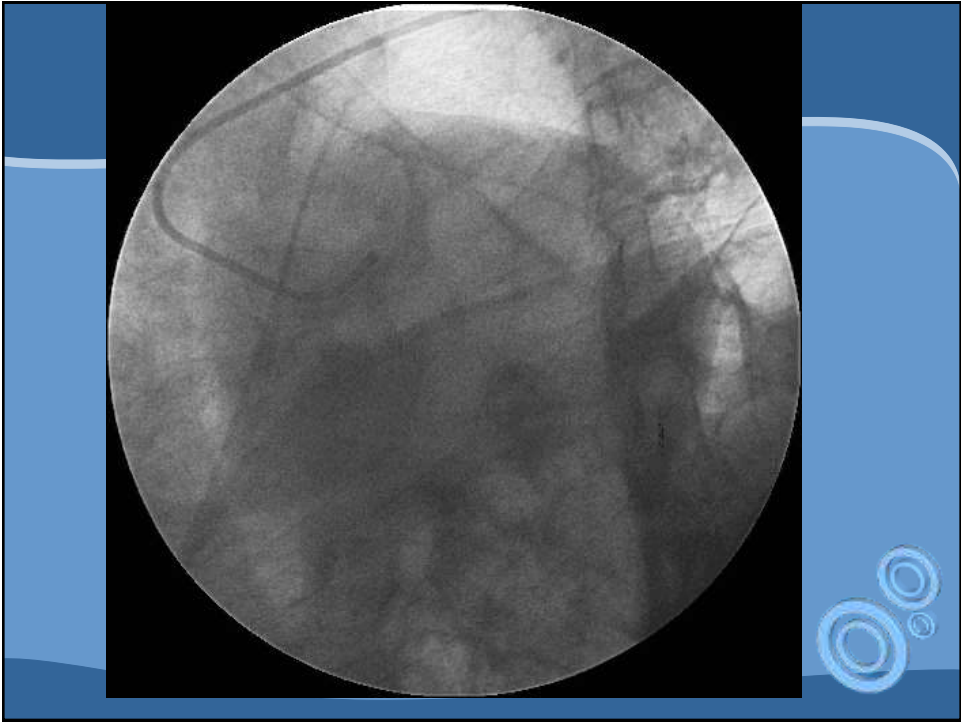
## Importance of standard projections

### CASE PRESENTATION











## **Take Home Message**

- Check your machine before starting procedure.
- The presence of an experienced technician is important issue.
- Selective cannulation is mandatory as much as possible.

## Take Home Message

- inject dye with the correct technique.
- Show image pre & post dye injection.
- Don't hesitate to take all standard projections even arteries looks normal.



Hesham Rezk