

ANGIOGRAPHY

Dr Manik Mahajan
Lecturer Radiology
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ANGIOGRAPHY

- Is the general term that describes the radiologic examination of vascular structures within the body after the introduction of an iodinated contrast medium or gas

HISTORY

- ❖ The first angiogram was performed only months after Roentgen's discovery

- ❖ ***Which was when?***

Two physicians injected chalk or mercury salts into an amputated hand and created an image of the arteries

ANGIOGRAPHY

➤ It is used to assess for diseases of the:

- ⦿ **Arteries** (these take blood to the brain, limbs and abdominal organs)
- ⦿ **Veins** (these carry blood back to the heart)

These diseases may include:

1. **Atherosclerosis:** causing them to narrow.
2. **Aneurysms:** blood vessels that become enlarged with a risk of rupture.
3. **Conditions causing internal bleeding**

TYPES OF ANGIOGRAPHIC PROCEDURES

- **Arteriography:** imaging arteries
- **Venography:** imaging veins
- **Angiography:** imaging heart and associated vessels
- **Lymphography:** imaging lymphatic vessels/nodes





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OTHER TECHNOLOGIES/MODAILITIES

which demonstrate the vasculature to a greater or less degree

- ◉ CT Angiography
- ◉ MR Angiography
- ◉ Ultrasound (particularly Doppler)
- ◉ Nuclear Medicine
- ◉ All these are used to image vessels and each has its advantages and disadvantages

PERSONNEL IN THE ANGIO ROOM

- ◉ Radiologist/ Specialist
- ◉ Nurse
- ◉ 2-3 Radiologic Technologists
- ◉ Sometimes Anesthesiologist

INDICATIONS

- ⦿ Verify the presence of tumors
 - Vascularity of tumors
- ⦿ Internal bleeding
- ⦿ Stenosis
 - Can be caused form atherosclerosis
- ⦿ Occlusions
 - Clots
 - Thrombus
 - Embolus
- ⦿ Aneurysms
- ⦿ Heart disease

CONTRAINDICATIONS

- ⦿ Previous severe reaction to contrast
- ⦿ Impaired renal function
- ⦿ Impaired blood clotting factors
- ⦿ Inability to undergo surgical procedure

CONTRAST MEDIA

- ◉ Iodinated contrast media is used
 - Can produce nausea & an uncomfortable burning sensation
 - Allergic reactions
 - Severe: anaphylactic shock
 - Shock, rapid shallow breathing, high pulse rate
 - Mild: Hives or slight difficulty breathing

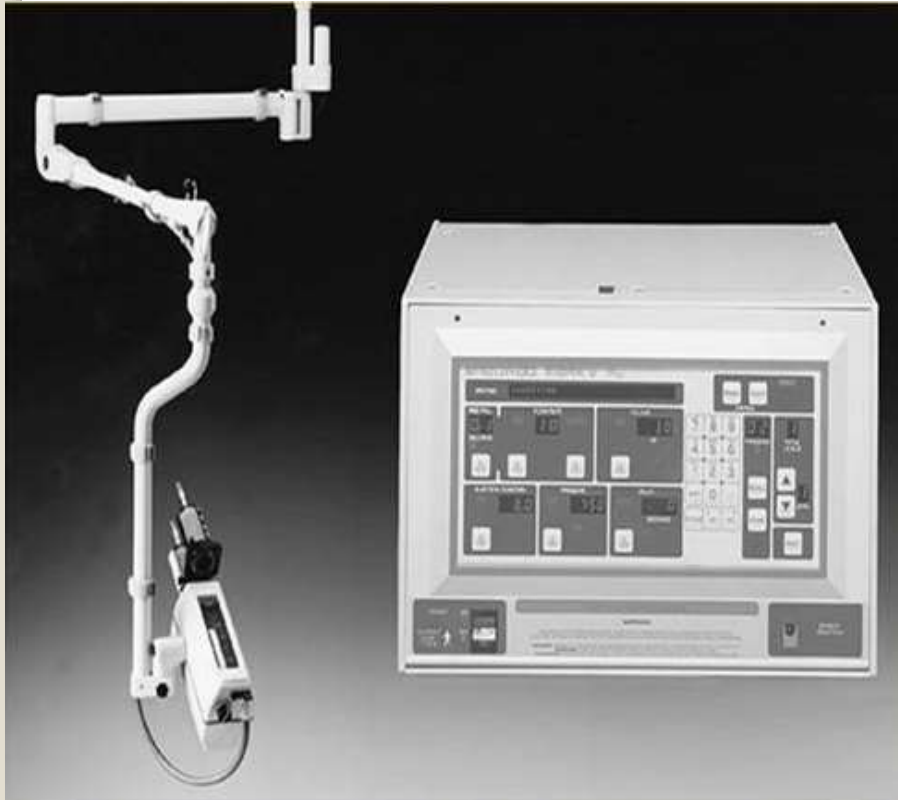
WHAT ARE THE RISKS OF CONVENTIONAL ANGIOGRAPHY?

- Conventional angiography is usually a very safe procedure but because it is more invasive than MRA or CTA, the risks of complications are greater. The risks include: minor bleeding/bruising and a small risk of damage to the vessels, but the risk of serious complications is rare.
- It is possible to suffer an allergic reaction due to the contrast medium required during the test. Thankfully, they are uncommon and usually minor (mild rash or itching). More severe reactions are possible (1 in 2500 patients) and very rarely can be life threatening (1 in 25,000).
- It is important to tell your Doctor or radiographer if you have had a previous reaction to contrast medium before your test commences.

PRESSURE INJECTORS

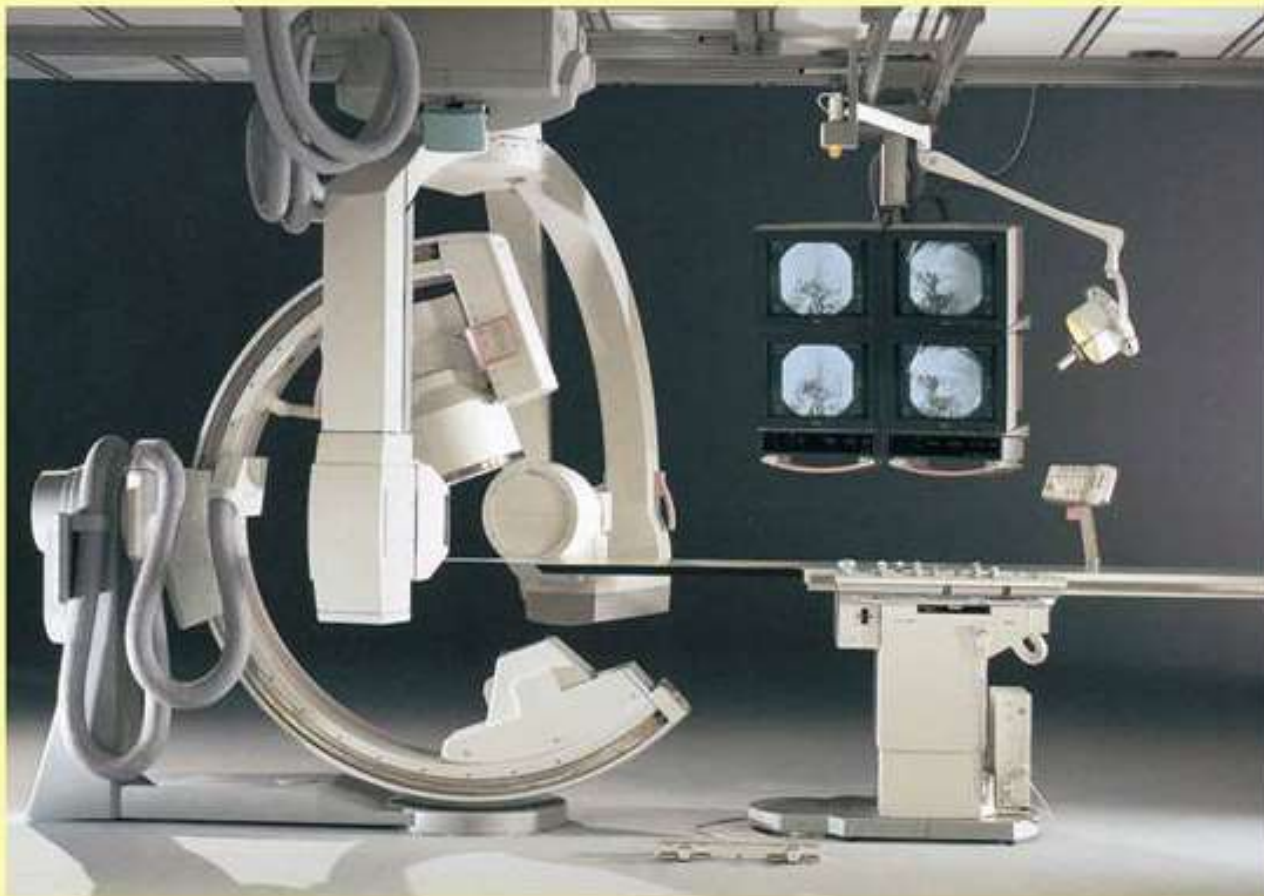
- ⦿ In most angiographic studies contrast media must be administered at a constant speed
- ⦿ Faster administration is required as in abdominal angiography
- ⦿ Slower administration in lymphangiography

WHAT IS THIS?



- Maintains flow rate
- Includes heating device
(To reduce the viscosity of the contrast media by keeping it near body temperature)

ANGIOGRAPHY EQUIPMENT



General angiographic room with biplane C-arm digital imaging

DSA: Digital subtraction angiography is primarily used

- ⦿ Gold standard of vessel imaging when other modalities are inconclusive
- ⦿ Now *common practice* to be considered as an area needing advanced training for:
 1. Radiologist: Interventional
 2. R. T. (CIT, CV) etc ANGIO tech

ANGIOGRAPHIC EQUIPMENT

Technical innovations

- image intensification
- three-phase generators
- rapid film changers
- automatic pressure injectors
- advanced catheter technology

An important offshoot of angiographic imaging

- ◉ therapeutic implications including
- ◉ Embolization
- ◉ intra-arterial drug therapy
- ◉ transluminal angioplasty
- ◉ are among the procedures that have radically changed and broadened the scope of the diagnostic imaging department

EQUIPMENT NEEDED FOR Angio*

- Biplane C-arm digital imaging
- Autoinjector
- --syringes, a heating device,
- a high-pressure mechanism
- a control panel
- Image Intensifying screen
- Sliding table

Rapid film changer (NOW DIGITAL*)

- Cut film 6 & Cassette changer /magazine

ANGIOGRAPHY EQUIPMENT

1. Puncture Needle

Stylet and Cannula

large cannula size (1.6mm)

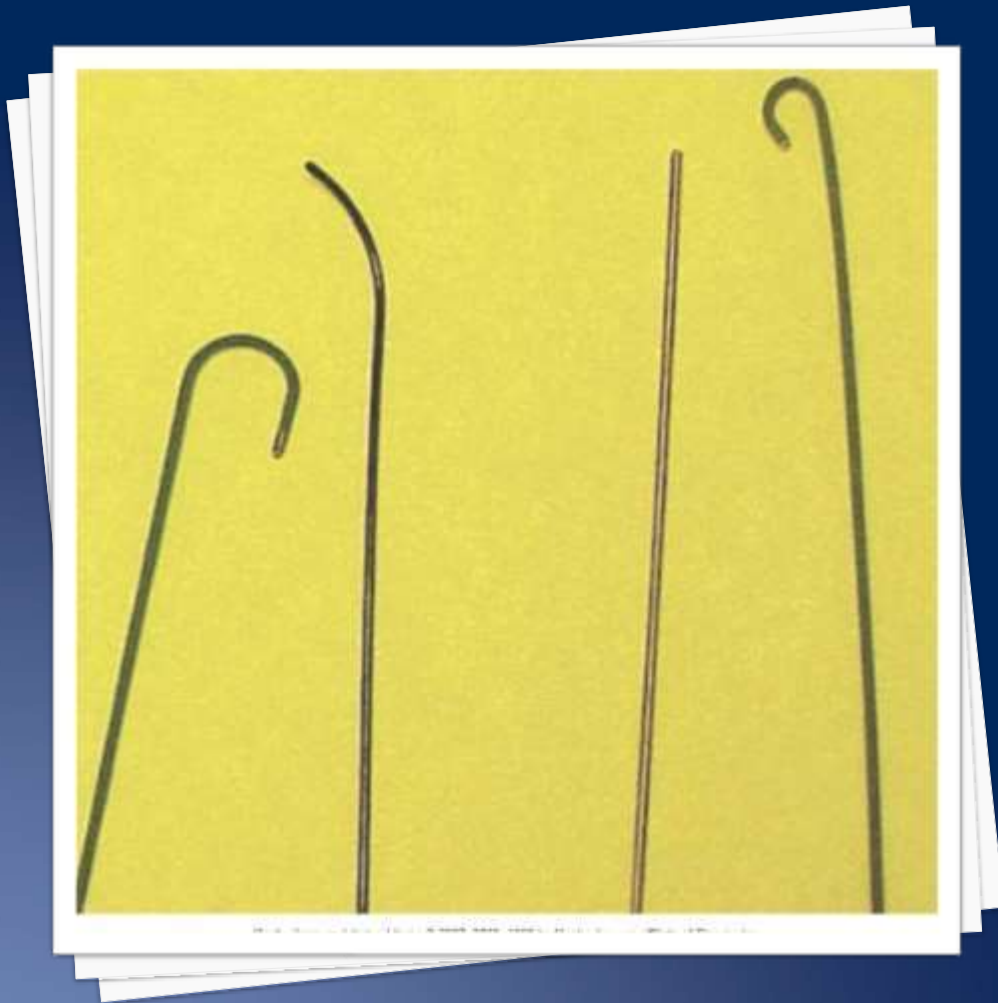
2. Guide Wire

--Soft flexible wire with the strength to pass through curved vessels (.6 – 1.0)



NEEDLES

- Vascular access needles
- Size based on external diameter of needle
- Allows for appropriate Guidewires matching
 - So internal diameter must also be known



GUIDEWIRES

- Used as a platform over which a catheter is to be advanced
- Once positioned guidewire is fixed and catheter is advanced until it meets the tip of the guidewire
- Mostly constructed on stainless steel & coated with Teflon



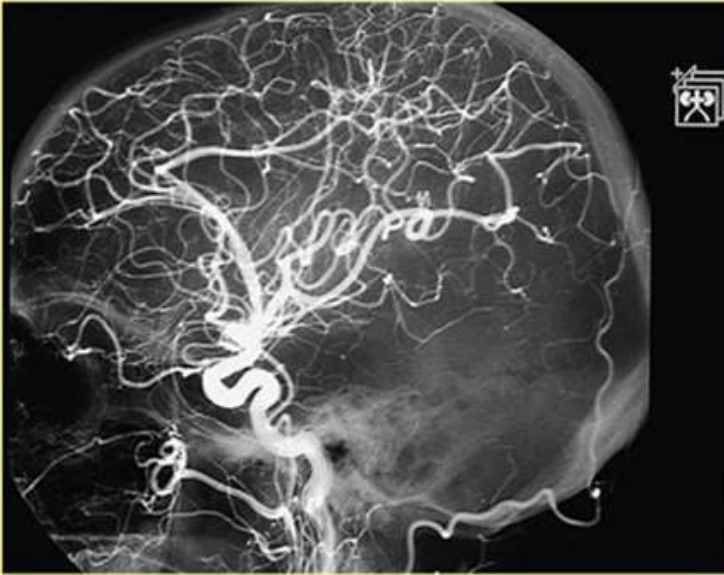
INTRODUCER SHEATHS

- Short catheters used when multiple catheters will be used
- Placed in lieu of a catheter

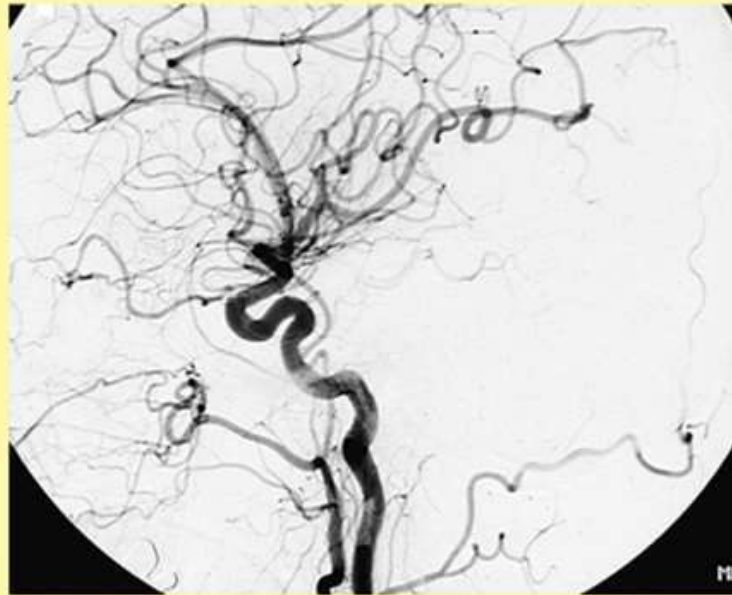


CATHETERS

DIGITAL SUBTRACTON ANGIOGRAPHY (DSA)



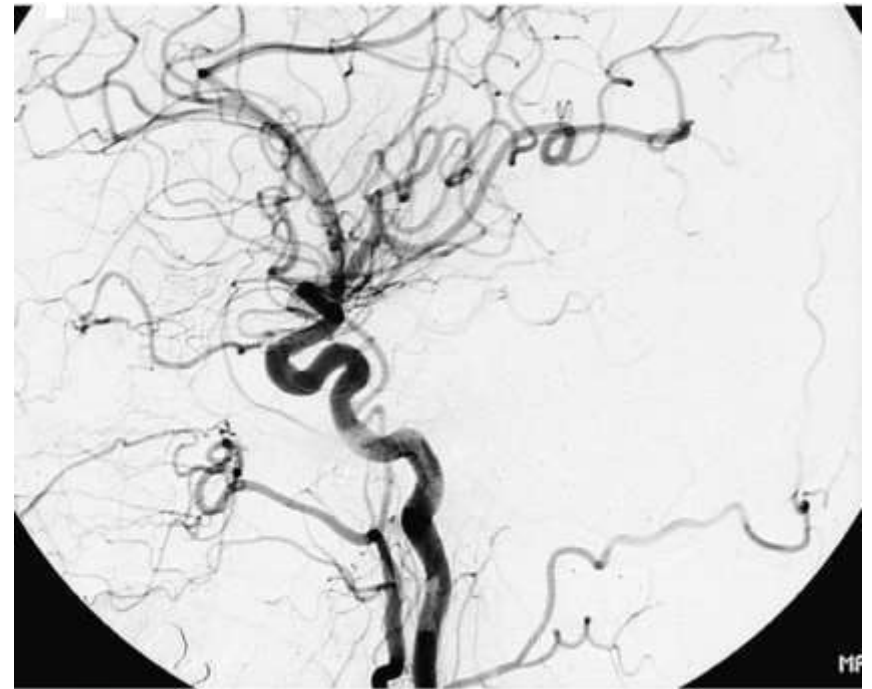
Nonsubtracted carotid angiogram



Digital subtracted carotid angiogram

DSA

- ⦿ A subtraction mask is taken before contrast injected
- ⦿ Each of digitized image is from the mask
- ⦿ Images acquired form
 - 1 image every 2-3 sec
 - Up to 30 images per sec

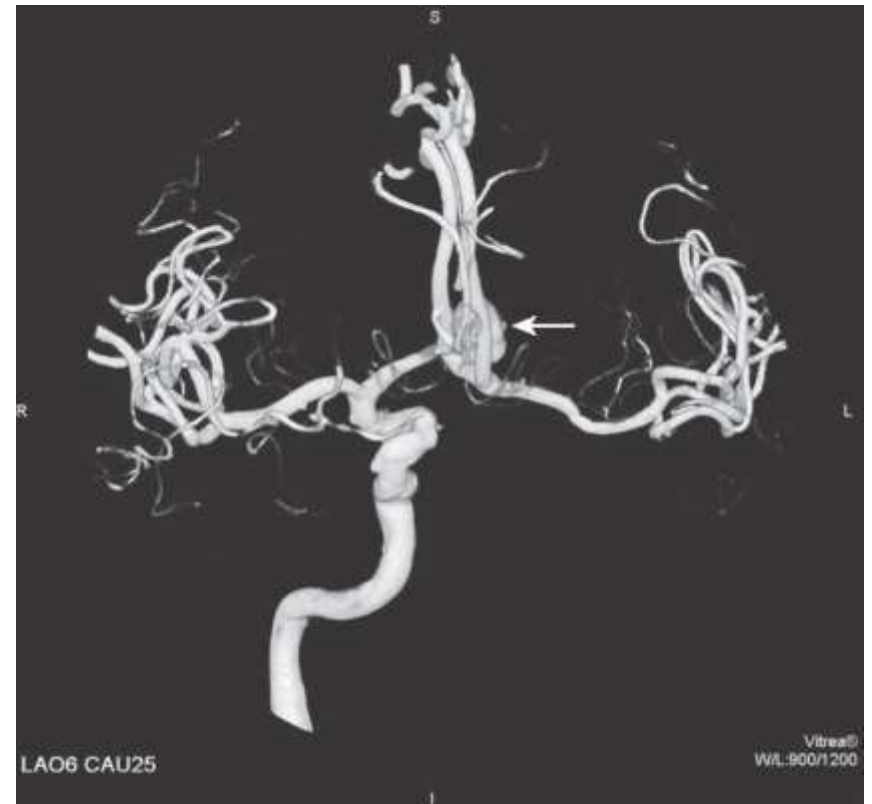


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THREE DIMENSIONAL (3-D) INTRAARTERIAL ANGIOGRAPHY



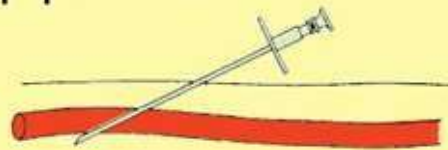
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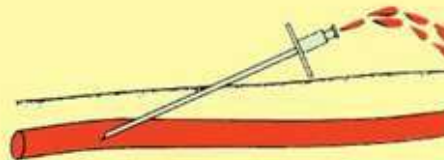
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CATHERIZATION: SELINGER TECHNIQUE

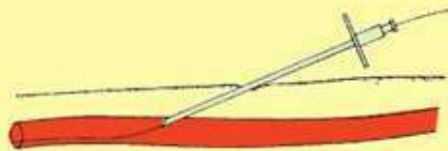
- Method of vessel catheterization
- Six step process



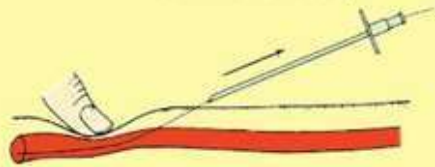
Step 1. Insertion of needle
(with inner cannula)



Step 2. Placement of needle in
lumen of vessel (inner
cannula removed)



Step 3. Insertion of guide wire



Step 4. Removal of needle



Step 5. Threading of catheter
to area of interest



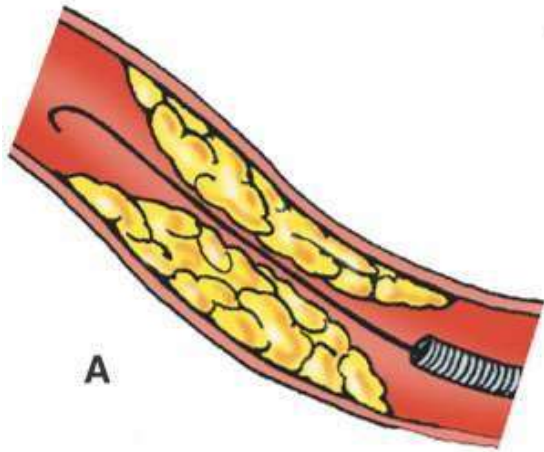
Step 6. Removal of guide wire



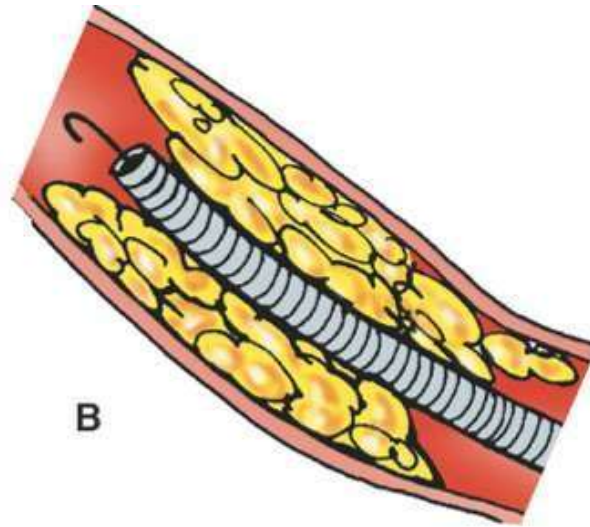
SELINGER TECHNIQUE CATHETERS AND GUIDEWIRES



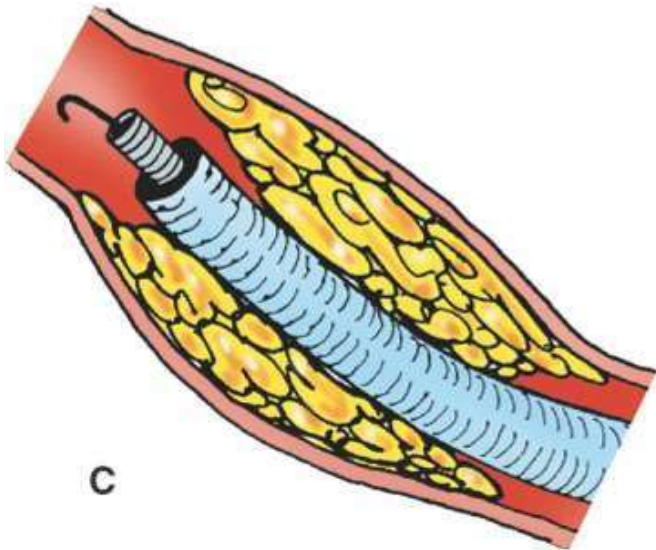
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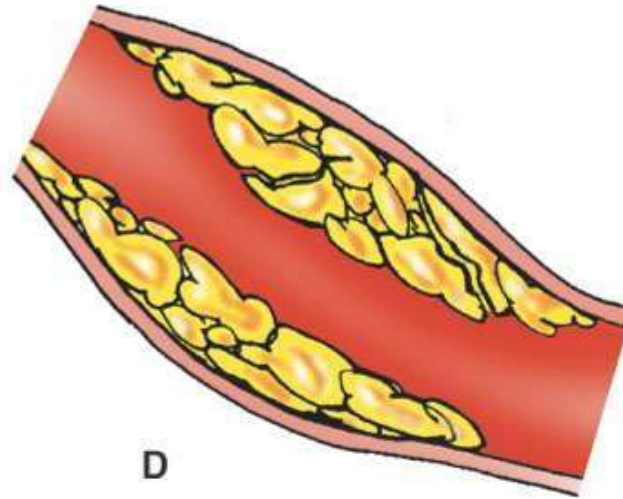
A



B

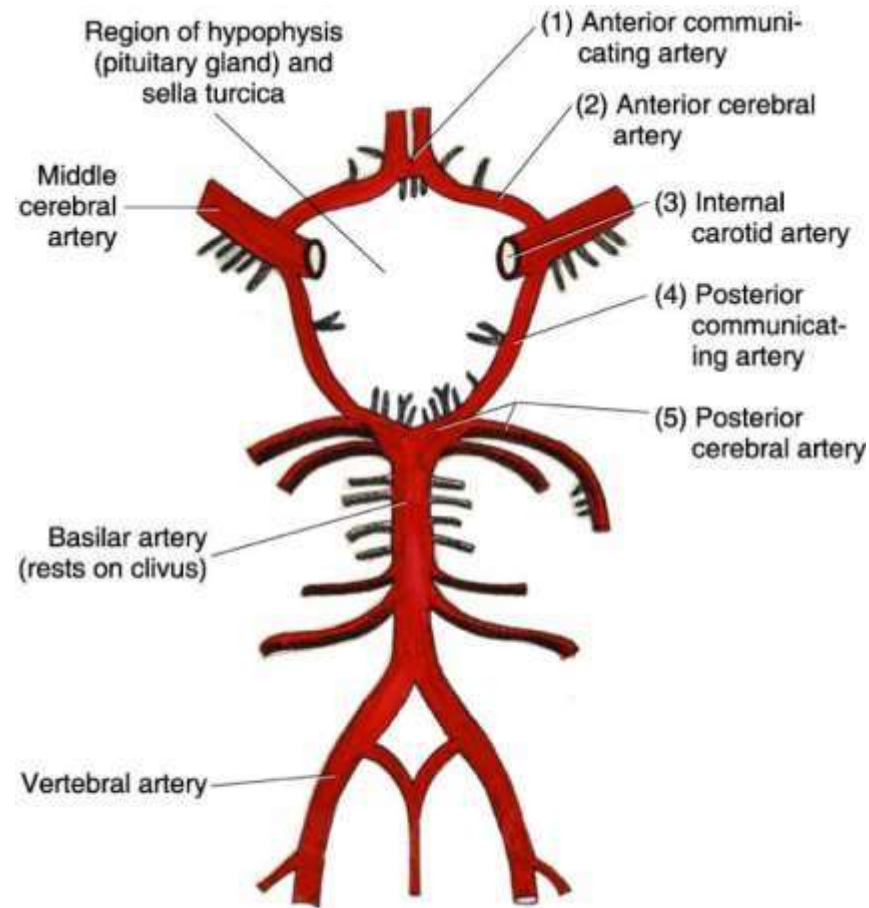


C

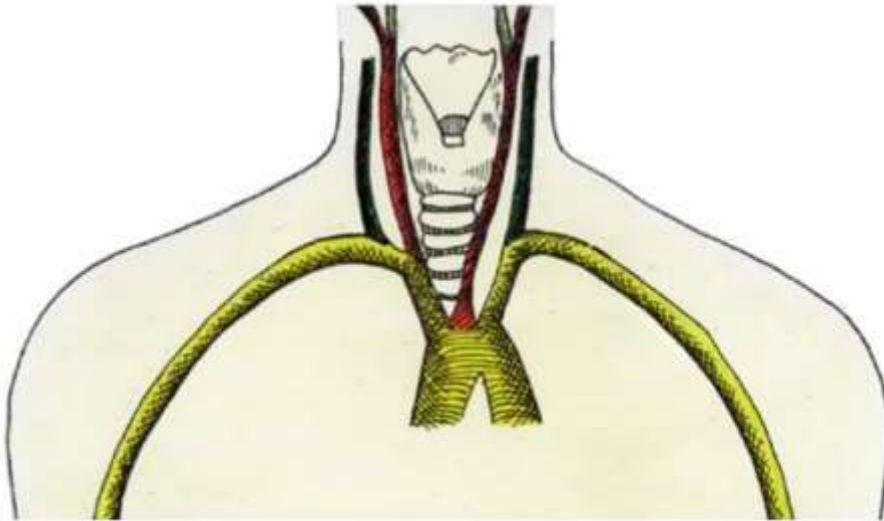


D

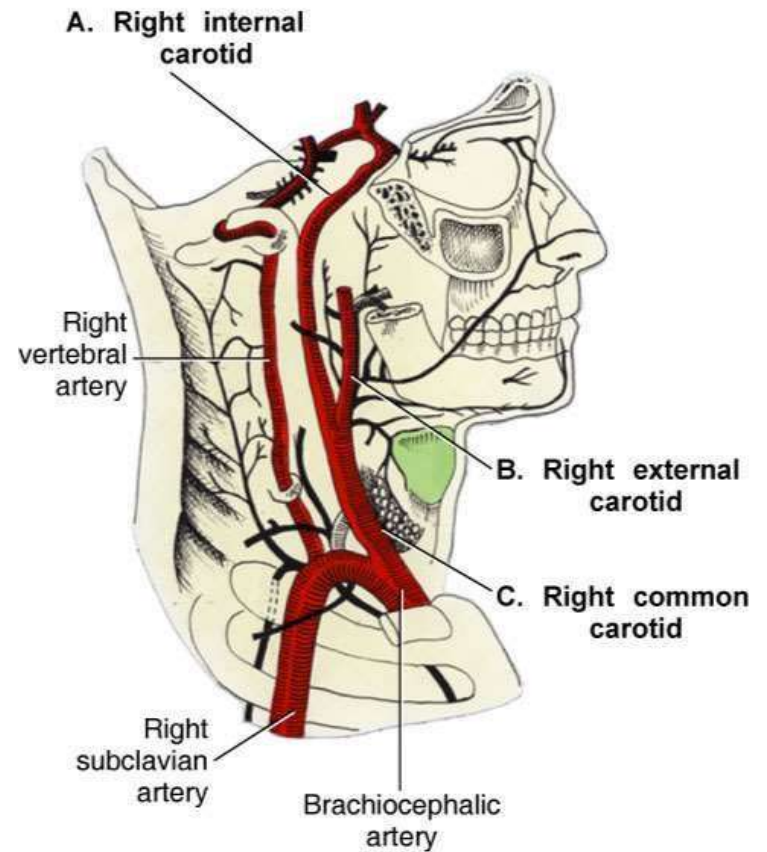
CIRCLE OF WILLIS



NECK AND BRAIN ARTERIES



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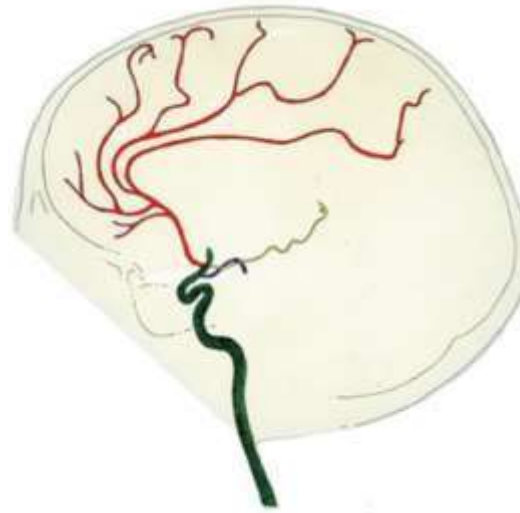


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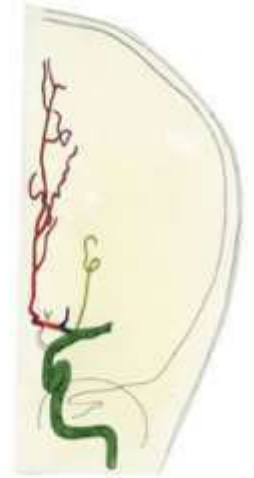
MIDDLE CEREBRAL AND INTERNAL CAROTID



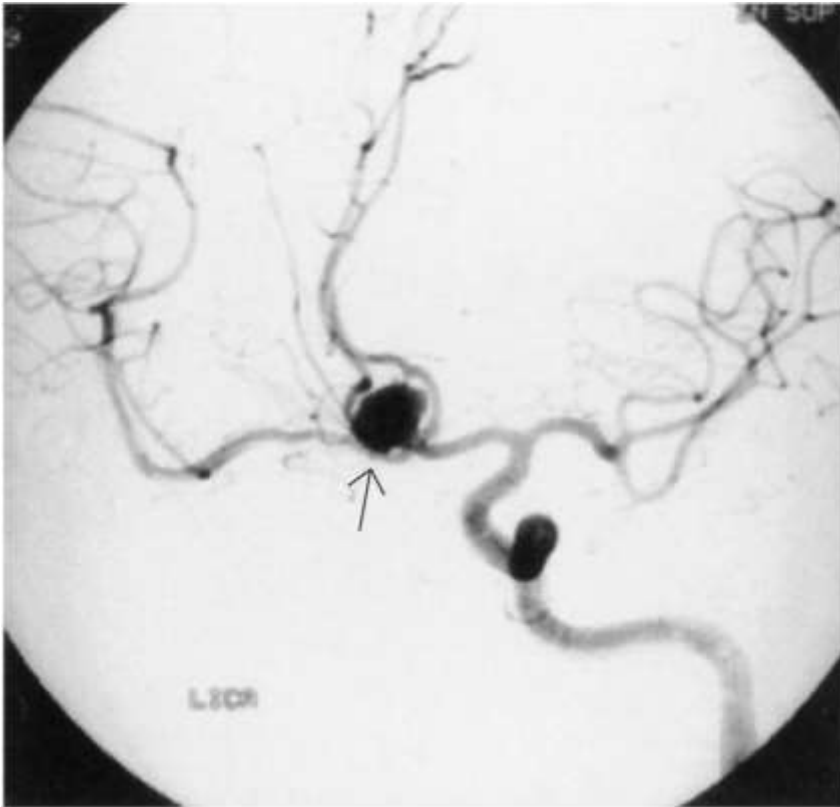
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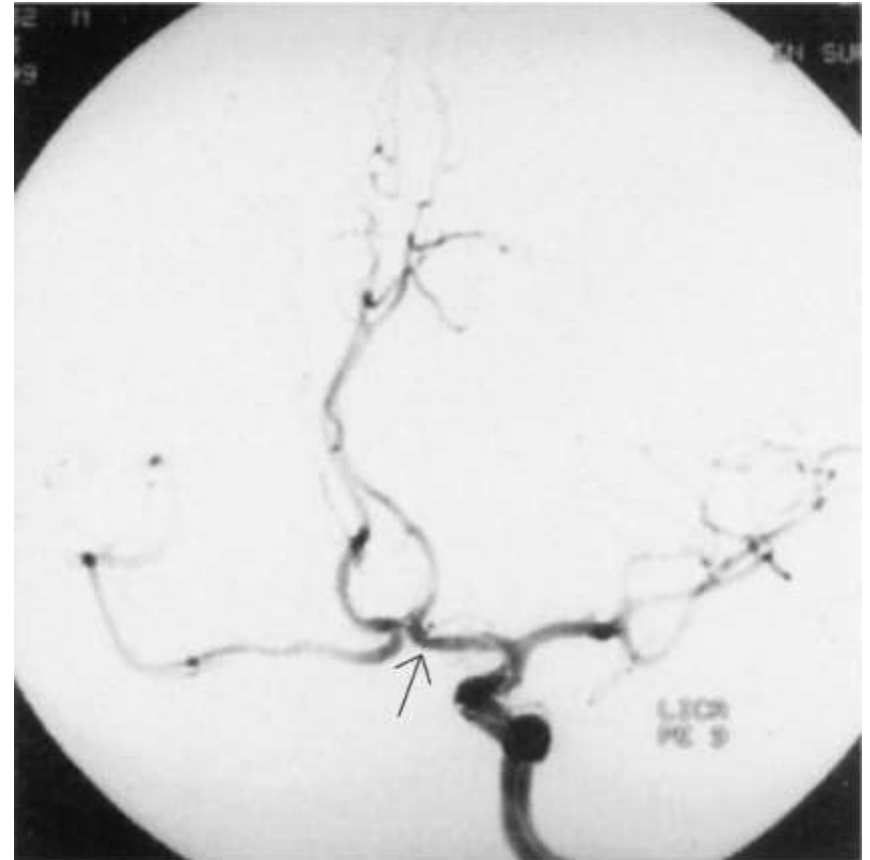
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DSA SHOWING EMBOLIZATION BEFORE AND AFTER PROCEDURE

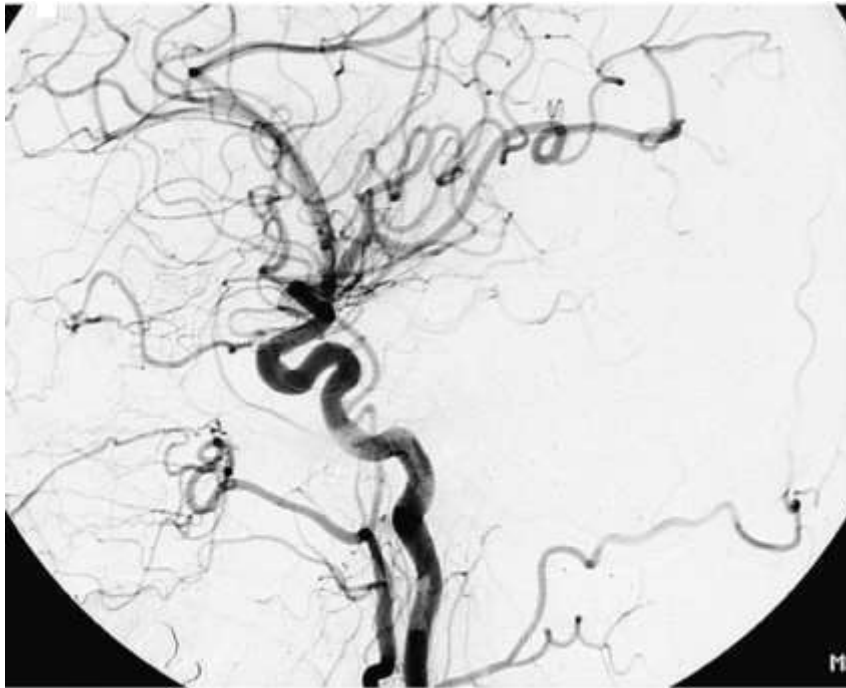


Courtesy Philips Medical Systems.

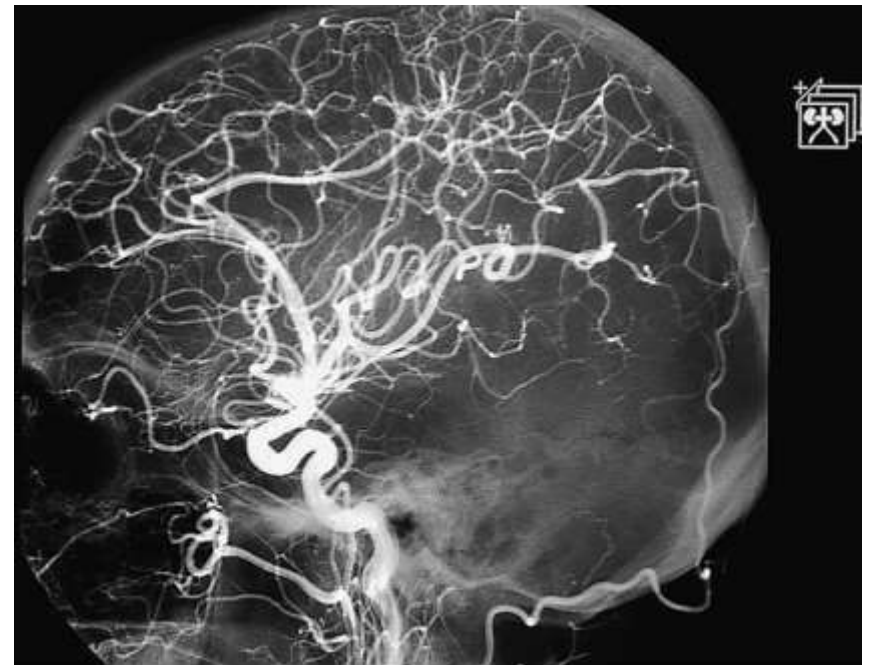


Courtesy Philips Medical Systems.

CAROTID AND BRAIN

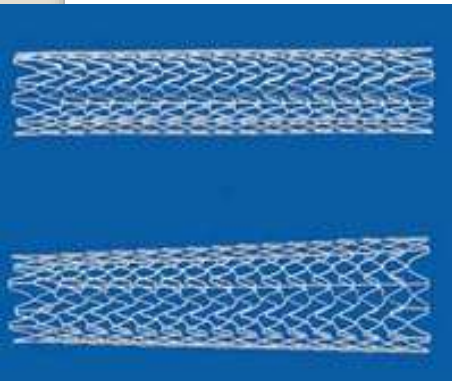


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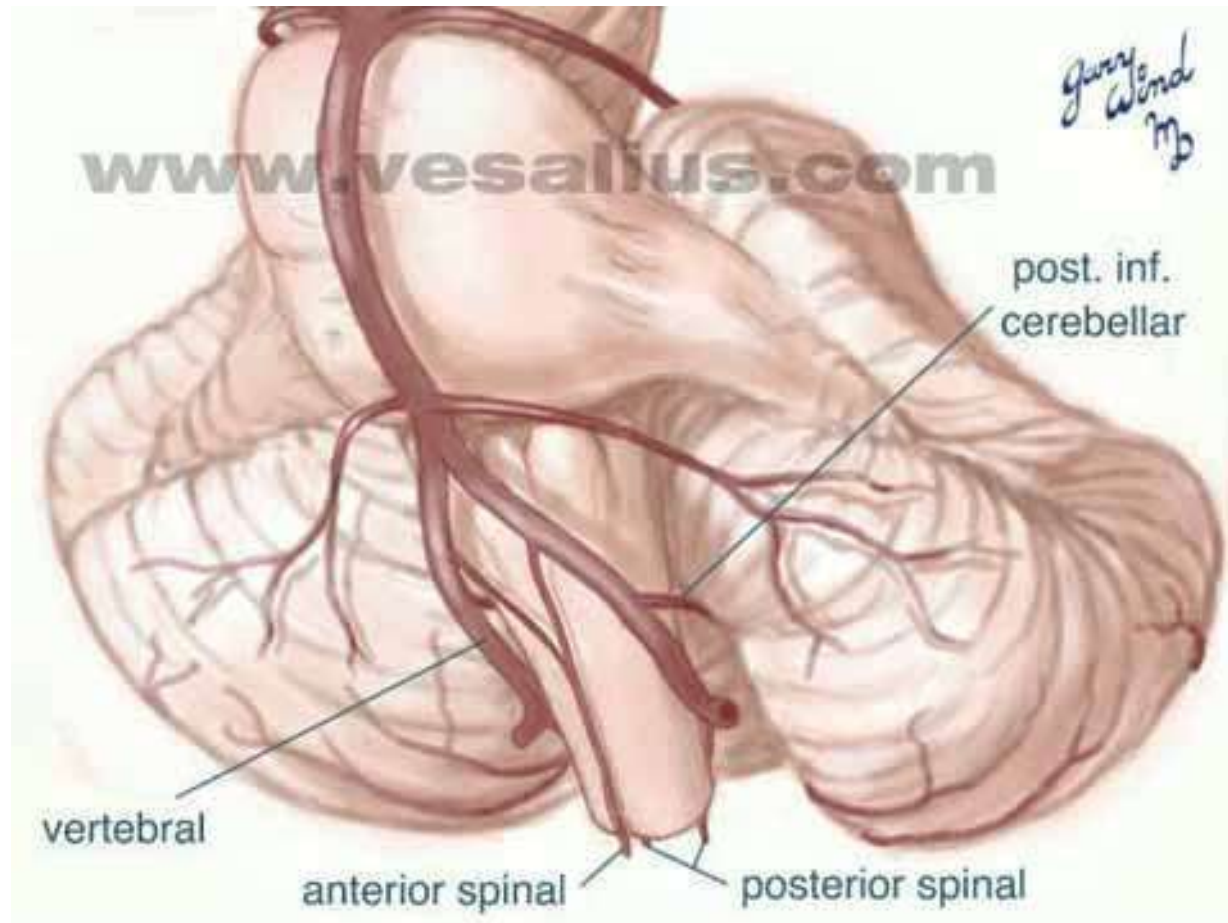


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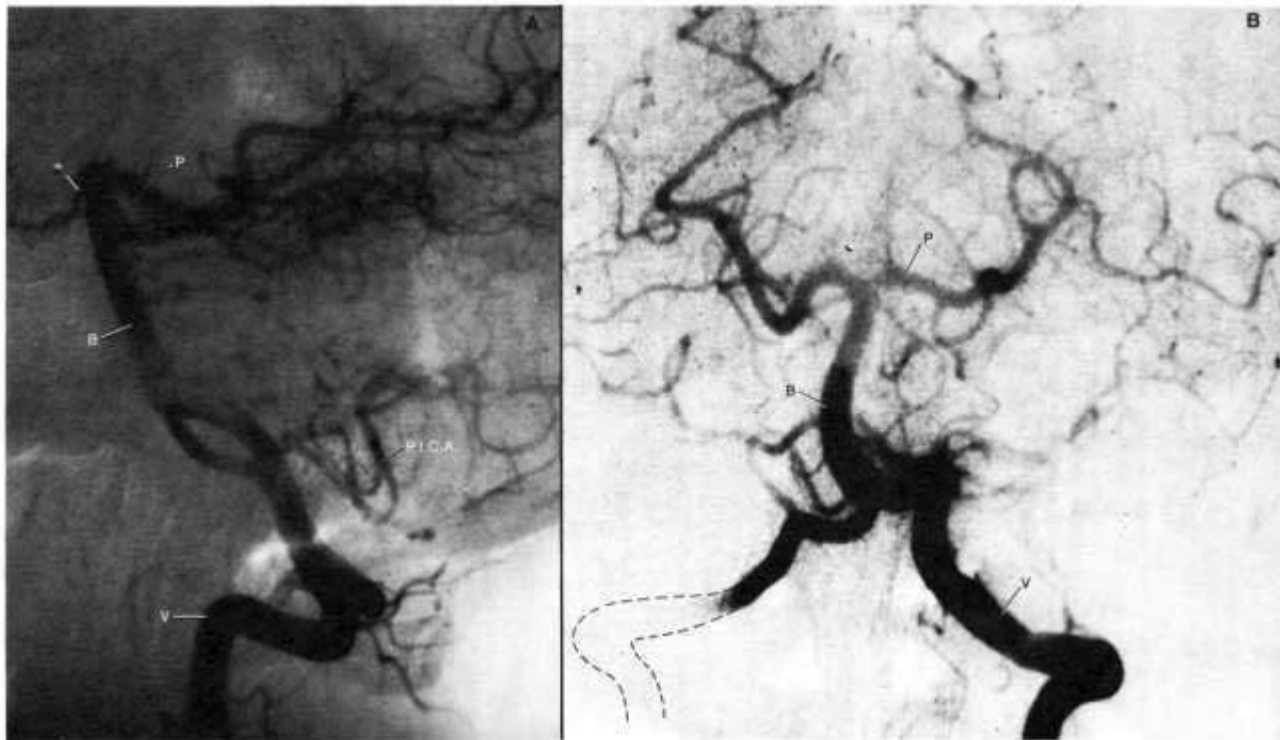
CAROTID ATHEROSCLEROSIS



POSTERIOR VERTEBRAL ARTERY



POSTERIOR VERTEBRAL ANGIOGRAM



ANEURYSMS



Thank You