



professional skills 1
3rd year
semester 6
radiography

Imaging Guided Biopsy

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Objective

By the End of this lessons you should :

- Define what biopsy
- Justify Aim to perform biopsy
- Enumerate types of biopsies
- Identify procedure
- Identify contraindication

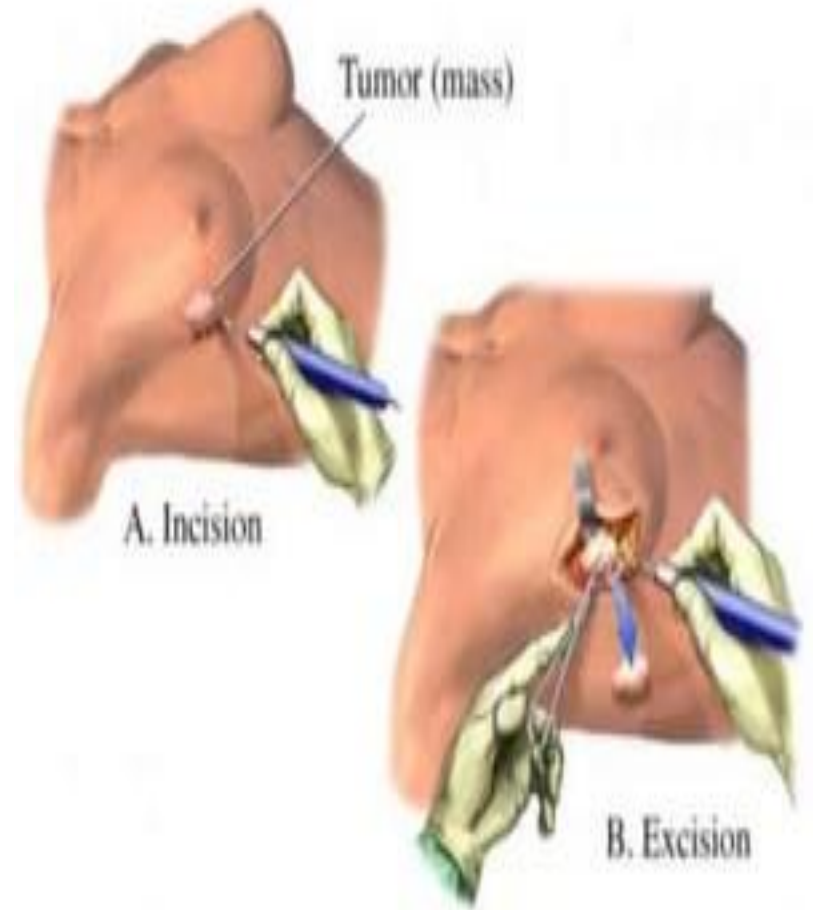
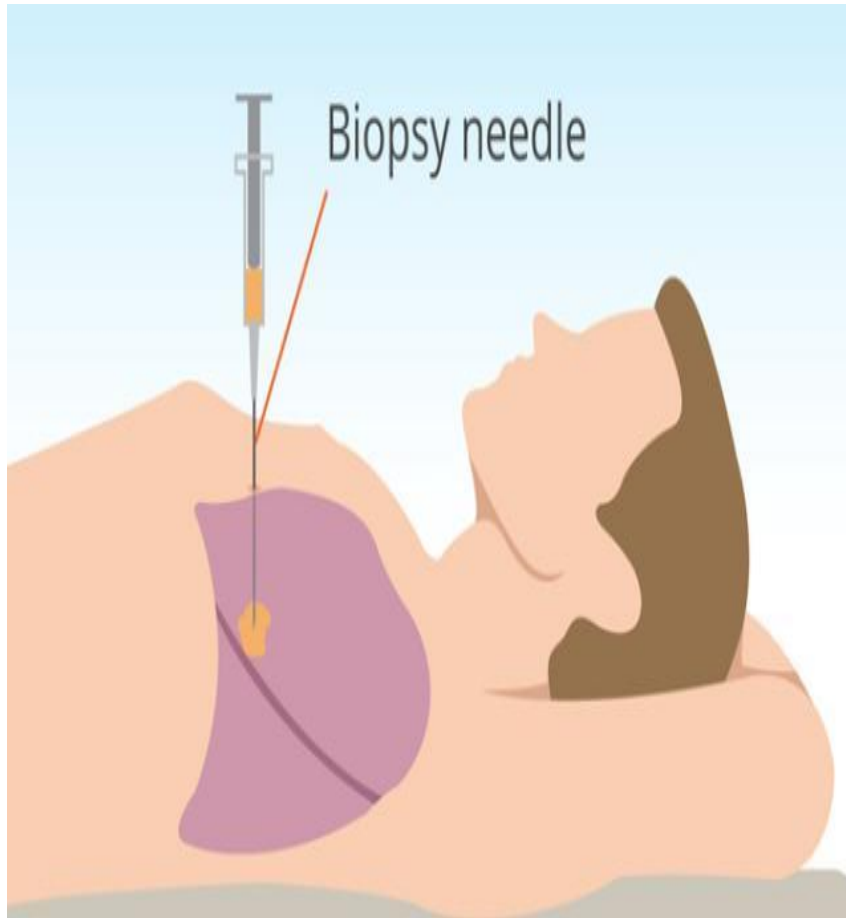
Introduction

- Definition:

A biopsy is the removal of tissue in order to examine it for disease. The tissue samples can be taken from any part of the body.

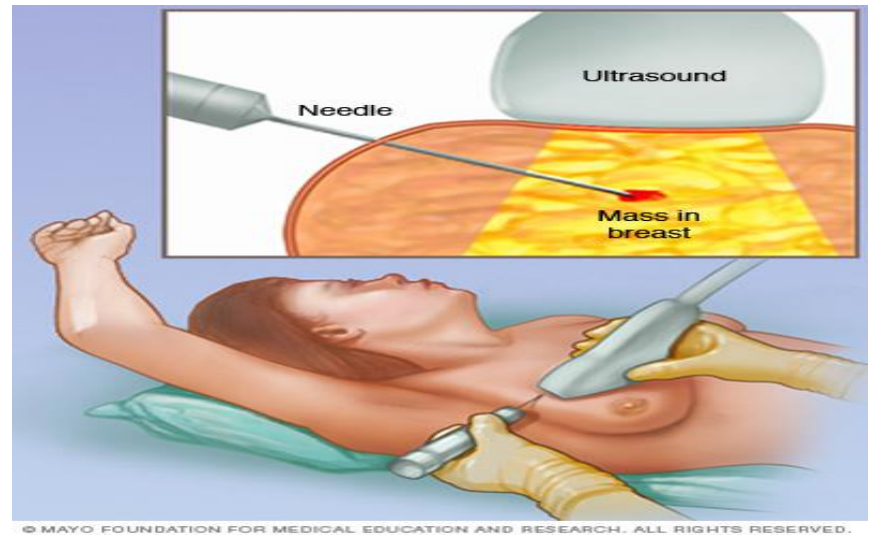
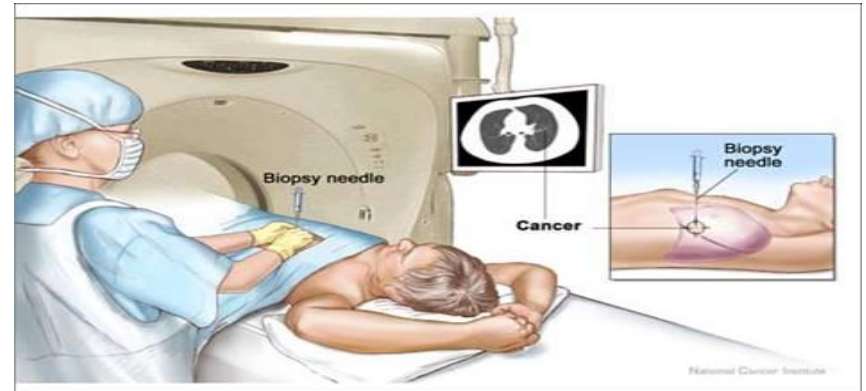
- Biopsies are performed in several different ways:
 - ✓ removing a small amount of tissue with a needle
 - ✓ surgically removing an entire lump, or nodule, that is suspicious (excision and incision biopsy).

Introduction



Introduction

- Biopsies can be safely performed with imaging guidance such as ultrasound, x-ray, CT or MRI.



Aim

- Biopsies performed to examine tissue for diseases. They are frequently used to diagnose:
 - Cancer.
 - Infections and inflammation.
 - Autoimmune disorders.
 - To match organ tissue before a transplant.

Types

common biopsy types and why they may be necessary are the followings:

1. **Abdominal biopsy** is used to diagnose whether a tumor in the abdomen is cancerous or benign.
2. **Bone biopsy** is used to diagnose cancer or infection in the bones.
3. **Bone marrow biopsy** is used to diagnose cancer in the blood, such as leukemia.

Types

4. **Breast biopsy** is used to determine if a lump in the breast is cancerous or benign.
5. **Kidney (renal) biopsy** is used to examine the condition of a kidney with impaired renal function in spite of maintained renal size, inflammation in the kidney or a suspected tumor.
6. **Liver biopsy** is used to diagnose diseases of the liver such as hepatitis C, cirrhosis, infections and cancer.

Types

7. **Lung nodule biopsy**

8. **Lymph node biopsy** is performed whenever there are enlarged or abnormal lymph node.

9. **Thyroid biopsy** is used to find the cause of a nodule in the gland.

10. Testicular biopsy is used when researching male infertility. It is also used to determine if a tumor in the testicles is cancerous or benign.

Types

- 11. **Muscle biopsy** is used to diagnose infections that affect muscle, defects in the muscle (myopathy) and diseases of the connective tissue and blood vessels.
- 12. **Nerve biopsy** is used to examine damage to small nerves, degeneration and destruction of the nerve and inflammatory nerve conditions. Nerve biopsies are typically performed surgically.

Types

- 13. **Endometrial biopsy** may be used when looking for the cause of abnormal uterine bleeding, to examine the lining of the uterus and to diagnose cancer. This type of biopsy can be performed by using a tool to scrape some of the lining for histopathological examination (dilatation & curettage (D&C)).
- 14. **Skin biopsy** examines a growth of an area on the skin, such as a mole, that has changed its appearance. Skin biopsies can be performed by shaving a small sample of the skin, removing a sample with a scalpel .

Guided abdominal biopsy

The intra-abdominal biopsies are commonly performed to take a sample from the liver, kidneys, para-aortic lymph nodes or intra-abdominal mass.

- Both ultrasound and computed tomography (CT) can be used to guide percutaneous needle intervention. The choice of method depends on multiple factors, including:
- lesion size and location

Guided abdominal biopsy - Contraindications

Relative contraindications to percutaneous needle biopsy include :

- Ascites.
- morbid obesity.
- known focal hepatic lesions or vascular anomalies.
- hydatid cysts.

Guided abdominal biopsy - Contraindications

Absolute contraindications include :

- A significant, uncorrected coagulopathy
- an uncooperative patient,
- extrahepatic biliary obstruction in liver biopsy.
- Ureteric obstruction in renal biopsy.
- lack of a safe biopsy route

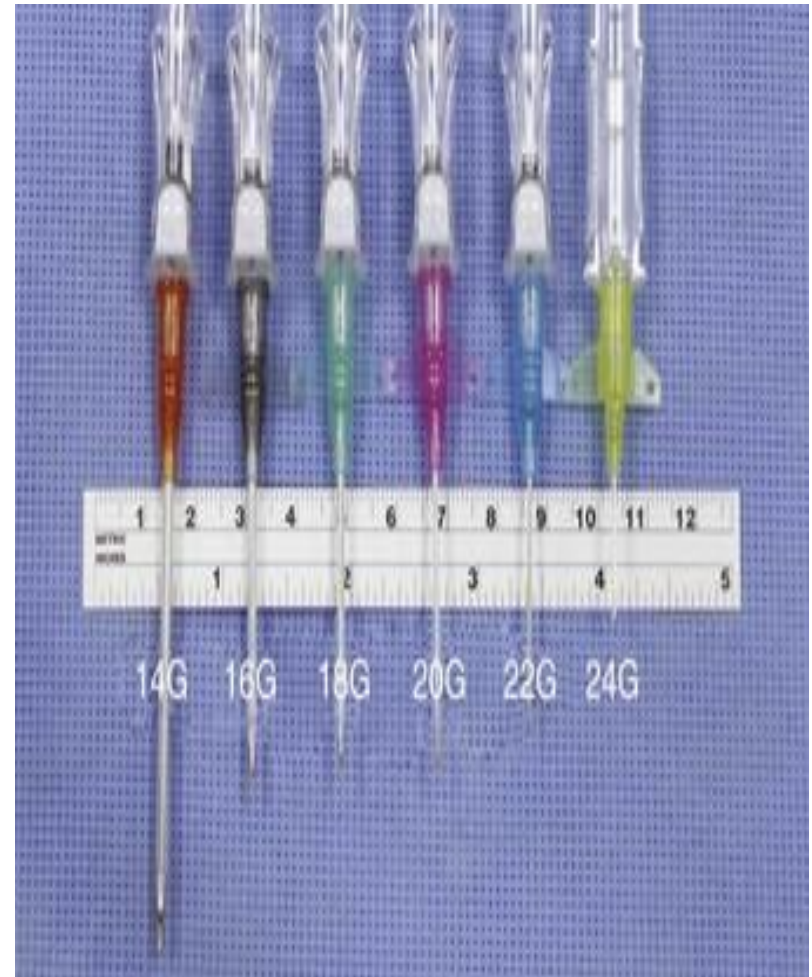
Guided abdominal biopsy - pre-biopsy work up

- ✓ Check patient PT (The prothrombin time), PTT(Partial Thromboplastin Time) & INR (international normalized ratio) Platelet count.
- ✓ Antiplatelet medications such as aspirin and Plavix should be discontinued.
- ✓ 4-hour fast prior exam (more so when conscious sedation is being considered)
- ✓ Informed consent obtained prior to the procedure

Guided abdominal biopsy - Needle Selection

Conceptually, needles can be grouped into small-caliber (20 gauge or above) or large-caliber (19 gauge or less) sizes.

- **Small-caliber needles :**
are traditionally used to obtain cells for cytologic analysis as fine-needle aspiration (FNA).
- **Large-caliber needles :**
can be used to obtain greater amounts of tissue for more thorough histologic and cytological analysis.



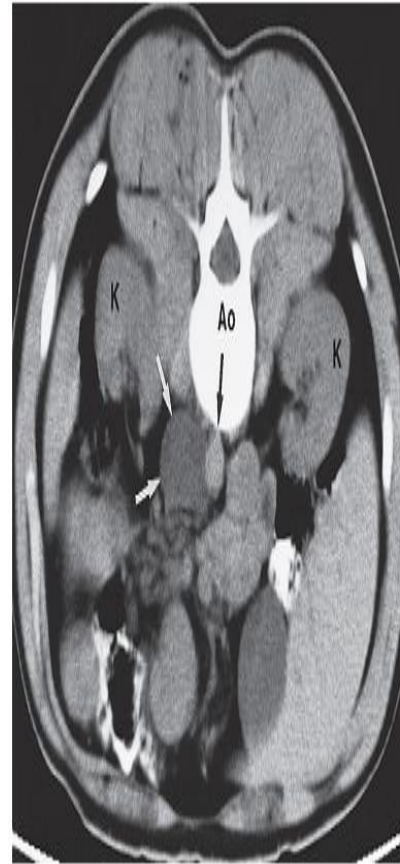
Cases No 1

Needle biopsy of an enlarged para-aortic lymph node under CT control with the patient prone.

(a) An enlarged lymph node (arrows) is seen to the left of the abdominal aorta (Ao) at the level of the kidneys (K).

(b) The tip of an 18-gauge cutting needle has been placed in the enlarged lymph node.

The tissue obtained confirmed that the lesion was a metastasis from a germ cell tumour of the testis.



(a)



(b)

Case no 2

Pancreatic pseudocyst drainage.
(a) CT scan showing a collection involving the body of the pancreas, which developed following acute pancreatitis.
(b) A drainage catheter has deliberately been inserted through the stomach into the collection which has decreased significantly in size.



(a)



(b)

Case no 3

(a) An abdominal abscess in the right iliac fossa secondary to appendicitis. Small pockets of air are seen in the collection (arrow).

(b) A percutaneous drainage catheter (partially seen) has been inserted into the collection (arrowhead) which is decreasing in size.



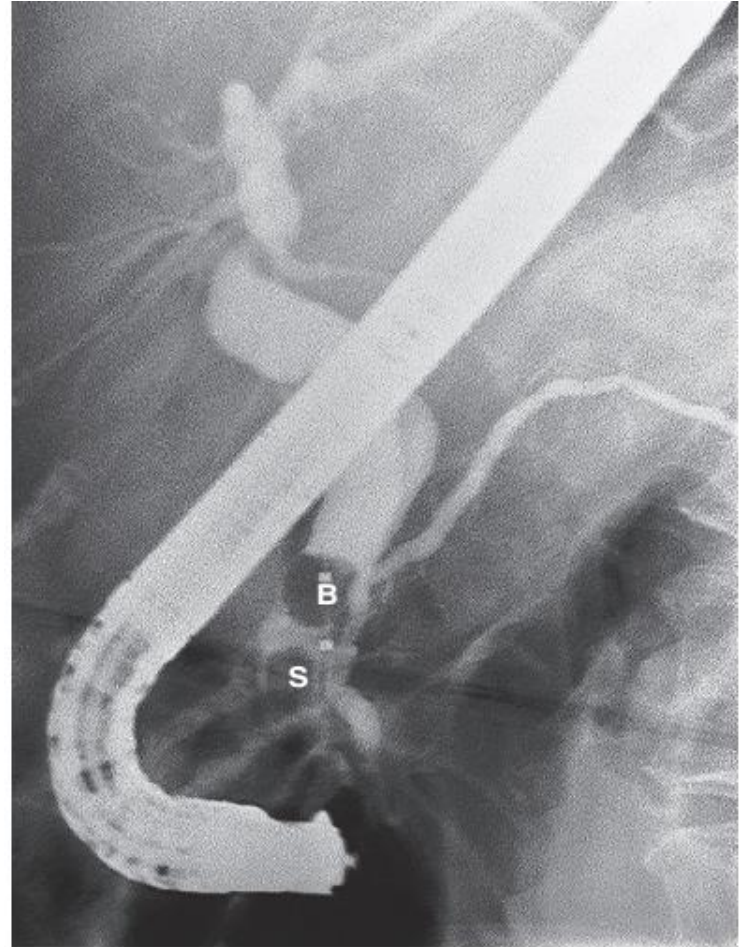
(a)



(b)

case no 4

Endoscopic removal of stones in the common bile duct (CBD). A balloon catheter has been passed into the CBD after endoscopic intubation of the papilla of Vater. The stones were then pulled out of the CBD. B, balloon; S, stone



**Ultrasound-guided
fine-needle aspirate and biopsy
technique**

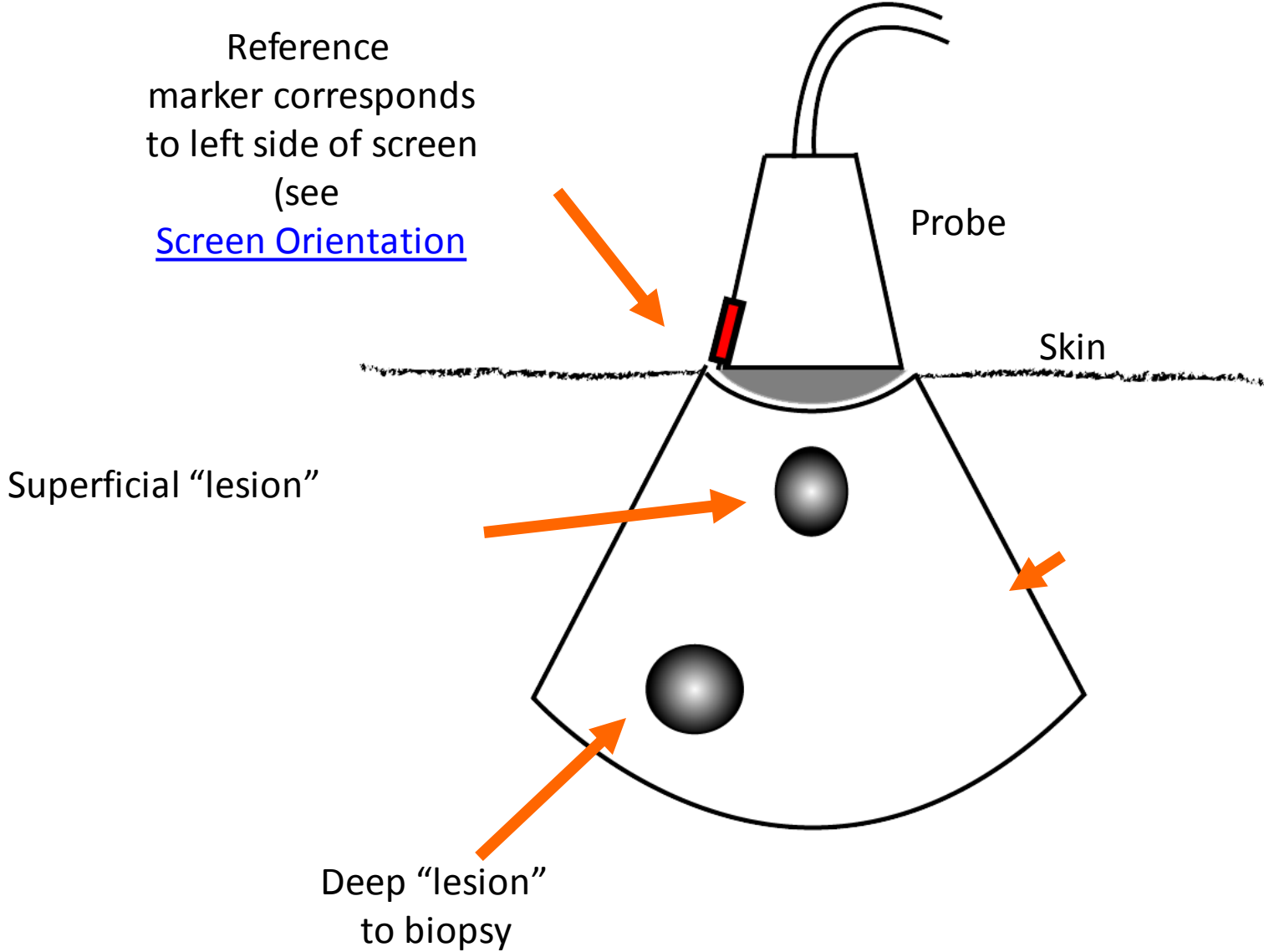
Indications

- Icterus/liver enzyme elevation/elevated bile acids
- Focal nodules or masses anywhere
- Renal disease sometimes (i.e. renal dysplasia, renal masses, lymphosarcoma suspects)
- Prostatomegaly
- Free abdominal fluid
- Cysts
- Lymphadenopathy

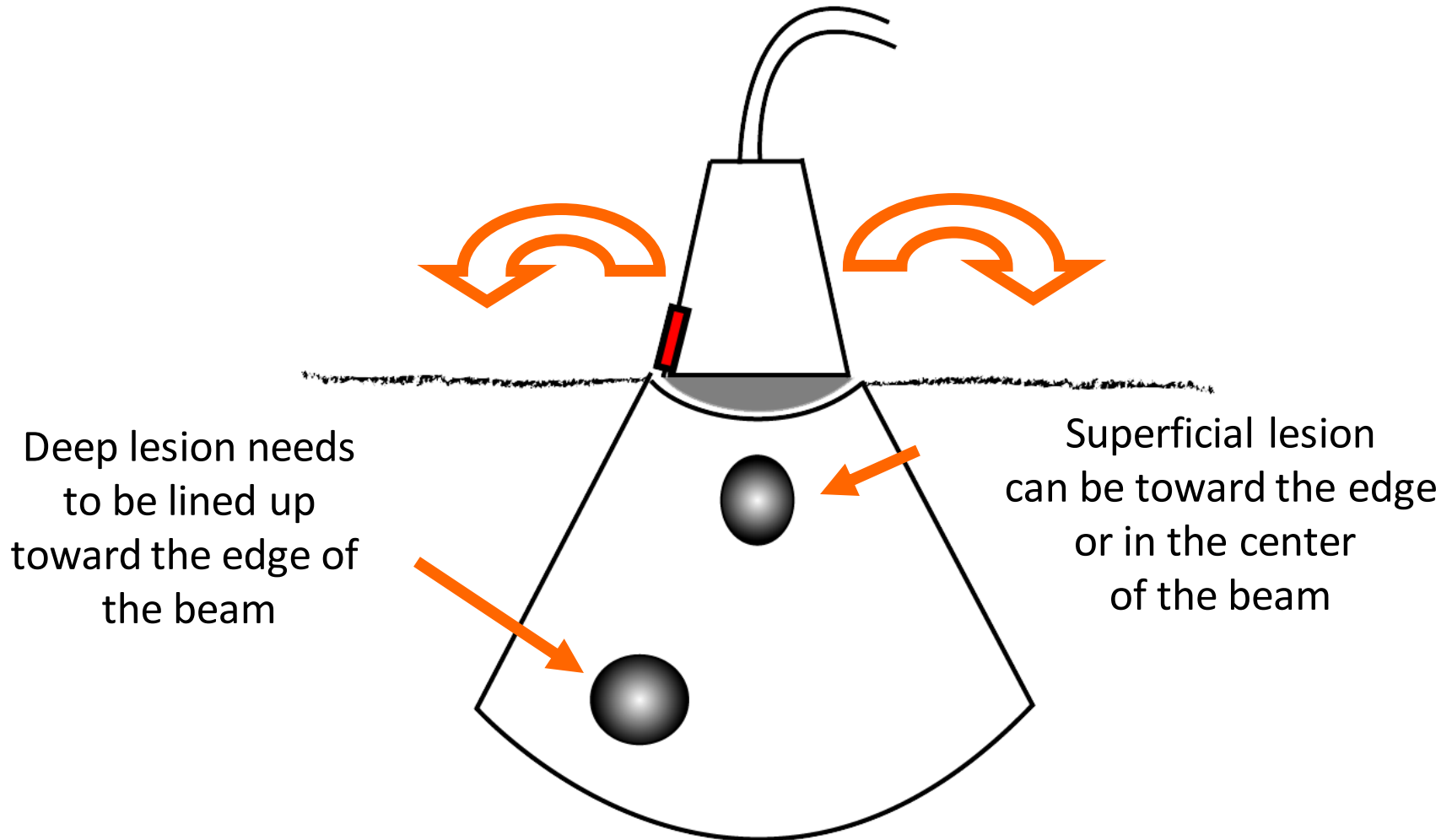
- U/S guided FNA/biopsies generally not done on:
- Adrenal glands
- Transitional cell carcinoma suspect masses
- Chronic renal failure, glomerulonephritis

Probe orientation

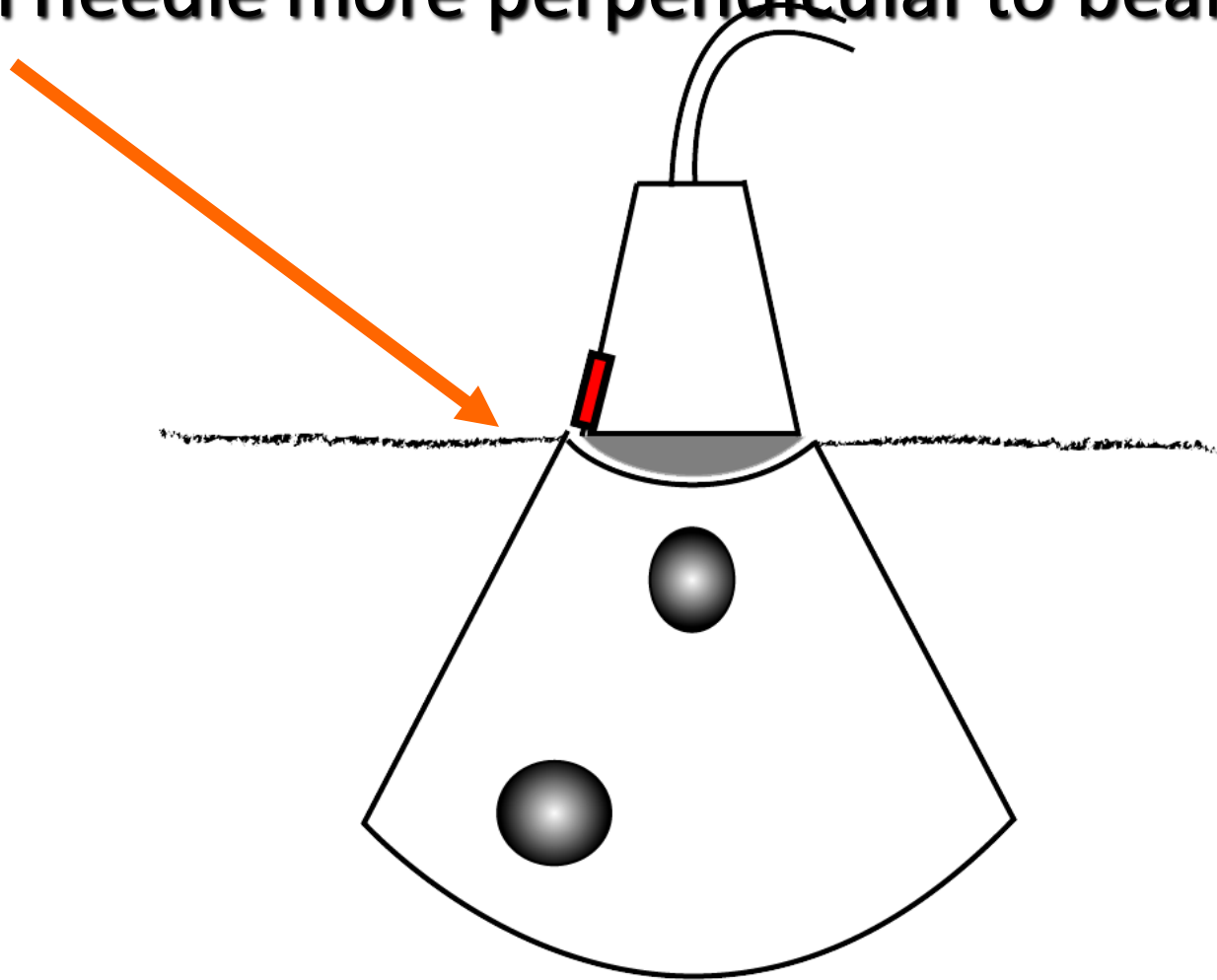
Reference marker corresponds to left side of screen (see [Screen Orientation](#))



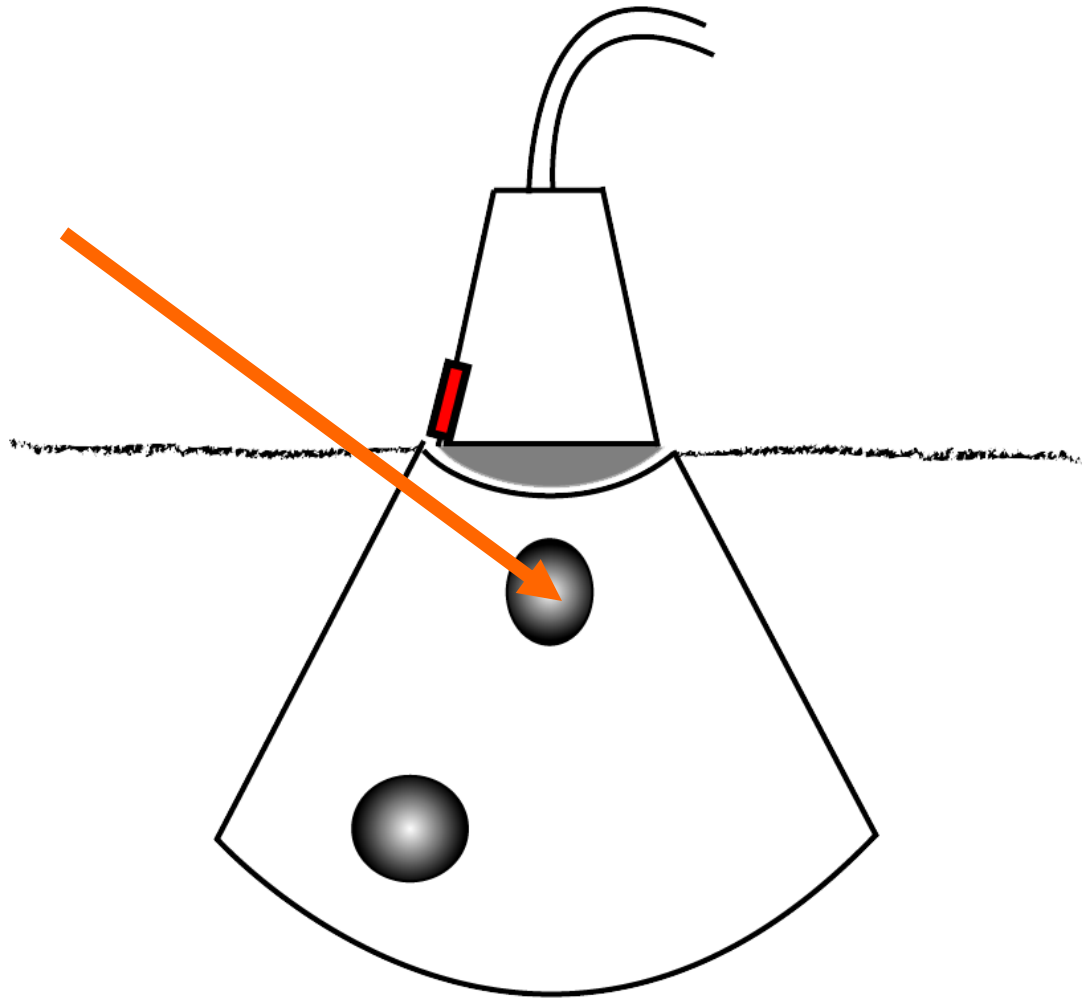
Rock and/or slide the probe
to line up the lesion
to a “reachable” position



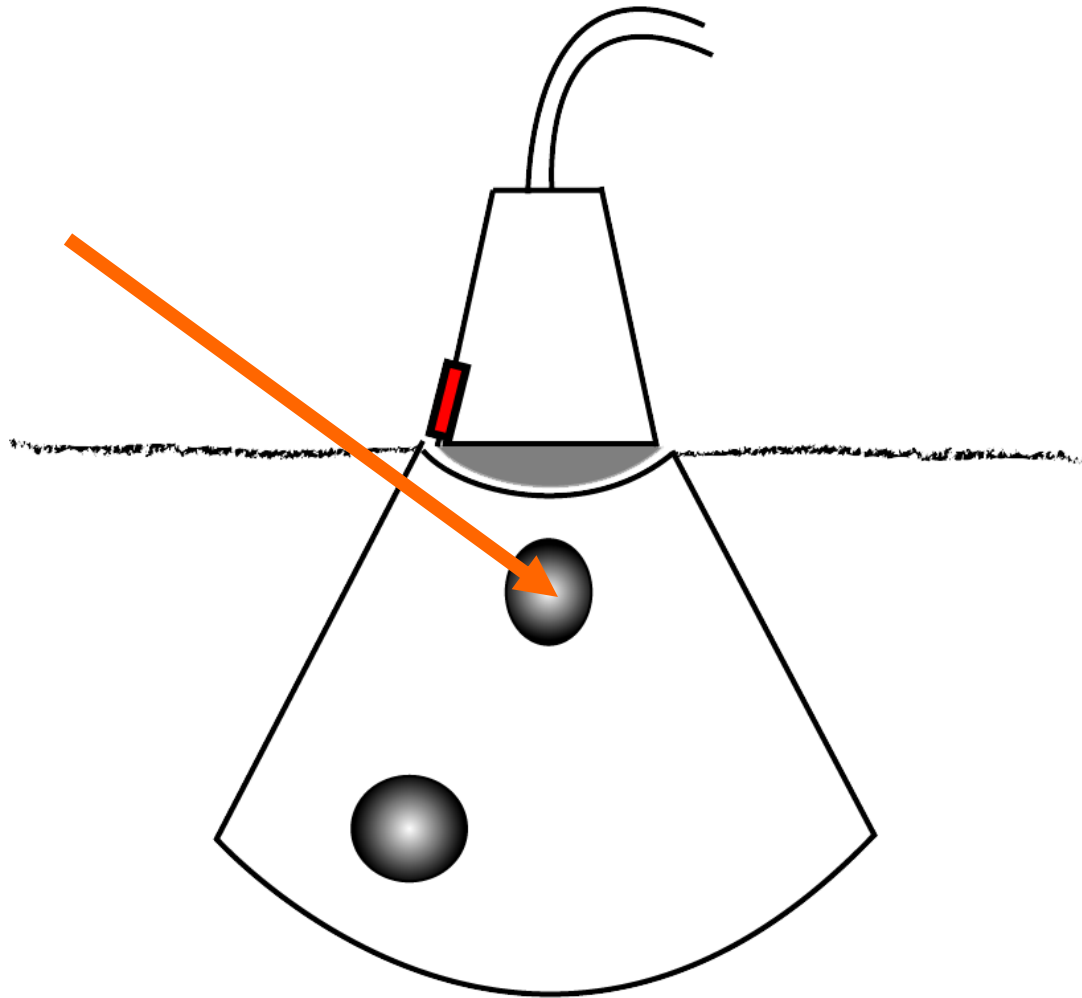
**Angle to use for a superficial lesion:
Aim needle more perpendicular to beam**



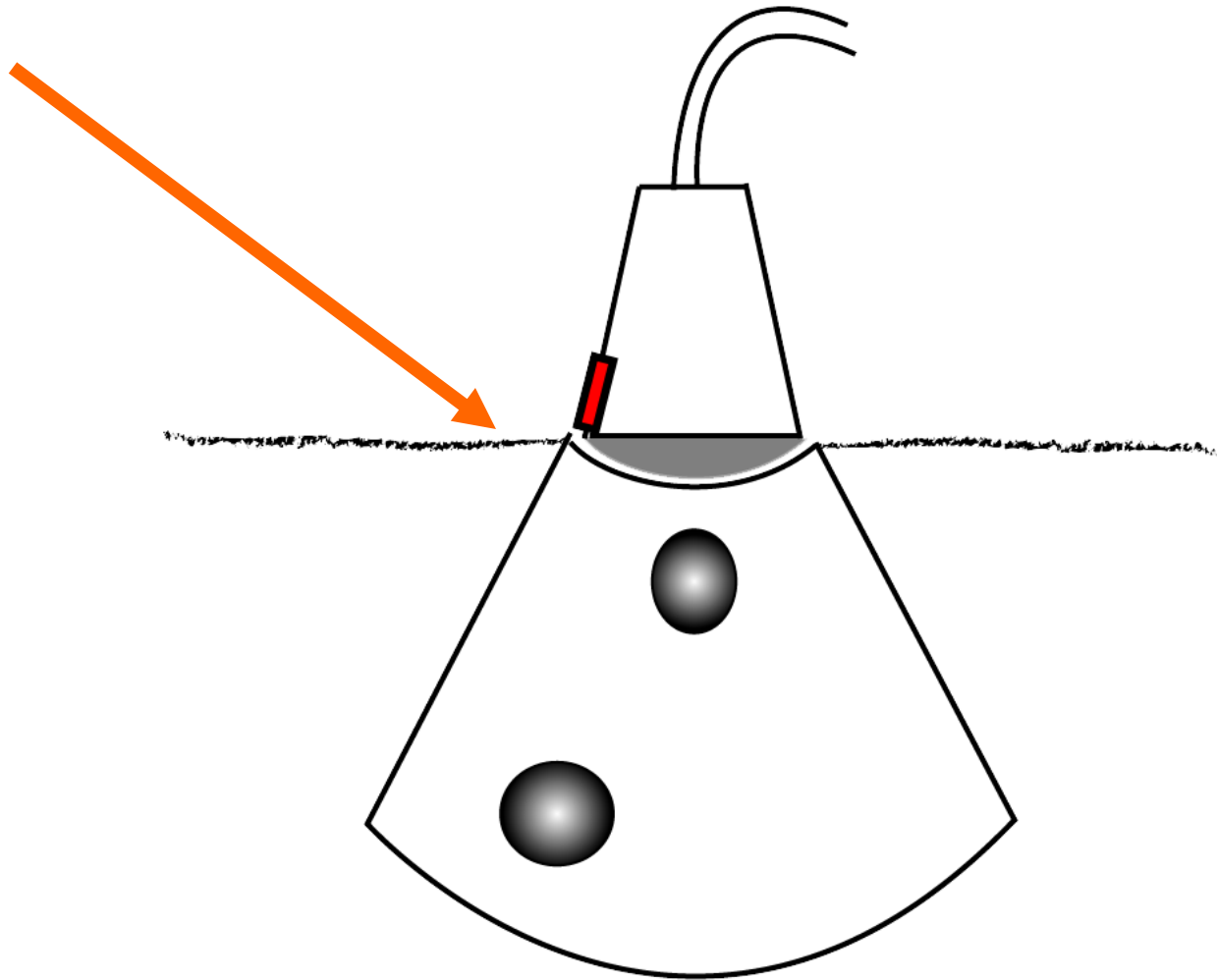
Superficial lesion FNA



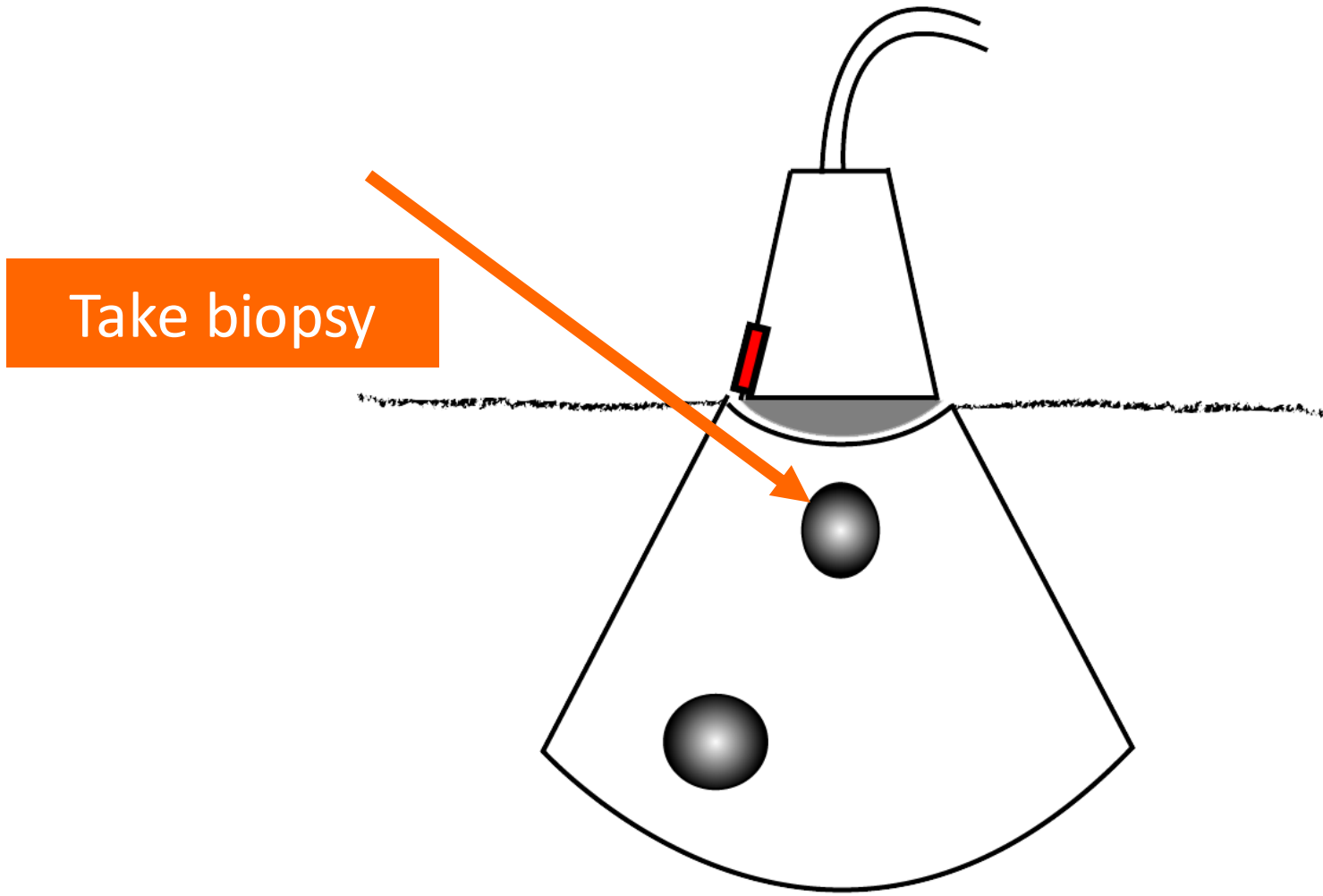
Superficial lesion FNA



Superficial lesion core biopsy

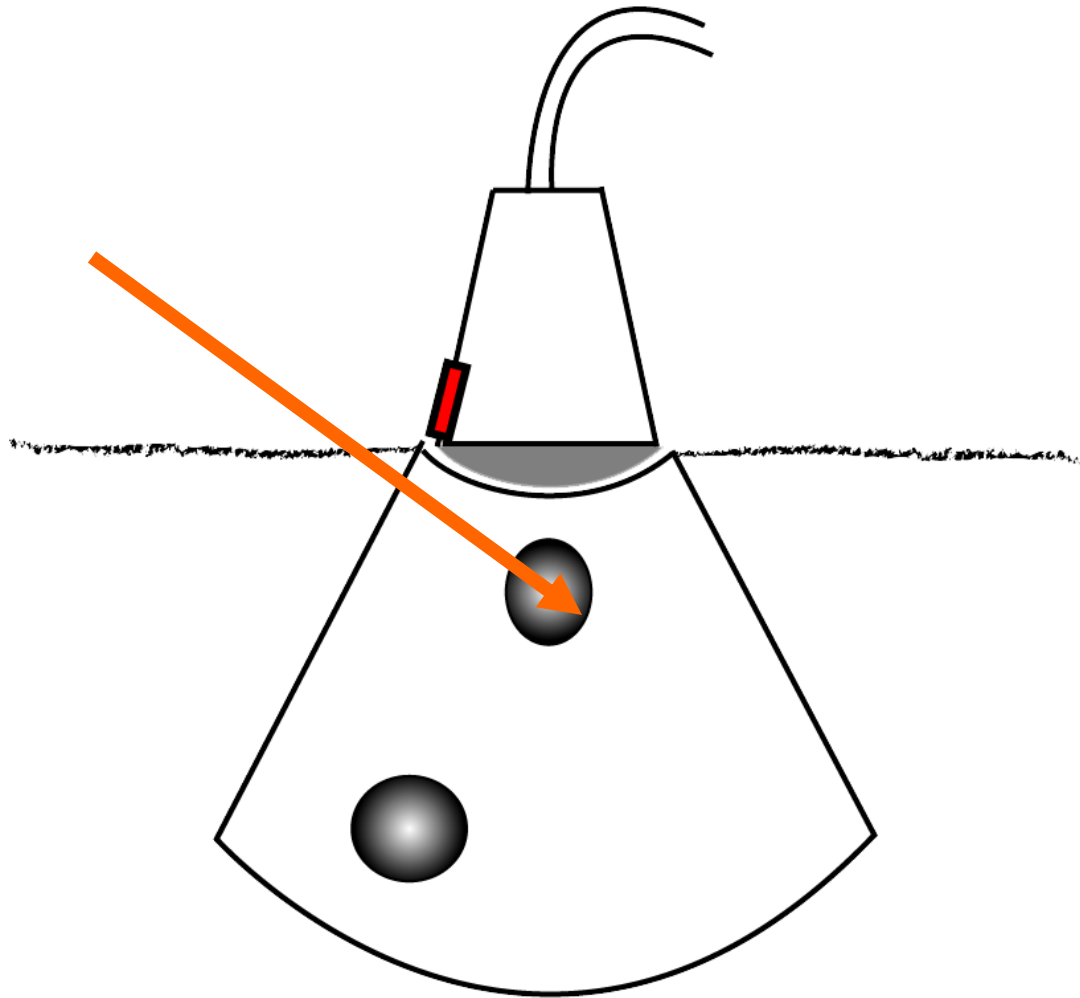


Superficial lesion core biopsy



Take biopsy

Superficial lesion core biopsy



Breast Biopsy

- Percutaneous needle biopsy of the breast provides reliable diagnosis of both benign and malignant disease and is a proven alternative to open surgical biopsy

Breast Biopsy

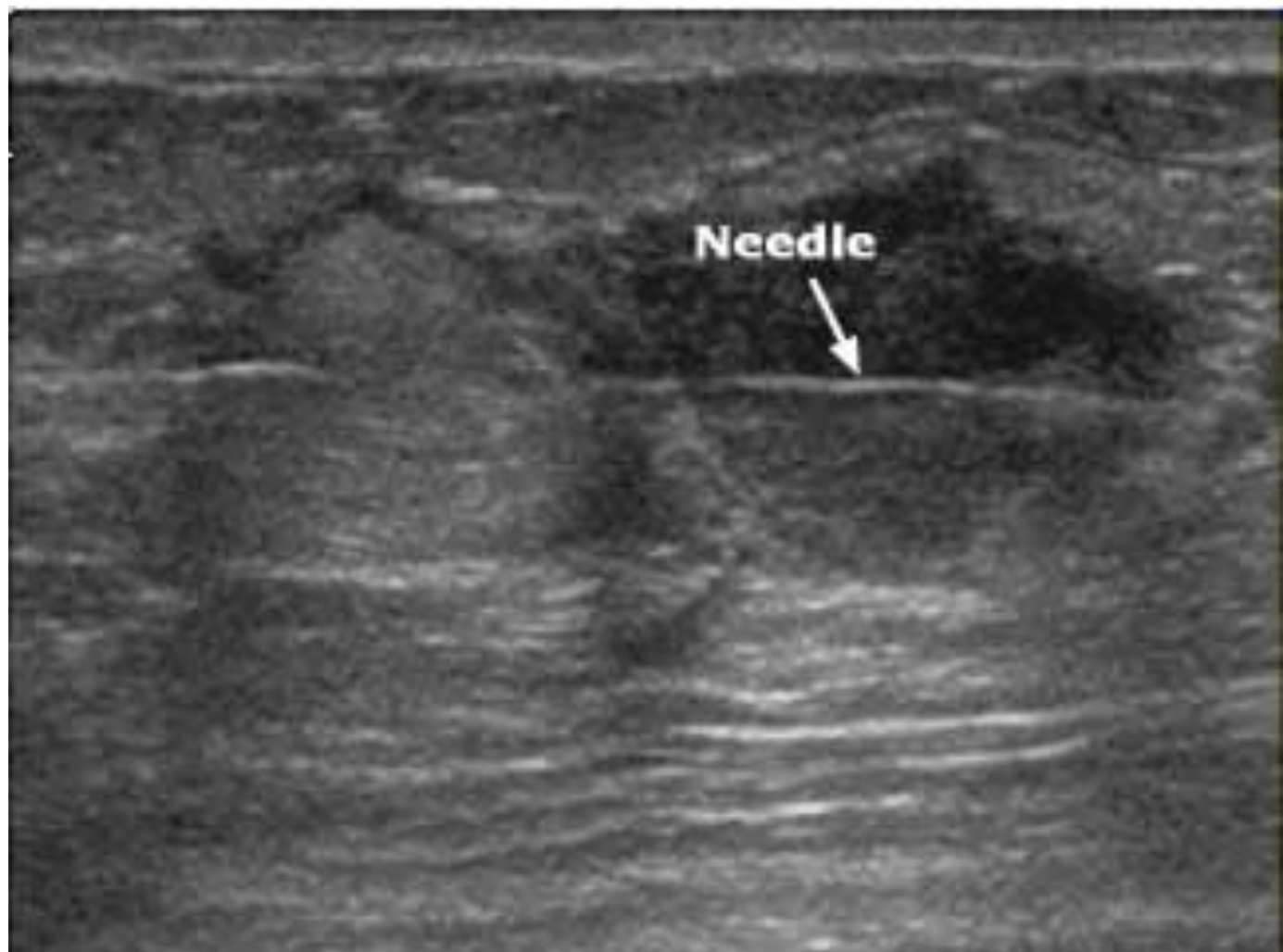
- Ultrasound guidance is an accurate and reliable biopsy guidance technique and is the method of choice and suitable for all breast lesions visible on ultrasound

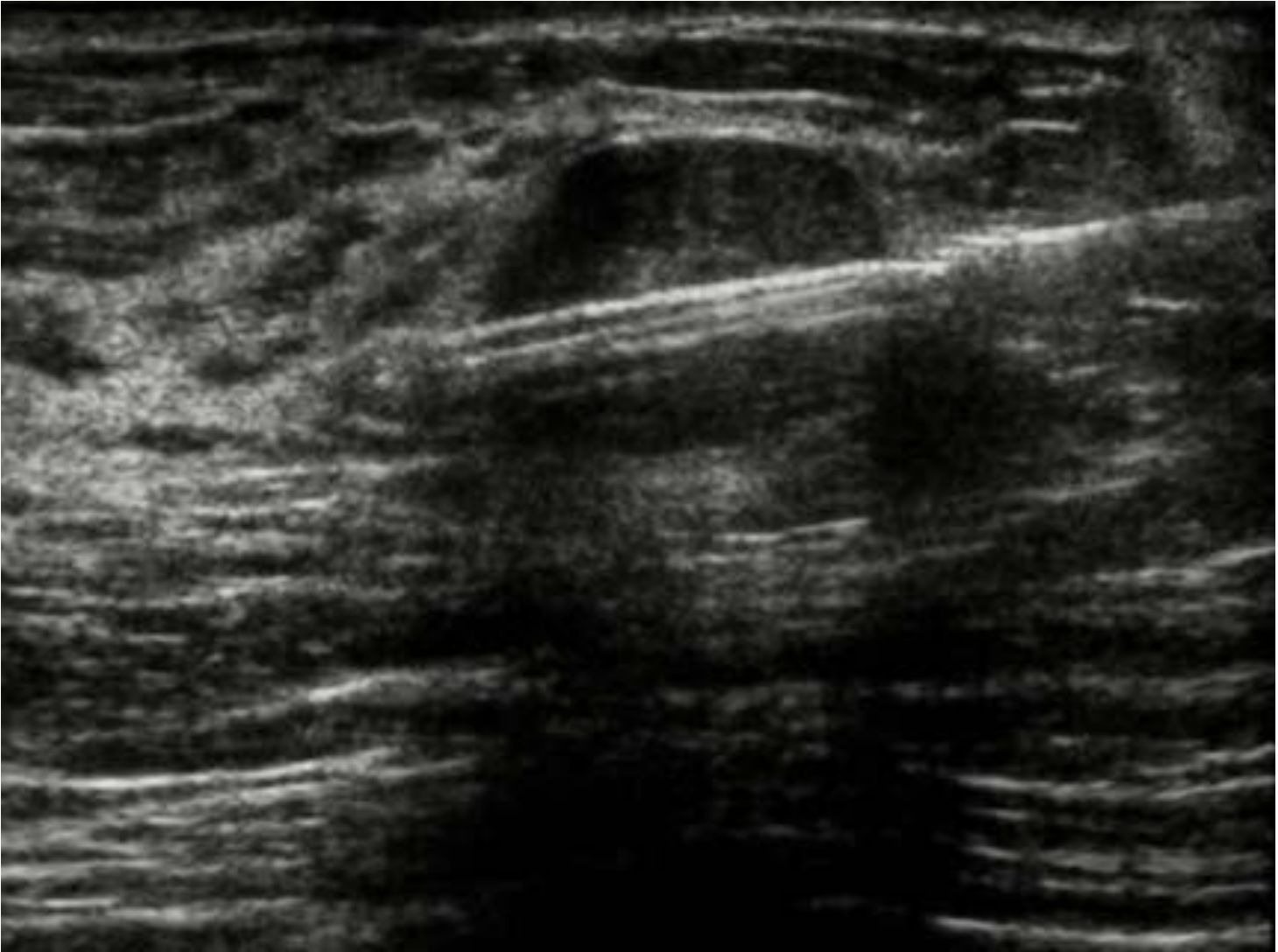
Breast Biopsy Indications

- Focal mass or other lesion of unknown nature – palpable or non-palpable
- Architectural distortion
- Micro-calcifications
- Cyst aspiration

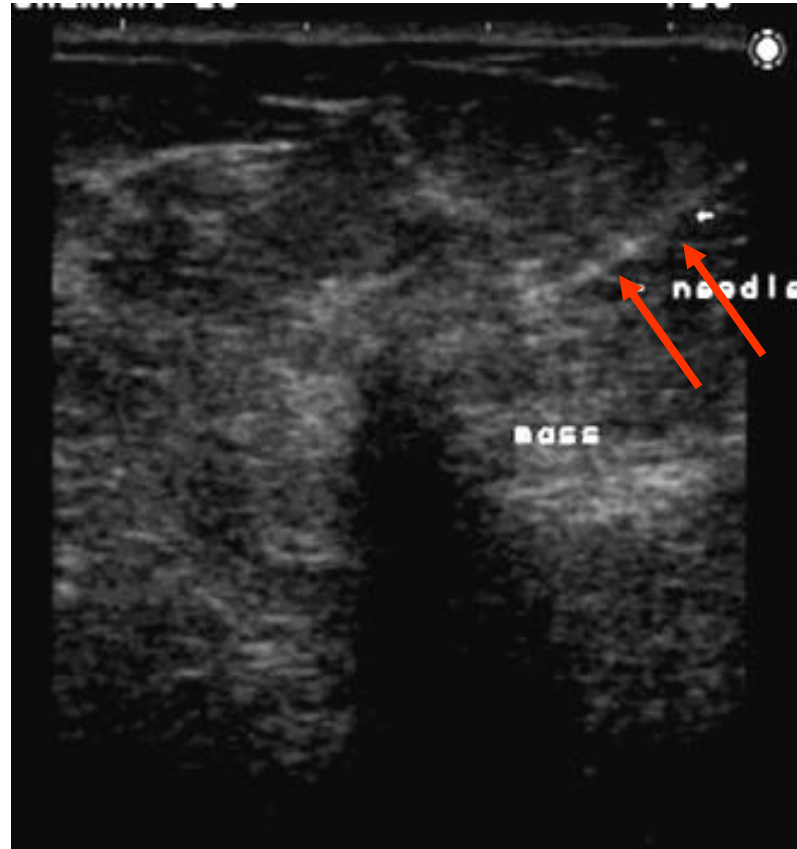
U/S GUIDED BREAST BIOPSY

- PROCEDURE:
- The long axis of the needle, should be visible along the long axis of the transducer.
- Occasionally, during an FNA biopsy or cyst aspiration, the transducer can be rotated 90 degrees to visualize the echogenic dot of the needle within the lesion.





Ultrasound Guidance



Ultrasound Guidance

