Breast Ultrasound

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The palpable mass/pain
Screening?
Callbacks
Masses
Second look after MRI
Axilla
Pregnancy
The young patient
The male breast
What kind of practice?

- Scan breast only
- Breast boarded?
- Have dr to check cases with?
- Do 3d at your site
- Do mri at your site
- Do biopsies at your site
- Do you participate in biopsies
Optimize parameters, probe: linear array 7-13 MHz, ergonomics

When start scanning – change depth to include the pec and chest wall

When find a lesion - change depth and focal zone to focus on mass, up to 2

Scan and annotate Antiradial/Radial

Annotate Side-Clock position-distance from nipple

When measuring things to be followed or biopsied- provide 3 measurements

Always check color flow- even on “simple cysts”
  - Make sure not to apply too much pressure
  - Can also use power doppler
Scanning

- compression and angulation of probe from heel to toe to sharpen up the edges of a lesion
- Dynamic range: some settings can make a cystic lesion look solid and vice versa
- Compound imaging and resolution
  - cleans up speckles
  - gives between edge definition
- Harmonics
  - transmits at one frequency
  - receives only multiples of this single frequency
  - most noise is generated near the transducer due to reverberation
- Traps for beginners
  - edge refraction: from vessels, Cooper's ligaments, edge of cysts
  - focal fat locules
  - Islands of fibroglandular tissue
Screening

- Dense breasts, difficult clinical exam, family history
- 3-4/1000 additional cancers
- Not recommended as additional screening in high risk (MRI)
- Easy to get caught up in cysts and other benign findings, main goal is to find small invasive cancers
- Have a system to scan entire breast, take images of each quadrant, retroareolar.
- ABUS
The palpable mass/pain

- <30 yo: Ultrasound first
- 30yo+: Should have bilateral mammogram first
- Should have mammogram in last 6-12 months, otherwise do unilateral mammo first, if greater than 12 months- bilateral mammo

- Did the patient or Dr. notice the change. Ask for description- how long, how big, painful?
- Have patient show you exactly where and try to feel it yourself. Does it feel firm, small, big, in the skin, mobile?
- Scan directly over the area and nearby- get a sense for the patients “normal” breast tissue.
- Be careful when taking pictures of “normal tissue”- only caliper things that are real
Callback from screening

- Read report and callback sheet
- Review mammogram if possible
  - Know exactly what you are looking for - increases sensitivity and specificity - reduces incidental findings that then require unnecessary follow-up
  - Important to know estimated clock location - distance from nipple and size
    - Lead drops-muffin top rule
  - Helpful to know if surrounded by fat or FG tissue, or if near another finding like a cyst or calcification
- If a mammographic finding is suspicious enough and you do not find it on ultrasound → Stereotactic biopsy
Because of the patient positioning when taking the MLO view, the true position of a finding may be more inferior or superior than expected based on if the finding is very lateral or medial on the CC view.

- The more medial (MUFFIN) a finding is, the farther it will rise to the TOP in true position as compared to the MLO
- The more lateral (LEAD) a finding is, the farther it will DROP in true position as compared to the MLO
- This exposes one to errors in scanning ie: may assume upper outer quadrant but it is so lateral that it drops into the lower outer quadrant
Cystic:
- Simple- anechoic, thin wall, through transmission, NO FLOW
- Complicated- Internal echoes- can look solid- may need aspiration vs followup
- Complex- thick wall, nodules, septations: Abscess, hematoma, fat necrosis, malignancy- depending on history may need CORE Biopsy

Solid:
- Fibroadenoma- Circumscribed or gently lobulated, hypoechoic with echogenic striations, may have through transmission. Biopsy vs. 6 month followup
- Fat necrosis- Great Mimicker- may have solid and cystic, hypo or hyperechoic areas. Often associated with trauma, surgery, large breast size. May have more fat density on mammogram. Usually resolves or calcifies over time. 6 month follow vs- biopsy.
- Cancer- Usually ill-defined, occasionally circumscribed, typically hypoechoic, echogenic halo, taller than wide, vascularity may be present
Axillary ultrasound

- Ensure depth covers to chest wall.
- Palpable adenopathy, accessory breast tissue, sebaceous cysts
- Get history: SLE, collagen vascular disease, leukemia, lymphoma, mets infection can all cause adenopathy

- Suspicious mass in the breast ➔ scan ipsilateral axilla
  - Cortical thickening >3mm
  - Eccentric cortex
  - No normal fatty hilum
  - Lymph node size does not matter
  - Good practice to note how many appear abnormal

- Any borderline enlarged nodes ➔ scan contralateral axilla for comparison
MRI is often done for preoperative staging to find additional sites of disease not seen mammographically or by initial ultrasound.

MRI suspicious findings are described as masses or non-mass enhancement.

Masses are often seen sonographically while NME is typically not seen.

US guided biopsy is preferred-easier on patient, cheaper, faster.

Confidence level of matching lesion on ultrasound to MRI must be high otherwise may not be biopsying the correct lesion.

If not high confidence, patient should have MRI guided biopsy.
Pregnancy

- Lactating adenoma
- Galactocele
- Fibroadenoma
- Accessory breast tissue
- Mastitis/Abscess
- Malignancy
Lactating adenoma

- Painless breast mass late in pregnancy or post partum
- Rapid growth but regress
- Variable sonographic appearance
  - Sharp margins
  - Homogenous hypo or hyperechoic
  - May have large cystic areas
  - May have posterior acoustic enhancement
- Will regress on own
  - 3 month followup ultrasound
  - Biopsy
Galactocele

- Most common breast lump in lactating women
- Painless breast lump occurs over weeks to months
- Retention cyst of the lactiferous ducts
- May be cystic, mixed or solid
- No color flow
- Will spontaneously resolve
Abscess/Mastitis

- Usually in breast feeding patient, diabetics, immunocompromised
- Pain, erythema, swelling, fever
- Skin thickening, increased blood flow
- Abscess or phlegmon
  - Complex cystic collection
  - Should be aspirated for diagnostic and therapeutic purpose
  - Can undergo repeat aspirations
  - Surgery not needed unless multiple failed aspirations or complicated by nonresolving fistula
  - Followup after antibiotic course or if worsening symptoms
Gynecomastia- Best diagnosed on Mammogram
- Right behind nipple, usually flame shaped no calcs, may be symmetric or unilateral

Malignancy- IDC, 1% of all breast cancers
- Any mass not directly behind the nipple must be evaluated with ultrasound +/- biopsy