

Image Guided Breast Intervention: Brief review and helpful tips

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“Why not just operate?”: Pre-operative Needle Biopsy is The Standard of Care

- Right choice benign or malignant (save \$ and time):
 - > With invasive cancer diagnosis, surgeons can perform definitive therapy including removal of the cancer and lymph node staging at once.
 - > Neoadjuvant possibilities
 - > With benign diagnosis, saved patient surgery
- Effective because Low False Negative Rate of Needle Biopsy
 - > 0 - 9 % (14G US Biopsy) *Schueller, et al. Eur Radiol 2008; 18: 1761–1773*
 - > <10 % (Stereo Biopsy) *Lomoschitz, et al. Radiology, 2004; 232:897–903*
Liberman, et al. Radiology 1994: 192:793-795
 - > Similar to cancer miss rate by surgical biopsy

What to biopsy:

Indications of Needle Biopsy

● BIRADS 5 lesions

- Confirm malignancy by histology (invasive or in-situ)
- Confirm multicentricity for surgical planning and neoadjuvant therapy

● BIRADS 4 lesions

- Confirm or rule out malignancy

● BIRADS 3 lesions

- Requests by physicians or patients

● Node sampling (less in the Z0011 Era)

Planning: Choose your approach

◎ Choose modality of best:

- > Visibility
- > Location

◎ Choose needle:

- > Least invasive for accurate diagnosis
- > Coagulopathy considerations (as low as 18G)

Needle Biopsy: Modality Choices

- ⦿ Ultrasound-guided
- ⦿ Stereotactic-guided
- ⦿ MRI-guided
- ⦿ All things equal patients prefer:
US > Stereo > MR

Ultrasound Guided Procedures

⊙ Advantages for both Patient and MD

> For Patients

- Faster
- More comfortable, No compression
- No radiation
- Lower costs

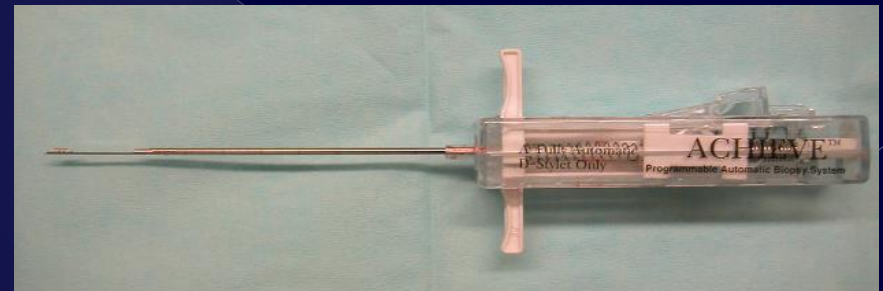
> For Radiologists

- More flexible access (anterior, superficial, far posterior, axillary tail lesions)
- More accurate: Real time visualization

US Guided Biopsy

● Biopsy Device

> 14G Automated Gun with Tru-cut Needle



US Guided Biopsy

◎ Motion of Tru-cut Needle

- > Pre-fire : Needle tip adjacent to the lesion

Visualization of area distal to the lesion



US Guided Biopsy

- ◎ Motion of Tru-cut Needle
 - > Fire in action



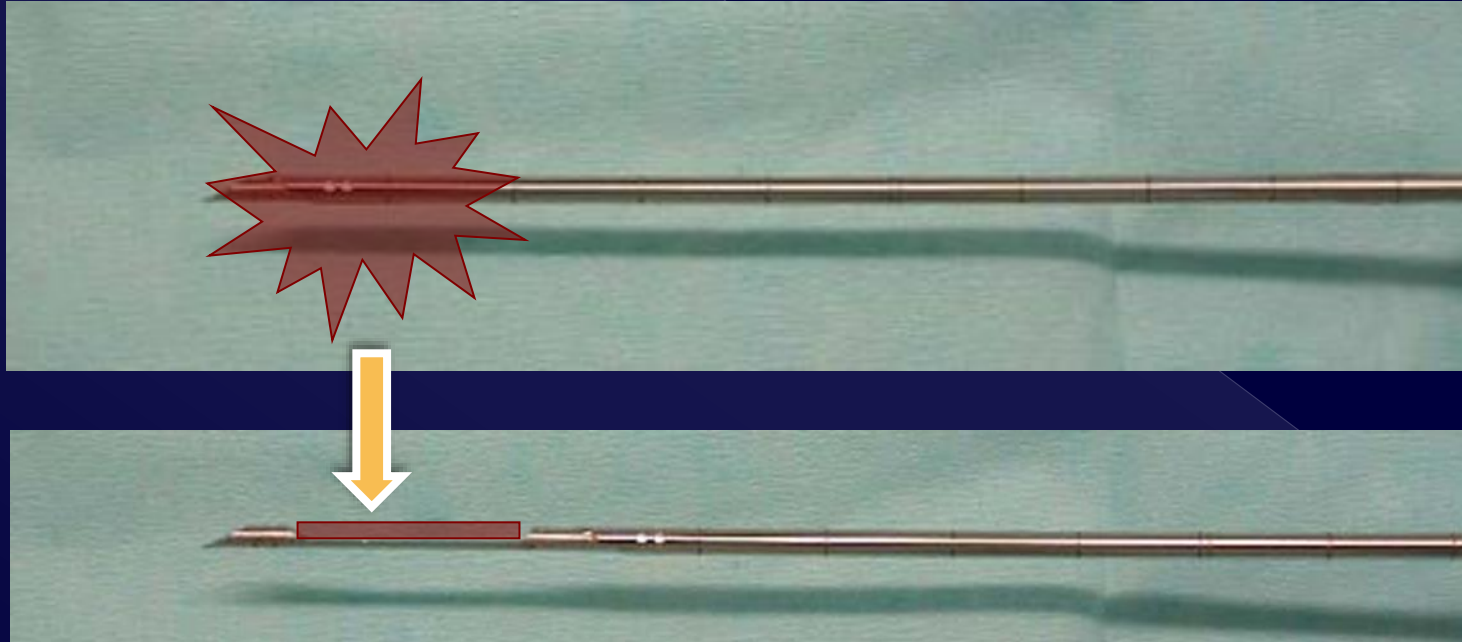
US Guided Biopsy

- ◎ Motion of Tru-cut Needle
 - > Post-Fire



US Guided Biopsy

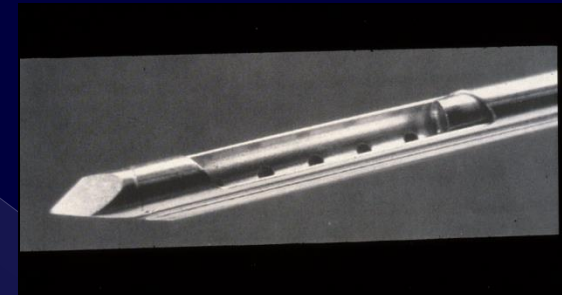
- ◎ Motion of Tru-cut Needle
 - > After Sampling



US Guided Biopsy

◎ Biopsy Device

> 12G Needle with Vacuum-Assisted Device



US Guided Biopsy – Technique –

◎ Biopsy Device

- Self-contained Vacuum-Assisted Biopsy System



14G Bard Finesse



12G Suros Celero



10, 14G Bard Vacora
(US, MRI, Stereo)

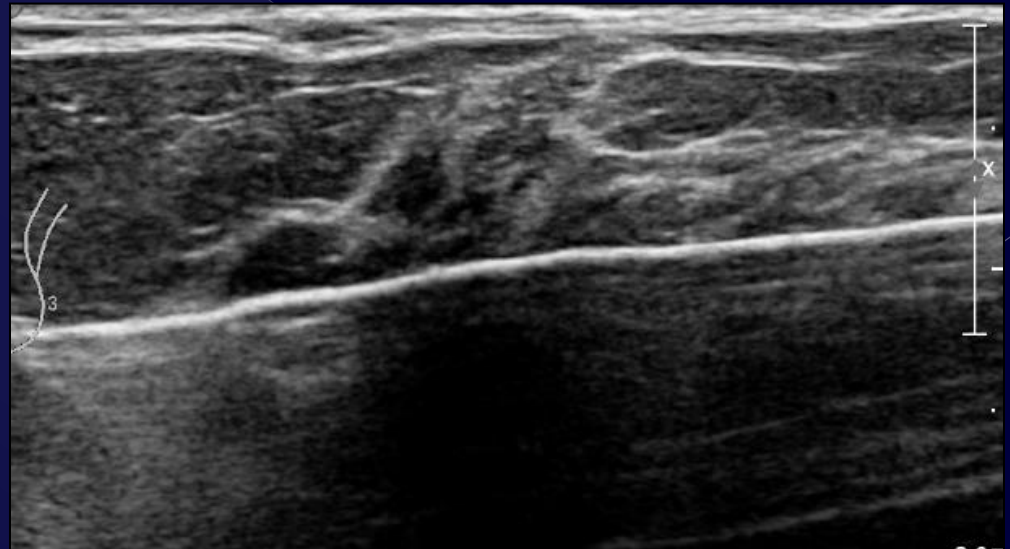
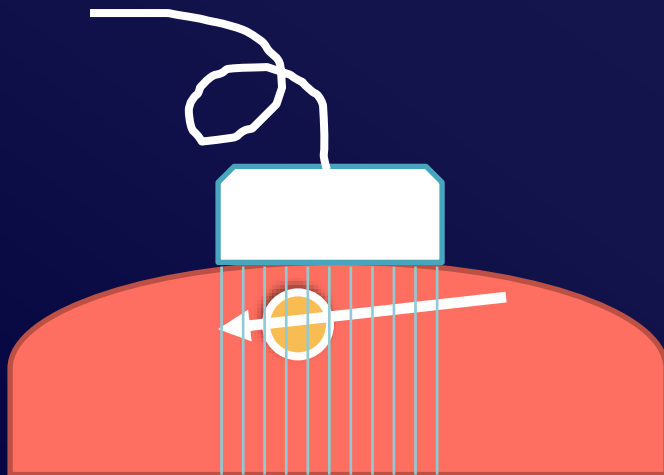
US Guided Biopsy – Technique – Helpful Hints:

- ⦿ Think before you nick
- ⦿ Look down at your hands (don't get locked on the US screen)
- ⦿ Move one thing at a time (US probe or needle)
- ⦿ Take away extra dimensions

US Guided Biopsy – Technique – Take away dimensions, Look down

● Goals:

- > Keep the needle parallel and central under the probe
- > Need to see the whole length of the needle and the target lesion

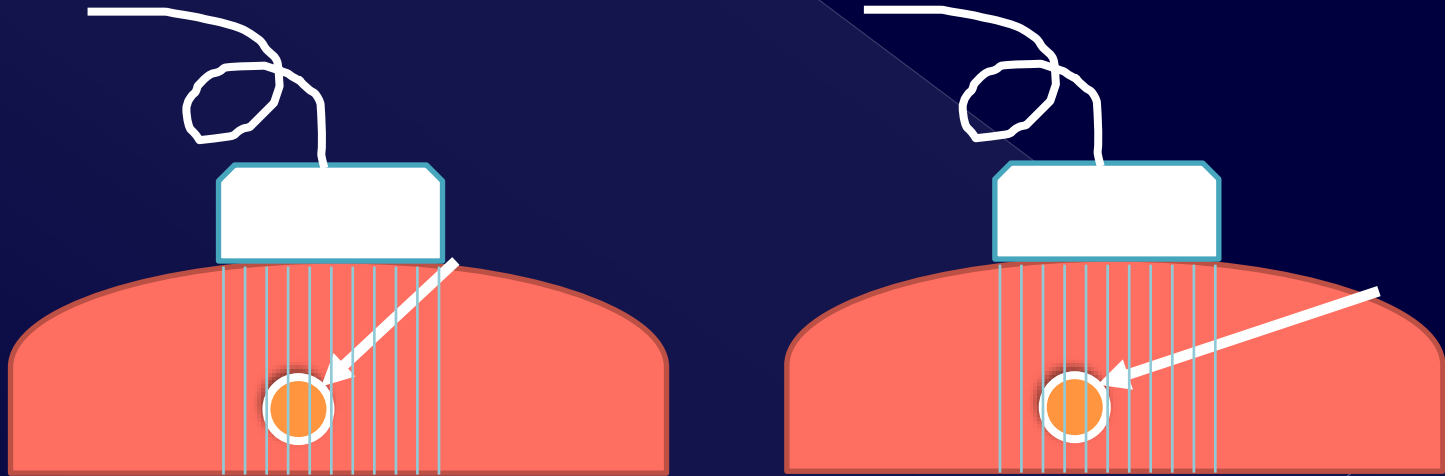


Think before you nick

US Guided Biopsy – Challenges–

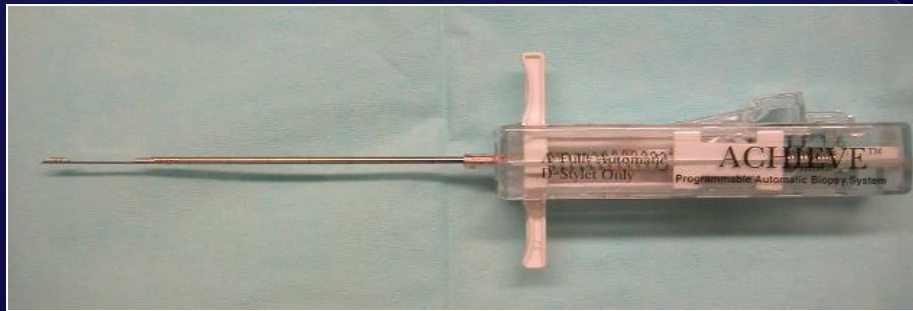
- Deep lesions

- > Entry point further from the probe



Think before you nick: US Guided Biopsy – Technique –

- Open trough technique with needles of controllable action
 - > Deep lesions
 - > Near vessels (axilla)
 - > Retroareolar



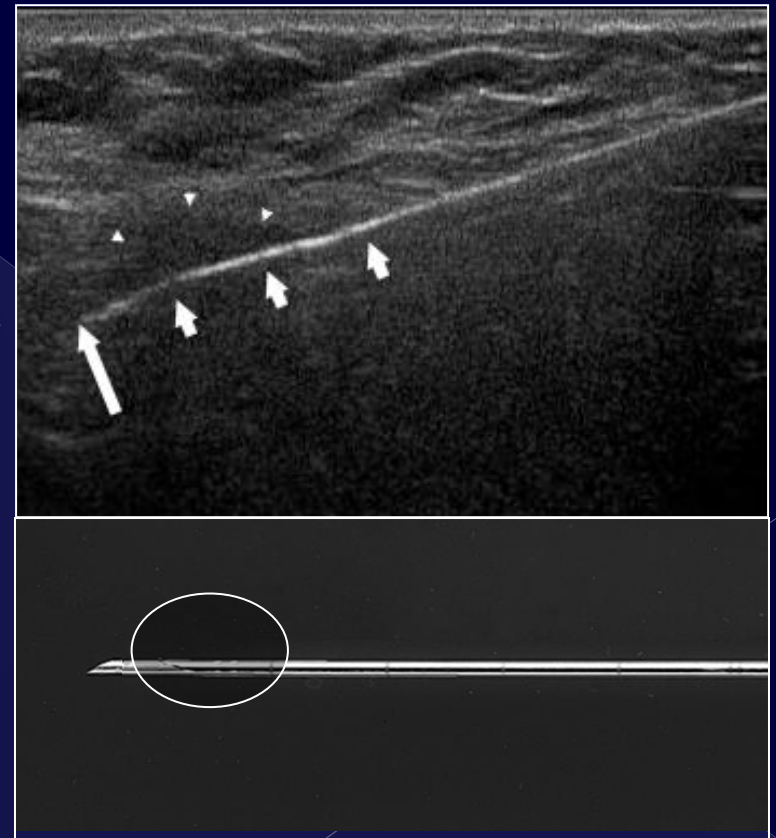
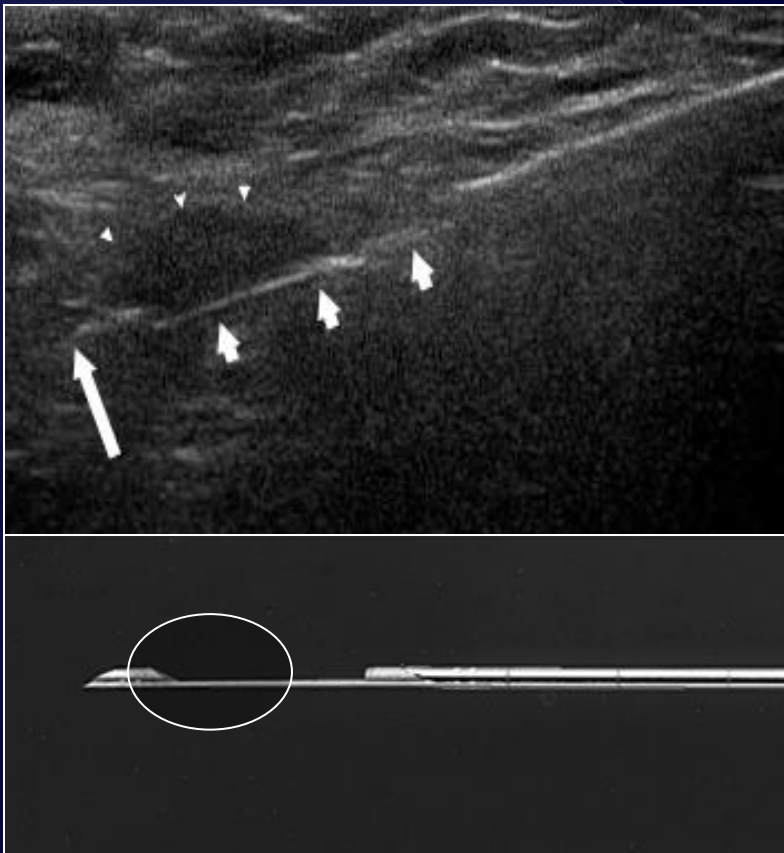
Achieve (14, 16, 18, 20G)



INRAD SelectiveCore (14, 18, 20G)

US Guided Biopsy – Technique –

⦿ Open trough technique



US Guided Biopsy

– How Many Cores? –

- Diagnostic yield

- > Many investigators suggested **minimum of 5 specimens**
- > 98% in 962 patients with **3 specimens**, when targeting is accurate

Schueller, et al. Eur Radiol (2008) 18: 1761–1773

Sauer, et al. Br J Cancer 2005; 92, 231-235

- Sampling from various parts of the lesion is important (center, peripheral, lesion boundary)
- Get “enough sinkers”

US Guided Biopsy – Size of Needle –

◎ No significant difference in outcomes

: False negative rates, Histologic underestimation, Need for re-biopsy, Complications

> 181 biopsies with 14G gun vs.
100 with 11G vacuum assisted device

Pilpotts LE, AJR 2003

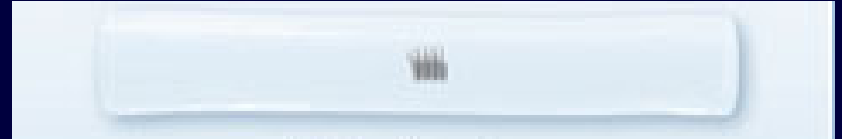
> 562 biopsies with 14G gun vs.
417 with 11G vacuum assisted device

Cho N, Korean J Radiol 2005

US Guided Biopsy – Marking Clip –

- ◉ Why use a clip?
 - > Ensure mammogram/ US concordance
 - > Allows localization for subsequent surgery
 - > Marks tumor site even if CR after chemotherapy
- ◉ Consider using different clips for multiple biopsies
- ◉ MR visible clips are preferable for probable cancers
- ◉ US visible clip is available

US Guided Biopsy – Marking Clip –



Stainless steel or titanium covered by hydrogel

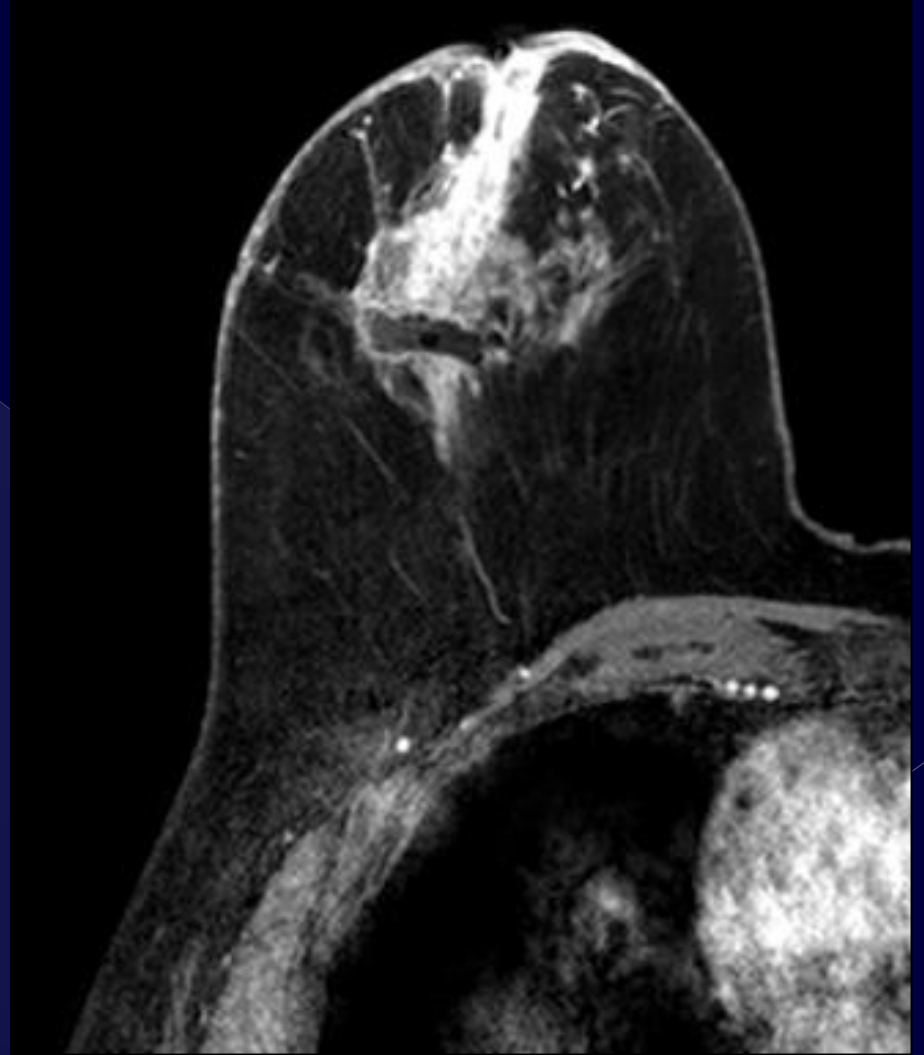
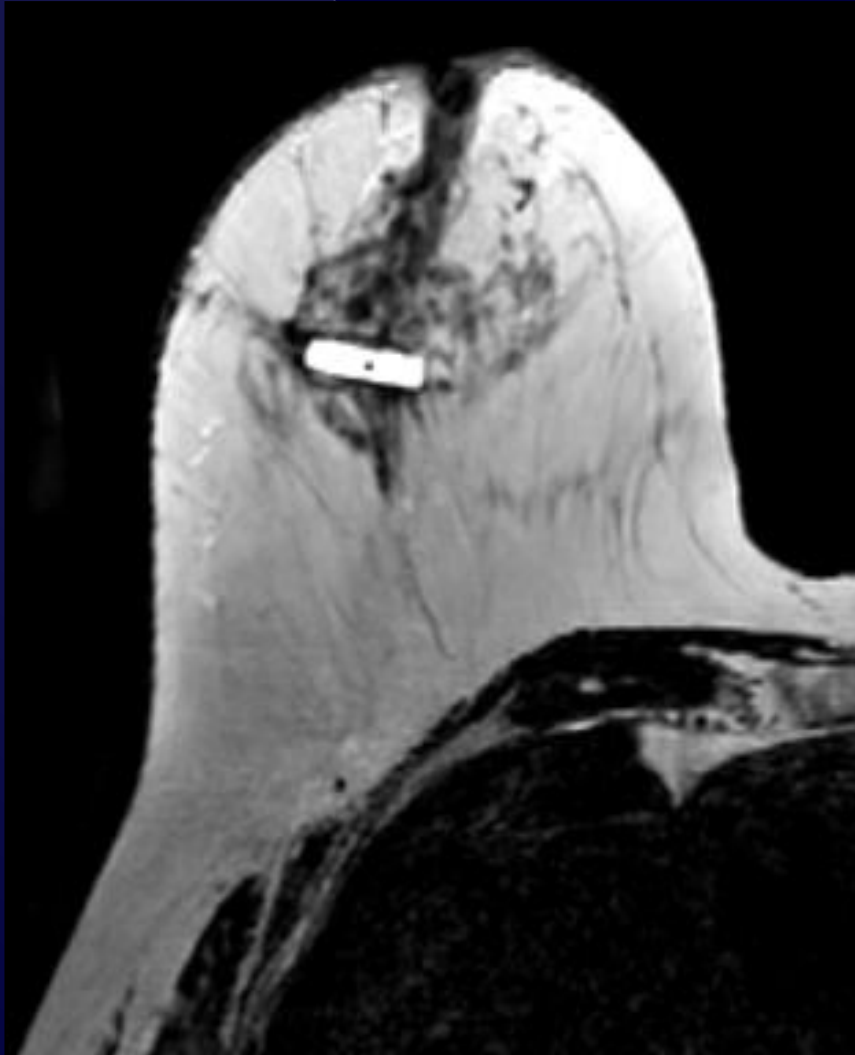


At the time of placement



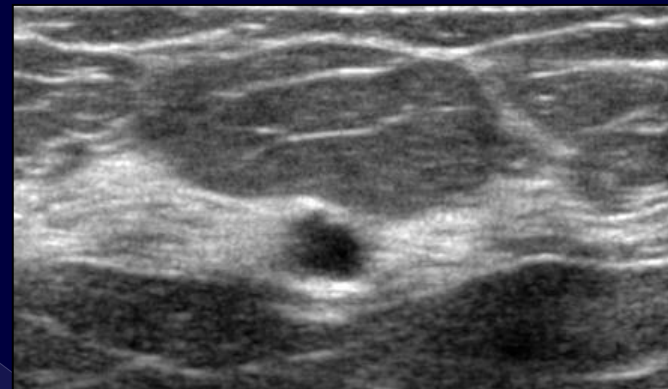
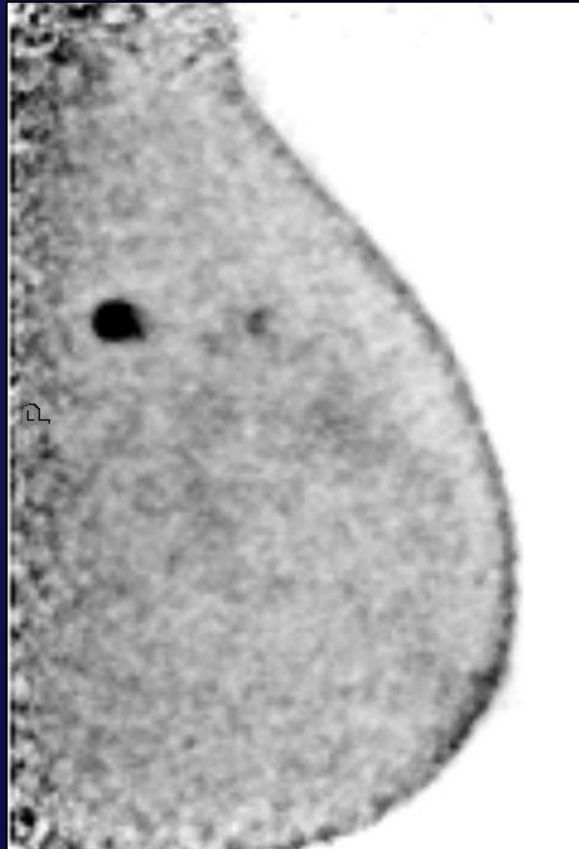
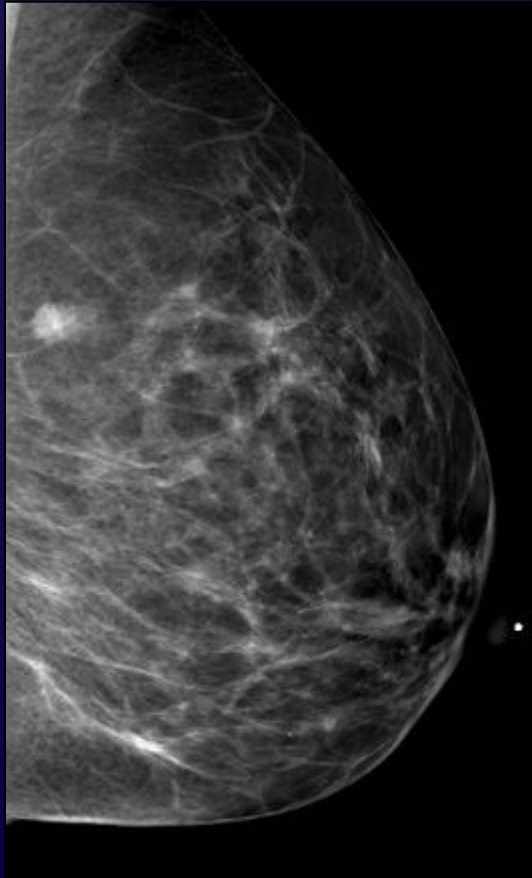
12 weeks after placement

US Guided Biopsy – Marking Clip –

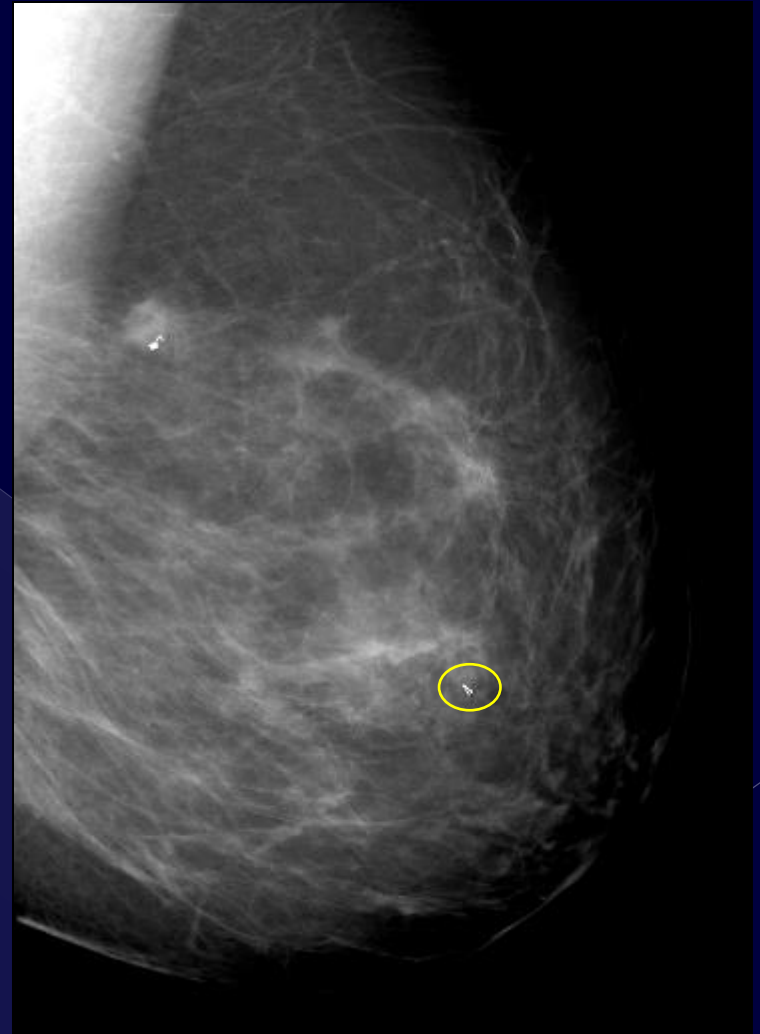
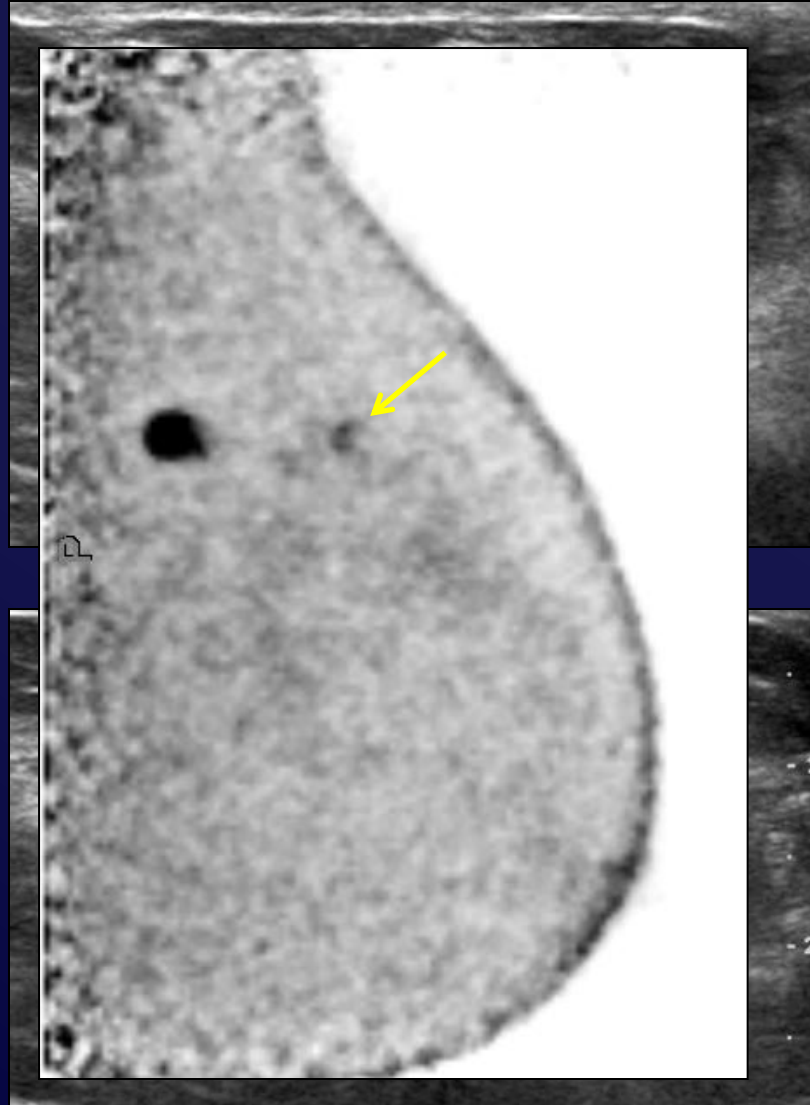


Case: Importance of Marking Clip

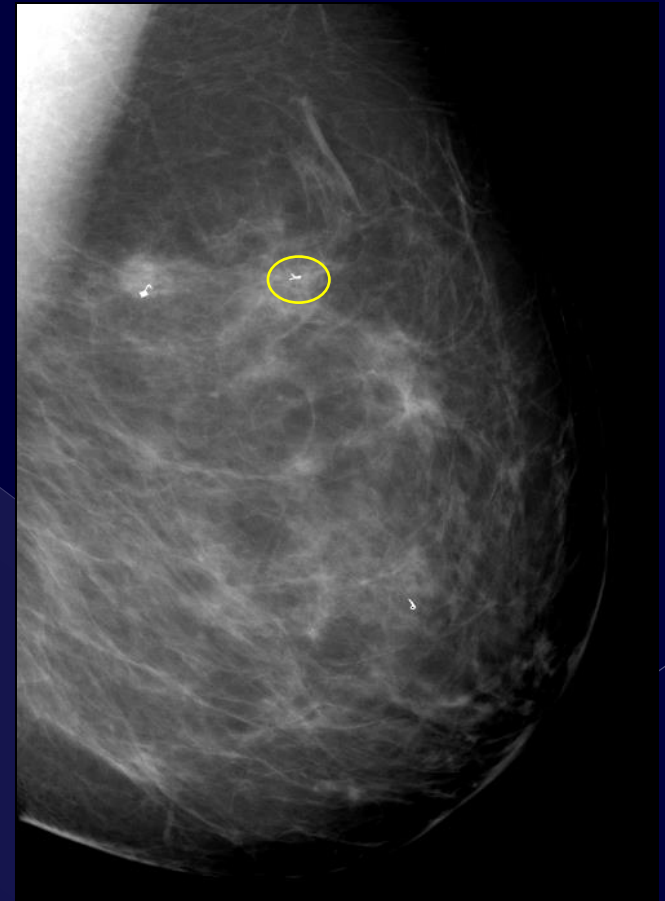
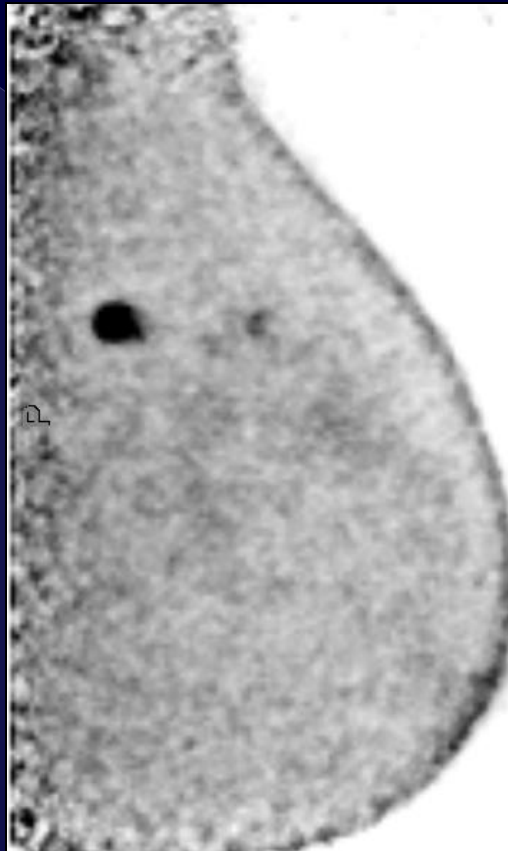
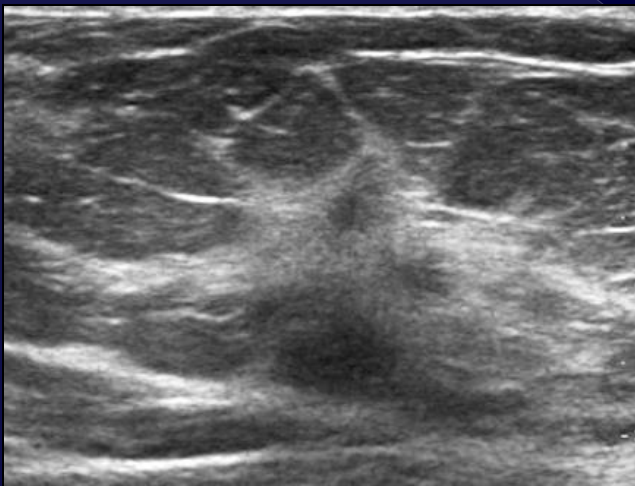
- Biopsy of small lesion/cystic lesion/satellites



US Guided Biopsy – Marking Clip –

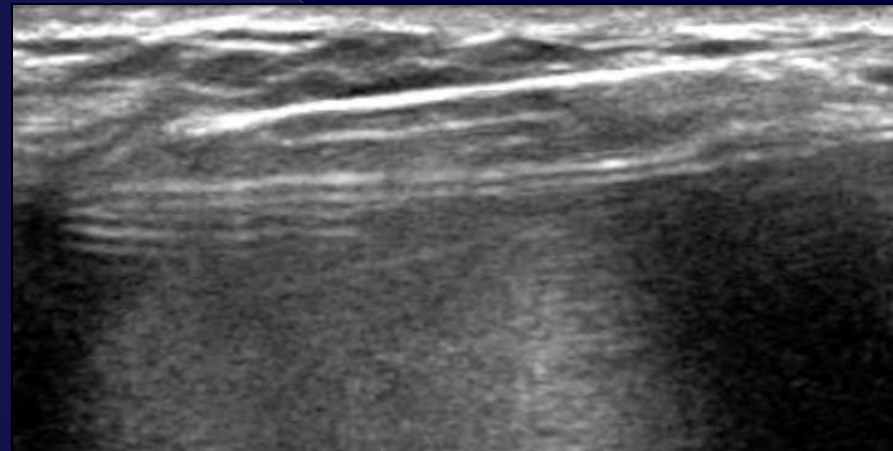
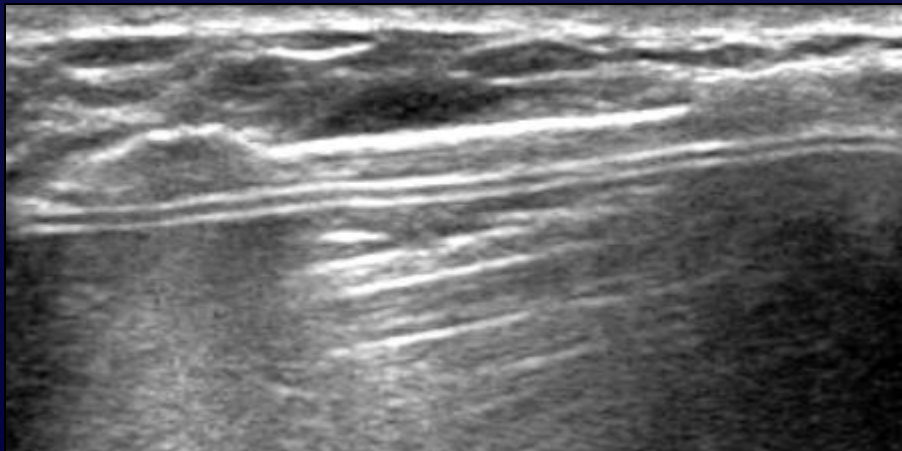
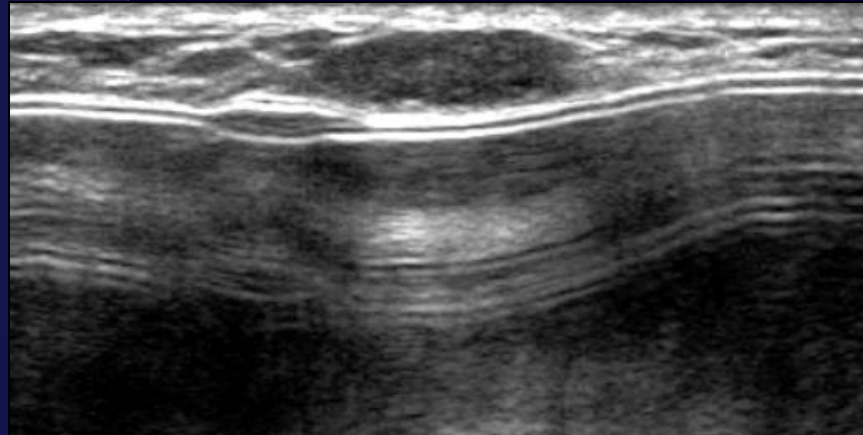


US Guided Biopsy – Marking Clip –



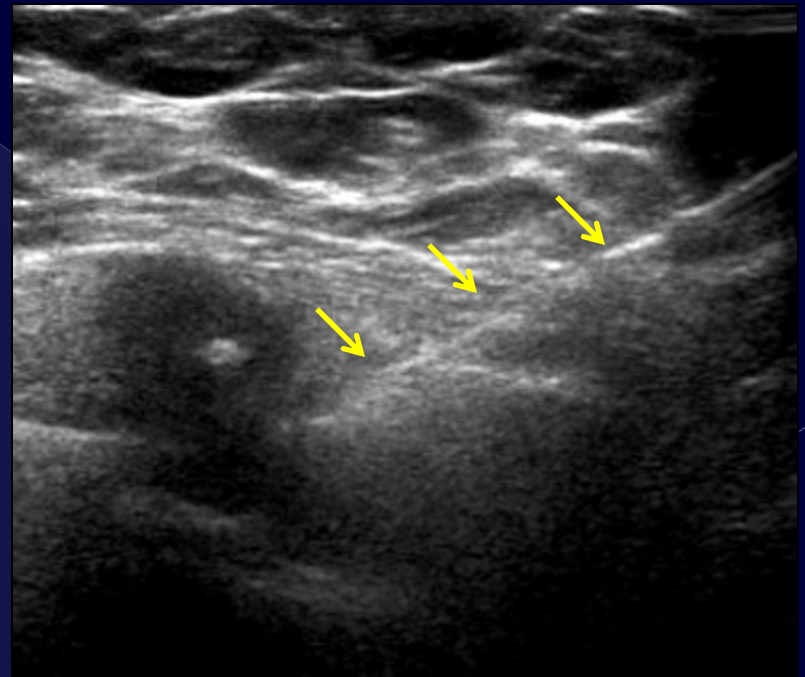
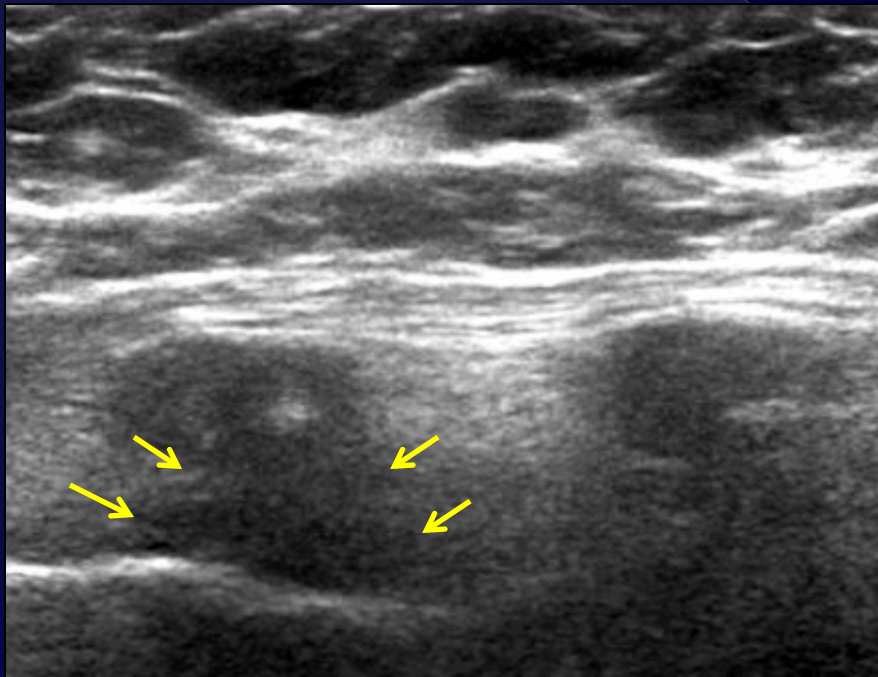
Special Case: US Biopsy – Breast with Implants

◎ Think: Open trough technique

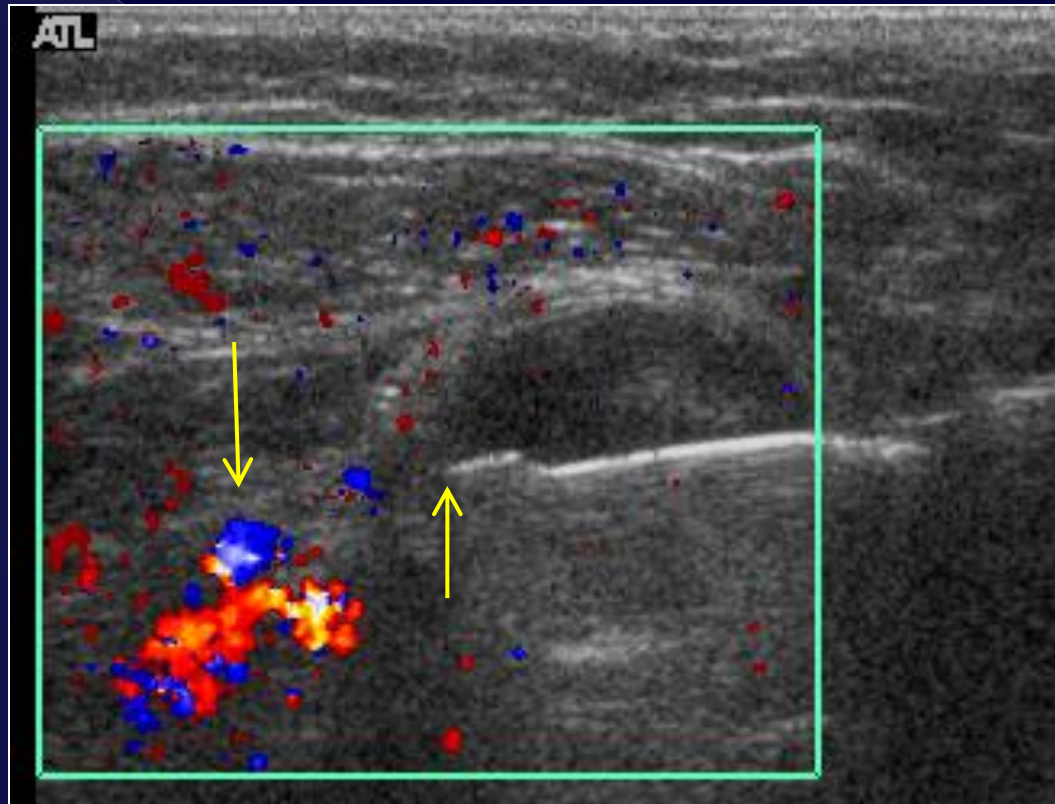


Special Case US Biopsy – Lymph node –

- Open trough technique
- Epinephrine (1:100,000)



US Biopsy of Lymph node



Biopsy of a node immediately adjacent to a large vein, using open trough technique

THANK YOU !

Thanks to Akiko Shimauchi MD
and Hiroyuki Abe MD, PhD

