INTERVENTIONAL TECHNIQUES WITH BREAST ULTRASOUND

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Ultrasound is a very versatile technique for any breast procedure that requires imaging localisation of the area of interest. It can be used for the guidance of:
- cyst aspiration
- cytology or core biopsy
- hookwire localisation
- carbon tracking localisation
- drainage of abscess or other collections.

For ultrasound guided procedures the patient lies supine or supine oblique, with her arm placed above her head to put stretch on the breast tissue, and minimise breast thickness and movement. A 7.5 MHz probe or greater is required for good resolution of the breast tissue.

For all procedures the preferable needle route is the shortest to the lesion in a radial or antiradial direction, avoiding the areola. For all procedures the needle should be introduced into the breast in the direction of the long axis of the probe. This allows visualisation of the full length of the needle and allows identification of the position of the needle tip. If the needle is introduced at right angles to the probe axis, the needle is visualised only in part, and it is not possible to identify the needle tip with certainty. The angle of the needle route should be as parallel as possible to the chest wall for good visualisation and safety. Constant visualisation of the needle tip will avoid the risk of accidental penetration of the chest wall and pneumothorax.

Cyst Aspiration
Most cysts can be aspirated using a fine needle, eg a 25 gauge venipuncture needle. If the cyst contents are thick and paste-like, a larger gauge may be required. A pistol grip handle is useful so that vacuum pressure can be applied easily during the procedure, using a single hand. It is not necessary to send cyst fluid for routine cytological examination or for culture unless there are clinical or imaging indications to suggest malignancy or infection.

Cytology
For cytology a fine needle (eg a 25 gauge, 38mm venipuncture needle) is used. The needle is moved back and forth through the lesion for several seconds, and suction may be applied. All movements should be monitored on the screen. Suction is released and the needle is then removed, and cytology slides prepared.

Core Biopsy
For core biopsy a large needle (eg a 14 gauge or greater, 50mm length) is used. Local
anaesthetic is injected in the subcutaneous tissue and, as preferred, up to the lesion. For automated Tru-Cut sampling the core needle is inserted up to the leading margin of the lesion and then fired. With vacuum assisted biopsy, the needle (or probe) is placed deep to the lesion with the sampling notch facing upwards. The tissue samples are placed in formalin.

**Hookwire Localisation**
With hookwire localisation the length of the route to the lesion is especially important so as to assist in minimising surgical disruption of normal tissues. A short route is easily obtained with ultrasound guidance. The radiologist should aim to traverse the area of interest and deploy the hook of the wire distal to this.

**Conclusion**
Ultrasound guided procedures are easy for the patient and, once skills are acquired, also for the radiologist performing the technique. The procedures are generally quick and safe, and make an important contribution to patient management.

**References**
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3D-BREAST ULTRASOUND (US) CORRELATION OF
2D-US GUIDED CORE NEEDLE BIOPSY AND HOOKWIRE
LOCALISATION

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**Purpose:** The purpose of the study is to evaluate the benefit of 3D-US correlation following core needle or hookwire placement with typical "freehand" 2D-US guidance.

**Materials and Methods:** All demonstrated cases were examined with a prototype of a linear 3D-US volume scanner (5-13 MHz, Voluson 530 D, Kretz-Medison). After stroke of the 2D-US guided core needle or following hookwire localisation a 3D-US data volume was acquired. Correlation with multiplanar scan plane analysis was performed.

**Results:** The option of 2D- and 3D-US with one and the same transducer offers a speedy and therefore suitable imaging procedure during biopsy. The system acquires a 3D-data volume (10 MByte) in about 4 seconds without additional moving of the transducer. The needle position or hookwire localisation is clearly demonstrated in relation to the lesion. Especially small lesions of 5mm in diameter can be pushed away by the stroke of core needle. This problem presents 3D-US more clearly than 2D-US and causes for example a better compression of the breast during the following stroke for a more effective needle path.

**Conclusion:** 3D-US is an essential tool which demonstrates very objective correct or wrong needle or hookwire position and helps therefore to optimize tissue sampling during biopsy.
CORE NEEDLE BIOPSY UNDER ULTRASOUND GUIDE AGAINST NONPALPABLE BREAST TUMOR

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Purpose: Aspiration biopsy cytology (ABC) is useful for diagnosis of non-palpable breast tumor, but many cases of benign tumor cannot be diagnosed by ABC, because in such cases obtained tumor cells are insufficient for diagnosis. So we perform core needle biopsy (CNB) under ultrasound guide aggressively for more define diagnosis.

Materials and Methods: 80 women, 83 cases. They were performed CNB at Tokai University Hospital. Many cases were thought benign tumor by ultrasound. In many cases used needle was 18G Biopsy needle, but some cases 18G Accura biopsy needle.

Result: 3 cancers and 47 benign tumor were revealed. In some cases obtained tissue was small, but CNB by 18G Accura biopsy needle tissue amount was more than by 18G Biopsy needle.

Conclusion: If diagnosis is not confirmed due to few amount of obtained cells by ABC, by CNB it may be obtained more cells which can reveal diagnosis. And some cases may be malignant which are thought benign by ultrasound or mammogram CNB should be done aggressively.
USE OF ULTRASOUND-GUIDED CORE NEEDLE BIOPSY FOR DIAGNOSIS OF OCCULT BREAST CANCER

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Purpose: To determine the role of ultrasound-guided core needle biopsy (UCNB) in the diagnosis of occult breast cancer.

Materials and Methods: One hundred and fifty eight women underwent UCNB using automatic gun with 14-gauge needle from July 1996 to June 1997. Of 31 women pathologically proved to have breast cancer, we investigated the number and sonographic findings of occult breast cancers detected with sonography alone. The reasons for referral of the patients with occult cancer were also evaluated.

Results: Of 31 cancers, 10 were palpable, 8 showed suspicious or definitive malignant features on mammography, and the remaining 13 lesions were occult both clinically and mammographically. Of 13 cancers detected with sonography alone, 6 showed the malignant characteristics on sonography, but 7 showed none of the malignant characteristics; 6 showed benign appearing solid nodules and one showed subtle thickening of Cooper’s ligaments. The mean size of occult cancer was 1 cm. The reasons for referral of the patients with occult cancer were screening in 5, contralateral breast cancer in 5, metastasis to axilla in 2 and metastasis to lung in 1.

Conclusion: Occult breast cancer may appear benign, especially in the women with contralateral breast cancer or metastasis of unknown origin. Breast sonography, actively combined with UCNB can easily diagnose small occult cancer.
UNCOMMON MAMMARY CARCINOMAS DIAGNOSED BY FINE NEEDLE
ASPIRATION CYTOLOGY: CORRELATION WITH HISTOLOGIC AND
RADIOLOGIC FINDINGS

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Purpose: To verify the usefulness of FNA cytology for diagnosis of uncommon mammary carcinoma.

Materials and Methods: From Jan. 1996 to Dec. 1998, 532 aspirations of the breast were performed, of which 148 had subsequent tissue diagnosis. Among them, we have experienced 14 biopsy-proven cases of uncommon carcinomas of the breast.

Results: Fourteen uncommon carcinomas of the breast consisted of medullary carcinoma (n=3), invasive ductal carcinoma with medullary feature (n=2), intraductal papillary carcinoma (n=1), invasive papillary carcinoma (n=1), carcinoma with osteoclast-like giant cells (n=1), infiltrating lobular carcinoma (n=2), secretory carcinoma (n=1), apocrine carcinoma (n=1), adenoid cystic carcinoma (n=1) and invasive ductal carcinoma encountered in the paraffinoma (n=1). Medullary carcinoma (n=3) revealed large isolated tumor cells containing irregular nuclei with prominent nucleoli and varying amount of lymphocytes and plasma cells in background.

Conclusion: Although some breast malignancies were uncommon in types, the cellular features are characteristic and may permit a specific diagnosis on fine needle aspiration.