



ORIGINAL RESEARCH PAPER

Radiology

Role of Ultrasound guided core biopsy lesions in the management of Breast lesions

KEY WORDS: Core needle Biopsy . Ultrasound guided Breast

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ABSTRACT

Ultrasound-guided core needle biopsy (CNB) plays an important role in the management of breast lesions. This technique shows a high sensitivity value of about 97.5% and it offers many advantages over other imaging techniques to guide a biopsy: non-ionising radiation, low cost, full control of the needle in real time, accessibility in difficult locations. All of these advantages have made this technique the most widespread used to perform a biopsy for a suspicious breast lesion. The most important limitation is the failure to perform a biopsy for lesions that are not seen on ultrasound. An adequate radiological-pathological correlation is necessary to minimise the false-negative results. Ultrasound-guided biopsy has proven to be a reliable technique for performing a biopsy for breast lesions that can be clearly seen on ultrasound.

Introduction

An ultrasound-guided breast biopsy uses sound waves which help in locating a lump or abnormality and remove a tissue sample for examination under a microscope. It is a less invasive technique as compared to surgical biopsies and cause minimal complications. There are two main objectives of trucut breast biopsy 1) To achieve maximum degree of accuracy 2) Providing maximum information about the tumour (type, grade, invasion, hormonal receptors, HER-2 NEU, etc.). As a result trucut breast biopsies are gradually replacing the minimally invasive technique of fine needle aspiration cytology. This technique was first described by Parker and coworkers in the early 1990s, and nowadays it has become the first choice for performing most breast biopsies.

Indication of Ultrasound-Guided Breast Biopsy

Lumps or focal lesions in the breast detected by physical examination, mammography, or other imaging studies are subjected to USG guided biopsy to differentiate between benign, malignant or grey zone lesions. A breast biopsy is performed to remove a thin core tissue from a suspicious area in the breast and give for histopathological examination. This is mostly performed by an experienced radiologist using a less invasive procedure. It is done in cases of a suspicious solid mass a distortion in normal architecture or density of the breast tissue. This is very useful in non-palpable lesions picked up an USG and then sampled accordingly.

Technical aspect

The patient is well explained about the technical procedure and its complications. History of medication is taken and PTI is done before the procedure. The needles of various sizes are available and can be selected varying from 18- to 8-gauge; however, 14-gauge conventional is used. The use of high-frequency (10- to 12-MHZ) probes, adjustments in the dynamic range and postprocessing grey scales, as well as correct focus, are important to improve the visibility of breast lesions. Local anaesthesia must be injected superficially and also as deeply as necessary, under sterile conditions. This anaesthesia does not mask the lesion and sometimes can help to manipulate it. After localising the lesion with ultrasound, the procedure is performed. The radiologist holds the probe with one hand and needle in the other. Will full control over the pressure on the needle the lesion is localised and its depth from skin is calculated. A vertical approach is best but an oblique approach is preferred. This is the way to avoid pneumothorax, the worst complication of this technique. This approach also enables the best visualisation of the needle. However, when the needle is parallel to the probe, the number of needle-generated reflected echoes that are perpendicular to the ultrasound beam is maximised, so the needle can be identified.

This horizontal approach can be used to perform a biopsy for cutaneous lesions. It is useful to move the patient to lateral decubitus positions, especially in the case of deeply located lesions. If possible, an approach through fat is preferable, because the puncture is easier (the fat is soft and the needle can be easily guided). It is important to insert the tip of the needle inside the mass, because there is a dead space behind the tip. If the tip is not inserted, then part of the specimen will be from the non-representative area. Necrotic areas should be avoided. In the case of very dense breasts, the puncture can be difficult. In such cases coaxial technique is applied. The number of samples should be greater for those lesions with complex radiological features. The first shot is important and representative as later it may be contaminated by bleeding. The macroscopic evaluation of the specimens is also important, because it can give additional information about their quality: colour, consistency and grade of immersion of the core biopsy in formaldehyde can be useful criteria for knowing their suitability for diagnosis. Intact, white or brown samples that quickly sink are considered more representative and are consequently preferred to fragmented, floating yellow ones, normally containing only adipose tissue.



Fig 1 Fresh tissue core biopsy breast

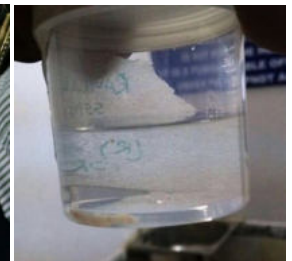


Fig 2 Adequate biopsy with tissue sinking in the bottom of container

Advantages

Ultrasound involves non-ionising radiation. Full control of the needle position in real time. Neither stereotactic guidance nor MR guidance offers this advantage. Ultrasound equipment is cheaper and more readily available than stereotactic or MR units. It provides accessibility of difficult places, such as the axilla or near the nipple. These are limitations for stereotactic or MR guidance. Multiple lesions (unilateral or bilateral) can be safely biopsied in one session. The breast is not compressed. Local anaesthesia and haematoma do not hide the lesion (non-calcified masses can be obscured with use of stereotactic equipment). However, bubbles injected with the local anaesthesia can obscure the lesion. It is a cost-effective technique. For masses amenable to either stereotactic or ultrasound guidance, cost savings are greater if the biopsy is performed under ultrasound guidance.

Complications

The complications of ultrasound CNB are minimal and not significant. Both haematomas and infections are very rare, accounting for less than 1/1,000 biopsies, being similar to the complications of other percutaneous biopsy devices. The possibility of pneumothorax exists, but it is very rare. One complication of all percutaneous biopsies is percutaneous seedling. Diaz et al. in his study mentioned that epithelial displacement was seen in up to 37% of all biopsies. However, the displaced cells did not seem to be viable. Later, in 2002, Chen et al. compared the recurrences after percutaneous biopsies vs surgical biopsies in patients with breast-conserving therapy, and found no significant differences in recurrence rates.

Benefits vs. Risks

Benefits The procedure is less invasive than surgical biopsy, leaves little or no scarring and can be performed in less than an hour. Ultrasound imaging uses no ionizing radiation. Ultrasound-guided breast biopsy reliably provides tissue samples that can show whether a breast lump is benign or malignant. Compared with stereotactic breast biopsy, the ultrasound method is faster and avoids the need for ionizing radiation exposure. With ultrasound it is possible to follow the motion of the biopsy needle as it moves through the breast tissue. Ultrasound-guided breast biopsy is able to evaluate lumps under the arm or near the chest wall, which are hard to reach with stereotactic biopsy. Ultrasound-guided biopsy is less expensive than other biopsy methods, such as open surgical biopsy or stereotactic biopsy. Recovery time is brief and patients can soon resume their usual activities.

Risks There is a risk of bleeding and forming a hematoma, or a collection of blood at the biopsy site. The risk, however, appears to be less than one percent of patients. An occasional patient has significant discomfort, which can be readily controlled by non-prescription pain medication. Any procedure where the skin is penetrated carries a risk of infection. The chance of infection requiring antibiotic treatment appears to be less than one in 1,000. Depending on the type of biopsy being performed or the design of the biopsy machine, a biopsy of tissue located deep within the breast carries a slight risk that the needle will pass through the chest wall, allowing air around the lung that could cause the lung to collapse. This is an extremely rare occurrence. There is a small chance that this procedure will not provide the final answer to explain the imaging abnormality.

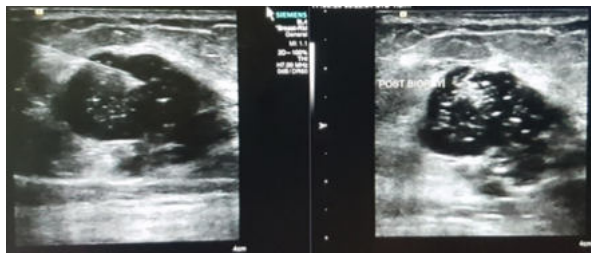


Fig 3 USG guided core needle biopsy of a breast lump

Limitations of Ultrasound-Guided Breast Biopsy

Breast biopsy procedures will occasionally miss a lesion or underestimate the extent of disease present. If the diagnosis remains uncertain after a technically successful procedure, surgical biopsy will usually be necessary. The ultrasound-guided biopsy method cannot be used unless the lesion can be seen on an ultrasound exam. Clustered calcifications are not shown as clearly with ultrasound as with x-rays. Very small lesions may be difficult to target accurately by ultrasound-guided core biopsy.

To conclude USG guided breast biopsies have become a gold standard procedure. All the radiologists should be well versed with all the technical aspects and complications of the procedure as it's the procedure in demand. It provides cheap, effective and patient friendly procedure for early diagnosis and proper management of the cases.

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