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Original Research Paper

Radiology

BREAST LESION WIRE LOCALISATION

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ABSTRACT Preoperative wire localization of nonpalpable breast lesions using ultrasound guidance aids surgical excision with a better precision. A breast-conserving treatment program requires successful multidisciplinary approach and planning between the surgeon, radiologist, and pathologist. The aim of this article is to review image-guided tools for preoperative breast lesion wire localization and also highlights the role of the radiologist in multidisciplinary breast care team.

KEYWORDS : Non-palpable, Breast Lesion, Wire, Localization

INTRODUCTION

Breast cancer is the one of the most common cancer in women all over the world and also a leading cause of cancer related deaths in women [1]

Delay in diagnosis and diagnosis at an advanced stage of the disease is the prime reason for breast cancer mortality. Therefore the main purpose of a breast cancer screening is primarily to detect cancer when it is small and impalpable. An interval time (sojourn time or the preclinical phase) has been described as the time between mammographic detectability and clinical detectability. This reflects the tumour growth rate and varies depending on the histological type, tumour type and patient's age. [2, 3]

In recent years, extensive use of screening techniques like mammography (MMG) and also the increased awareness of breast cancer among women have resulted in a drastic increase in the number of patients being detected with non-palpable breast lesions. [4]

On a parallel note there has been a significant progress in the types of available treatments of breast cancer. The approach from radical mastectomy has changed to a more minimally invasive approach of breast-conserving surgery.

A standard method described in the localization of non-palpable lesions is the hook wire localization technique. The key to successful management of these nonpalpable lesions is accurate localization of lesions using such advanced localizing techniques. This becomes essential inorder to achieve complete surgical excision with good surgical margins at the same time maintaining optimal cosmetics and minimal morbidity. Clear margins obtained with wire-guided excision are reported to be 70.8% to 87.4% according to a recent study.[9]

American Cancer Society Guideline for Breast Cancer Screening

The recommendations represent guidance from the American Cancer Society (ACS) for women at average risk of breast cancer: women without a personal history of breast cancer, a suspected or confirmed genetic mutation known to increase risk of breast cancer (eg. *BRCA*), or a history of previous radiotherapy to the chest at a young age.

The ACS recommends that all women should become familiar with the potential benefits, limitations, and harms associated with breast cancer screening.

Recommendations are as follows:

1. Women with an average risk of breast cancer should undergo regular screening mammography starting at age 45 years. (*Strong Recommendation*)
   - 1a. Women aged 45 to 54 years should be screened annually. *(Qualified Recommendation)*
   - 1b. Women 55 years and older should transition to biennial screening or have the opportunity to continue screening annually. *(Qualified Recommendation)*
   - 1c. Women should have the opportunity to begin annual screening between the ages of 40 and 44 years. *(Qualified Recommendation)*

2. Women should continue screening mammography as long as their overall health is good and they have a life expectancy of 10 years or longer. *(Qualified Recommendation)*

3. The ACS does not recommend clinical breast examination for breast cancer screening among average-risk women at any age. *(Qualified Recommendation)*

The BIRADS acronym stands for Breast Imaging-Reporting and Data System [7].

This system has been extensively reviewed and studies using multiple large scale trials and almost universally accepted and extensively used risk assessment and quality assurance tool in mammography, ultrasound or MRI.

Studies show that malignancy rate in BI-RADS-3 lesions is less than 8%, whereas in BI-RADS-4 lesions rate varies between 4% and 34%, and in BI-RADS-5 lesions between 54% and 97% [8].

INDICATION

The most common indication for a hook wire localization is the detection of a focus of suspicious microcalcifications or the diagnosis of a non-palpable lesion. A study done by Adam *et al* found that among the patients who have undergone a biopsy for a non-palpable lesion and diagnosed with malignancy, 98% of them had disease-free survival.[5]

Thus, by detecting the malignant lesions at an early stage, the disease can be cured and the patient's quality of life can be increased.

At our institution FNAC proven malignant lesions which are nonpalpable are localised by hook wire on the day of surgery.

PREPROCEDURE PRE-REQUISITES

Procedure should be planned in coordination with the surgical department preferably on the day of definitive surgery. Informed

consent should be taken. PT –INR should be normal. Screening for viral markers should be done prior to the procedure.

PROCEDURE

The localization of a lesion is performed by ultrasonography (USG). Patient should be put in supine position with arm raised above head. The area of interest is sterilised and draped. Adequate local anaesthesia should be provided with 2% lignocaine & 25 gauge needle. Needle is inserted into the lesion under guidance and stabilised. Multiple wires may be used to bracket lesions that measure 2 cm or greater or for satellite lesions.

Breast lesion localization wire is a two-component device consisting of a needle cannula with integral female Luer-Lok hub and a localization wire with dual locking elements at the distal tip.[6]

The distal end of the semi-rigid localization wire varies by manufacturer and may include a barb, hook, or pigtail to anchor the wire at the intended target.

In our institution BARD® DUALOK® Breast Lesion Localization Wire which has hook end is used.

While holding the cannula hub stationary, the proximal end of the wire is slowly grasped and the dual locking elements withdrawn into the distal tip of the cannula. Now the wire is fully withdrawn when the band of tight twists on the wire are visible outside the cannula hub.

On identifying the desired tissue entry location the cannula is advanced into the tissue. The reference markings on the cannula may be used to determine placement depth. When the distal tip of the cannula is just proximal to the desired location the advancement of the canula is stopped.

The needle cannula is held stationary inorder to set the wire locking elements while advancing the wire forward into the cannula hub. The locking elements are fully deployed when the band of tight twists on the wire are just inside the cannula locking hub if the localization wire needs to be repositioned or removed, the locking elements are withdrawn into the needle cannula by holding the proximal end of the wire stationary and the needle cannula slowly advanced forward. The locking elements are fully withdrawn into the cannula when the bands of tight twists are visible outside the cannula hub. The needle cannula is now repositioned to the desired location and the locking element re-set.

With the locking elements deployed, the localization wire is now locked into position. The cannula can now either be removed, or left in place to prevent accidental wire transection during surgery.

The lesion may now be easily detected by the surgeon who can resect the same with sufficient free margins and frozen sections sent for pathological analysis prior to taking further operative descisions.

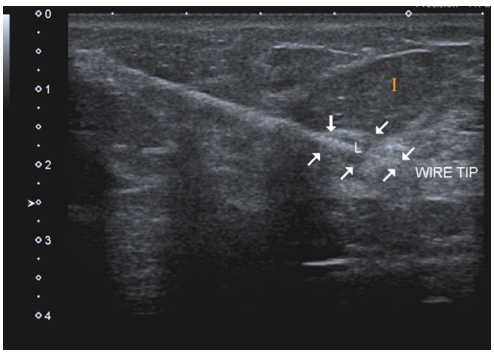
CONCLUSION

The purpose of this article is to raise awareness regarding the improvised methodology and improved accuracy of breast wire localization and improvement in the previously existing operational problems and effective outcomes.

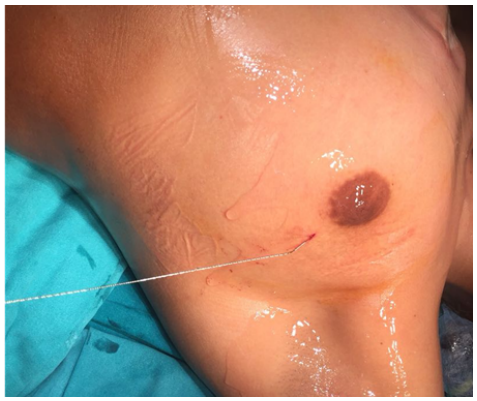
In early diagnosis of breast cancer, the usefulness of the image-guided biopsy of non-palpable breast lesions has already been proved and many studies suggest that the success rate in hook wire localization technique increases when departments of surgery, radiology and pathology work in harmony.

These methods improve cosmetic results and, with procedures performed as outpatients by using local anesthesia there is diminished patient risk.

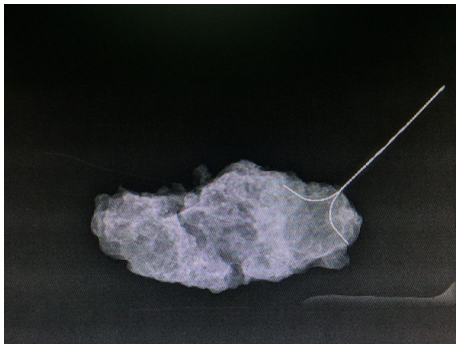
Also we would like to emphasize the fact that using ultrasound for wire localization of the lesion provides for real time and dynamic assessment.



Ultrasonography image showing the wire (white arrows) within the lesion (L).



Photograph of the patient post localization wire placement.



Conventional mammography image post-surgical excision specimen with localization wire in-situ.

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