**Hook wire Localization Procedure in Biopsy and Diagnosis of Early Breast Cancers: Oman Experience**

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**Abstract**

**Introduction**

Between January 2000 and December 2005, a total of 30 cases of impalpable suspicious breast lesions (microcalcifications or impalpable lumps classified as BIRADS IV and above) were biopsied after hook wire localization. This is a retrospective review of these cases.

**Results**

One third of the suspicious lesions were malignant or pre-malignant. All these had further oncological treatment and follow up.

**Conclusions**

- Hook wire localization biopsy remains an important tool for the diagnosis of impalpable lesions of the breast.
- The incidence of malignancy in our series was similar to the published international levels.
- Our series is small, so there is a need to review the data with bigger number.

**Key Words**

Breast cancer, impalpable lesions, Hook wire localization

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**Introduction**

Early Diagnosis is the key of successful treatment of breast cancer. With the introduction of screening mammography, small size breast tumors are diagnosed, and a big number of impalpable breast cancers are removed surgically.

Traditionally, impalpable breast lesions have been excised with a radiologically assisted hook wire as a guiding localizing tool (¹, ⁵).

In Oman and at the Royal Hospital, the treatment of breast cancer has improved after establishment of the breast cancer clinic as a super-specialized clinic in 2003.

This paper is a retrospective review of all operated cases of non-palpable tumors which were excised from January 2000 up-to December 2005 with the help of the Hook-wire to locate the tumors.

**Patients and Methods**

This retrospective study included all patients with impalpable breast lesions, who were submitted to hook wire localization biopsy between January 2000 and December 2005, at the Royal Hospital in the Sultanate of Oman.

All patients had suspicious breast lesions, confirmed by initial mammogram. Patients were seen in the breast clinic, and were posted for hook wire localization biopsy.

The hook wire was placed on the day of surgery under local anesthesia. Two mammographic views were taken to locate the lesion, then the hook wire was inserted. Two check views were done to confirm the position. Localization was done with the help of grids (Fig.1).

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Soon after the localization patient was shifted to the operating room and had a biopsy with the help of the hook to guide the surgeons to the location of the lesion. The specimen was sent back to the mammography room with the wire in place to confirm its location in the lesion (Fig. 2 A & B).

Tissues were fixed in formalin and sent to the pathologist, where it was oriented according to the radiograph. The specimen was sectioned serially and embedded as numbered blocks relevant to the area with specified calcifications. Tissue in paraffin blocks were processed. Haematoxylin and eosin slides were examined by the pathologist. Hormonal receptors with immunohistochemistry was done if malignancy is proven.

Statistical Package for Social Sciences (SPSS) version 13 was used for database construction and analysis. Quantitative variable were summarized using mean ± SD, Median, Minimum and Maximum. Qualitative variable were summarized using frequency and percent.

**Results**

Thirty patients with impalpable lesions were enrolled in the study. All patients were females with a mean age of 48.9 years (±SD 9.87). Sixteen (53.33%) were Omani, 14 (46.67%) were non Omanis. Of the 14 non-Omanis patients, 5 (35.71%) were Indian, 3 (21.43%) Sri Lankan, 2 (14.29%) British, 1 (7.14%) Bahraini, 1 (7.14%) Pakistani, 1 (7.14%) Egyptian & 1 (7.14%) Philippino. Thirteen (43%) had left breast biopsy and seventeen (56%) had right breast biopsy.

All patients had impalpable lesions. Sixteen patients (53.3%) had mastalgia as a symptom and fourteen were asymptomatic (47%).

The mean duration between mammography and hook wire localization was 4.37 weeks (±SD 4.0). Three hook wires were performed between 2000 and 2002, while 27 patients were done after the beginning of 2003 (Structured breast clinic has been established at Royal Hospital by the beginning of 2003).

The lesions were mainly in the upper outer quadrants 19 cases (65.3%), the upper inner quadrant 7 cases (23%), in both the lower quadrants 4 cases (13.3%) and 2 cases were bilateral (6.7%).

The lateral approach to center the lesion with the hook wire was used for 22 (73.33%) times and the superior approach 8 (26.67%) times. The lateral approach was used for the lesions in the lower quadrants and the superior one for the
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lesions in the superior quadrants.

The hook was centered in the lesion in 73.33% but missed it in 26.67% of the cases. It was away from the lesion for a median of 0.78cm ±SD 0.41.

The median excised lump size was 4x6 cm ±SD 0.87x1.26. Nine (30%) patients had malignant lesions, 6 (66.67%) of them had ductal carcinoma in situ, 2 (2.22%) lobular carcinoma in situ and 1 (1.11%) case had invasive ductal carcinoma of T1mic. All patients with malignant lesions were staged and treated. One patient had involved margin and had re-excision.

The duration of follow-up varied from a minimum of one month to a maximum of 29 months (mean time 12.2 months ±SD11.65). The patients with malignant lesions are still under regular follow up at the Royal hospital.

Except for one patient who had a contra-lateral malignant lesion 6 months after the first surgery, all the other had no local or distant recurrences.

Discussion

Breast cancer is better controlled with longer disease free survival when it is diagnosed and treated in its early stages. Impalpable lesions of the breast when malignant are considered early stages and can be detected only by mammogram. For this, the Breast Imaging and Reporting Data System (BIRADS) classification of the mammographic breast lesions was used.

To confirm the malignancy of the impalpable breast lesion, it is necessary to have cytological or histological confirmation by fine needle and/or core biopsy.

One potential disadvantage of the fine needle and core biopsy methods for biopsy of impalpable abnormalities found by mammography is the difficulty to biopsy them. If no cancer is found, there may be some uncertainty as to whether the needle tip missed the target.

Biopsy under radiological guidance is the only trustable method. Hook-wire placement within 2 mm of the target allows an excision of 6 mm specimen with 96% of the lesions removed. A confirmation specimen radiography was done, which is an important part of the biopsy procedure done for microcalcifications in order to confirm that the calcifications are present. Failure to excise the impalpable lesion was reported in less than 5% of cases.

Following the check radiography no frozen section was performed but only paraffin section. Frozen section is generally reliable in the diagnosis of palpable breast masses, but indications for its use in the evaluation of impalpable breast lesions are limited. The abnormalities being sought by needle-localization biopsy are usually small and are often histologically borderline and difficult to diagnose on frozen section. The reported discordance rate between the frozen-section diagnosis and the final histological diagnosis is 12%.

In our series 1/3 of the suspected patients had malignant or premalignant lesions (International figures of biopsied malignant non palpable lesions is around 30%) (17, 19). These patients should start the treatment earlier for a better chance of disease free survival.

It is difficult to operate on without the help of the Radiologist. In more than 30% of cases the wire was more than 0.5 cm away from the lesion. Surgically we knew about it and wider excision was done. The rate of unsuccessful localizations can reach up to 16.0%.

Traditionally when the impalpable lesions were detected they are localized and hooked with a wire through it by the radiologist, either under mammographic or ultra-sound guidance. This procedure allows the surgeon to use a long wire in a way to perform a biopsy of the impalpable lesion with the smallest targeted sample.

The specimen were sent for pathologic review to determine the nature of the lesion. A biopsy is the only way to tell if cancer is really present.

In the Sultanate of Oman the structured breast clinic has been established at the beginning of 2003, in concomitance with the inauguration of the National Cancer Center at the Royal Hospital.

In spite of not having a regular mammographic screening program, patients above 40 years of
age used to come to the breast clinic for routine check up, do have a regular mammogram, which increased the number of diagnosed impalpable lesions by 90%.

A lot is needed to be done in this field as the total number of newly diagnosed breast cancer is around 70-80 cases, and the number of non invasive breast cancer cases diagnosed by hook wire localization now is around 8 cases.

Although this procedure needs to be done under general anesthesia, an alternative approach to the diagnosis of nonpalpable abnormalities is the image-guided breast biopsy, using either stereotactic mammography or ultrasound guided needle biopsy.

Internationally extensive experience has been gained with these techniques, and a number of indications for excisional biopsy after core biopsy have been identified and these include:

- Lack of concordance between the radiographic finding and the histologic diagnosis.
- A diagnosis of radial scar, or atypical hyperplasia

Atypical hyperplasia on a core biopsy is associated with ductal carcinoma in situ in 30% to 50% of cases, while radial scar is difficult to distinguish from a well differentiated carcinoma with a fibrous reaction.

For benign mammographic abnormalities, core biopsy is clearly less traumatic and more cost effective than hook wire localization and excision.

For highly suspicious abnormalities, the benefits are still less clear. For experienced surgeons, the likelihood of obtaining negative margins with a single operative procedure during excision of impalpable abnormalities is the same whether or not a core-biopsy diagnosis of carcinoma is obtained before surgery.

Core biopsy reduced the number of operations for all types of lesions, except when patients were treated by lumpectomy alone. This suggests that for microcalcifications with a high likelihood of being pure DCIS, surgical excision still remain the diagnostic procedure of choice.

New modalities for localization of microcalcifications include MRI localization either with or without the help of the mammograms are associated with promising early results.

**Conclusion**

- Hook wire localization biopsy remains an important tool for the diagnosis for impalpable lesions of the breast.
- The incidence of malignancy in our series was similar to the published international levels.
- Our series is small & we need to review our data with a bigger number, but we do believe that it is representative.

**References**


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