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## **Specimen Radiography Following Hook Wire Localization and Excision of Screen Detected Breast Abnormality**

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**Abstract:** This study evaluates the role of specimen radiography after hook wire localization. The Otago audit database was searched for women who had hook wire localization and excision-biopsy for screen detected non-palpable breast abnormalities. Specimen X-ray reports were reviewed to assess the completeness of excision on the first attempt of surgical resection. The need for repeat resection at the same operation was reported. There were 152 procedures performed on 148 women. The lesion was correctly removed in 148 occasions with the guidance of the hook wire and confirmed radiographically. When the localization of a non-palpable breast lesion has been successful, specimen radiography reduces the re-excision rate to 2.6%. We suggest that satisfactory hook wire localization obviates the need for specimen radiography in this situation.

**Key words:** Breast, X-ray, mammography, cancer, surgery, screening

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### **Introduction**

Utilization of breast screening has led to detection of breast lesions that are not clinically palpable. Hence, the sampling of those lesions usually needs to be image guided by ultrasound or stereotactic mammography. Percutaneous imaging-guided core biopsy is a less invasive and less expensive alternative to surgical biopsy for the evaluation of breast lesions. For masses that can be seen with ultrasound, guidance with this modality may be preferable to stereotaxis because of the absence of radiation, lower cost, speed and simplicity (Lieberman, 2000). Yet some lesions, on sampling by either method, show benign pathology while the radiological features are still suspicious. In this situation, an excision biopsy is required. Hook-wire localization of such non-palpable lesions is an accurate and safe method for their excision (Markopoulos *et al.*, 2005).

In our study, this involves the following procedure. An arrangement is made to have a mammography machine, a mammography technologist and a specialist breast radiologist all immediately available at the estimated time of surgery. Once the specimen with the hook wire has been excised, a porter transports it from theatre to the mammography unit some distance away. The specimen is then radiographed in two projections. The waiting radiologist views the films and then rings the surgeon in theatre to report the results. The initial surgery takes about twenty minutes, while the specimen radiography and reporting a further twenty minutes. This study is aimed to examine the role of specimen mammography in suspicious breast lesions.

### **Materials and Methods**

The Otago audit database was searched for women who had hook wire localization and excision-biopsy for screen detected non-palpable breast abnormalities. These lesions were not detectable on clinical examination. Patients who had benign results from ultrasound guided FNA and/or

core biopsy, or the lesion was not detectable on ultrasound, went on to have hook wire localization and excision-biopsy under general anesthesia. Specimen radiography was used to confirm excision of the lesion.

Medical records were reviewed for the radiological features of those lesions, the findings of the specimen radiography, the need for re-excision on the same occasion and the results on histological examination. We evaluated the necessity for specimen radiography after adequately performed hook wire localization in the setting of excision biopsy.

## Results

There were 152 procedures performed on 148 women (median age 58 years) who had screen detected (mammographic) breast abnormalities that were not clinically palpable. For these lesions the usual method of investigation is FNA or core biopsy under ultrasound guidance. However, in this series the lesions were either not seen on ultrasound (104) or the core biopsy was benign in spite of the suspicious nature of the lesion on mammography (48).

On the morning of the operation all patients had a hook wire placement in the lesion with local anesthesia under radiological guidance. The patients then proceeded to have excision of the lesion under general anesthesia on the same day. Radiography was performed immediately on the excised specimen. The lesion was correctly removed in 148 occasions with the guidance of the hook wire and confirmed radiographically. In 4 (2.6%) of the cases (3 architectural distortions and 1 stellate lesions) the lesion was not correctly removed and re-excision was performed on the same operative session (Table 1). These 4 cases had technical problems with hook wire placement. All patients who were found to have malignant lesions had further definitive surgery.

## Discussion

Stereotactic core needle biopsy has been used as an alternative to surgical biopsy of breast lesions containing micro-calcifications provided that radiography of the specimen cores has been performed to ensure removal of the appropriate tissue (De Paredes *et al.*, 1998) suggested that specimen radiography should be routinely performed in stereotactic core biopsies of breast micro-calcifications (Lieberman *et al.*, 1994). Roth *et al.* (1999) suggested that excision biopsy might be avoided if microcalcifications are visible in specimen radiographs of core biopsy specimen with benign histology.

Open surgical biopsy compares favourably to core needle biopsy with regard to accuracy, adequacy of specimen, identification of primary site (Hall *et al.*, 1998). Accurate diagnosis of mammographic lesions requires radiological-pathological correlation. The presence of microcalcifications on the specimen radiograph is an essential and highly reliable part of core biopsy assessment for mammographically suspicious calcifications (Dahlstrom and Jain, 2001). However, specimen radiography can produce a false positive or false negative result (Hasselgren *et al.*, 1993). An important implication of this is that postoperative mammography of the breast in question

Table 1: Radiological and pathological features of all lesions

Radiological features	Malignant (%)	Benign (%)
Microcalcifications 70	24 Invasive (34) 13 DCIS (19)	33 (47)
Radial scar 21	6 (29)	15 (70)
Architectural distortion 61	3 (5)	58 (95)

should always be performed after biopsy with needle localization, regardless of the result of the specimen x-ray, to ensure that the lesion has not been missed (Hasselgren *et al.*, 1993; Grunert *et al.*, 1999).

Davies *et al.* (1997) advocate the use of four-view specimen radiography to ascertain the removal of the radiologic abnormality. According to them, two-view specimen radiography is suboptimal and may contribute to confusion over determining the adequacy of surgical excision margins of ductal carcinoma *in situ*. In our institution, two-view radiography is considered sufficient.

Present study has shown that hook wire localization of no-palpable breast lesions is a very useful method of guiding surgical removal of the breast abnormality. Specimen radiographs taken after excision confirmed the removal of the abnormal tissue in 97.6% on the first surgical attempt. Only 2 cases needed a repeat excision and in both of these the radiologists reported technical difficulties in placing the guide wire into the lesion. In no case where the radiologist considered the hook placement satisfactory, was re-excision required.

In our practice, waiting for a specimen radiograph to be reported essentially doubles the duration of surgery, from 20-40 min. The patient remains anaesthetised and on the operating table in theatre during the final 20 min waiting period. This has obvious resource implications. Omitting specimen radiography over the duration of our study would have saved about fifty hours of theatre time. There are further resource implications in holding a mammography machine vacant with a technologist and radiologist on standby during what might be a time-window of an hour or longer in which the specimen might arrive.

A theoretical advantage in having a breast radiologist report on the specimen radiograph might be to estimate the excision margin and perhaps suggest further excision in a particular direction. In practice, this scenario did not occur in our series.

Since there was no re-excision in any case where the radiologist was initially satisfied with the hook wire placement, we conclude that specimen radiography is only needed if there are technical difficulties with the placement and should be requested at the discretion of the breast radiologist.

In conclusion the use of hook wire guided excision biopsy of breast abnormality followed by two dimensional specimen x-ray reduced the reoperating rate in this series of on-palpable breast abnormality to 1.2%.

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