Chapter 4
Handling of Specimens with a Nonpalpable Lesion

According to the American Cancer Society, about one in four cases diagnosed as breast cancer represent ductal carcinoma in situ (DCIS). The majority of these cases are nonpalpable. In addition, some small invasive tumors are only detected by imaging studies without forming a lump or a mass. For several years, frozen sections on excisions for nonpalpable lesions have been discouraged and intraoperative evaluation of these surgical specimens is no longer a standard practice. However, in 2009, the CAP has required a staging summary for DCIS that includes the documentation of extent of the disease and several other characteristics of this lesion. Therefore, the handling of breast specimens for nonpalpable lesions has become more critical (Fig. 4.1) and this chapter is dedicated to this subject.

**CORRELATION WITH THE SPECIMEN RADIOGRAPH**

The first step in processing excisions for nonpalpable lesions is to obtain specimen x-ray or digital image. Almost all such excisions have a needle/wire localization to guide the surgeon. Once the surgeon has finished the excision, a specimen radiograph is obtained (Figs. 4.2 and 4.3). This is transmitted to both the radiologist and the pathologist, either in the form of a film or a digital image. Once the radiologist confirms the complete removal of the imaging abnormality, this area is marked on the film or the image, the surgeon is notified and the pathology laboratory can proceed.
with the specimen processing. In certain institutions, the specimen radiograph is obtained either in the operative room or the pathology department. In these kinds of setup, the initial specimen handling is often done together by the surgeon, pathologist, and radiologist. Additional images of the sliced specimen may be taken to help the pathologist focus on the part of the specimen most likely to contain the area of interest. This may also help in selecting tissue for possible intraoperative evaluation, such as for close margins. During these steps, the pathologist gets to learn more details about the reason for excision and performs the correlation between the findings on corresponding imaging study and the specimen.

Figure 4.1 Diagnostic mammogram showing two clusters of calcifications. The one in central posterior location shows coarse calcifications and is considered benign. The anterior group is pleomorphic and fine and is classified indeterminate, prompting needle biopsy.
**Figure 4.2** Specimen radiograph after needle localization. The specimen is placed on a radioopaque spec board. The wire hook is relatively away from the clip (arrow). There is a cluster of calcifications to the right of the arrow.

**Figure 4.3** Specimen radiograph for a mass lesion. The mass appears as a rounded density at G-5/6 coordinates of the grid. There is a spiral metal clip next to the mass. Two rectangular radioopaque densities are due to markers placed on top of the specimen to mark the clip location.
PREPARATION OF THE SPECIMEN FOR PROCESSING
As stated in Chap. 3, the specimen should be weighed and measured in three dimensions. The area of radiologic abnormality should be marked on the surface of the specimen, corresponding to the area marked by the radiologist on the specimen radiograph. After that, the margins should be inked, using multiple inks (Figs. 4.4 and 4.5). After these steps, the specimen can be serially sectioned into 3–5-mm thick slices (Fig. 4.6). It is often difficult to cut fatty specimens into such thin slices at room temperature. The method described below can be a useful adjunct.

This method was developed and optimized in our laboratory and it allows sectioning of fatty breast tissue into thin slices without lengthy formalin fixation. The specimen is rapidly cooled on the surface by direct immersion in an isopentane bath at –65°C for 5–60 s, based on size of the specimen. This makes the adipose tissue firm for a short time, allowing one to slice the specimen into 3–4-mm thick sections (Fig. 4.7). After examination, the tissue is placed in 10% NBF for tissue fixation. This method has been shown not to affect the histology or special stains including immunohistochemical stains.

Figure 4.4 Wire-guided excision received on a spec board. The specimen radiograph was taken and showed the lesion at 4-5/H-J coordinates of the grid. The specimen margins have been inked using the protocol described in the text. The red ink marks the area of localization.
FIGURE 4.5 Inked specimen from needle localization. The surgeon has inked the specimen in the operating room using a sterile tissue inking kit and then placed it on the spec board for radiography (see Fig. 4.2). The purple ink (center) marks the area of the clip. The lesion is on the anterior margin (green ink). This case was a phyllodes tumor that required re-excision of this margin.

FIGURE 4.6 Specimen serially sectioned using standard method. These slices are 7–8-mm thick. It is difficult to cut thinner slices when breast tissue is so fatty. It allows for a good gross examination, showing a long biopsy cavity spanning four slices. However, the tissue needs to be trimmed for submitting sections for histology.
The area of abnormality or lesion should be described using appropriate phrases for size in three dimensions, color, edges, feel of the cut-surface, and exact distance from all the margins (Figs. 4.6–4.9). The goal is to provide all the necessary sections to verify the findings of the gross examination and to assess all the microscopic characteristics of the lesion. In the majority of cases, selective or representative tissue sections should be submitted in a logical and methodical, yet cost-effective manner.

Some experts recommend submitting the entire specimen removed for a nonpalpable abnormality for microscopic evaluation. The reason behind this approach is to identify all premalignant lesions, which cannot be seen on gross examination. In the current environment of cost savings in delivering quality healthcare, these two seemingly contrary objectives require more thoughtful and evidence-based practice. The radiologically guided specimens can be handled in a fashion similar to lumpectomies. As described above, a clip or residual calcifications in the specimen radiograph identify the area of abnormality (Fig. 4.10). This can be marked on the surface of the specimen by a specific ink.
FIGURE 4.8 Close-up view of a biopsy cavity. There is focal organized hemorrhage and some fat necrosis. It is difficult to identify a specific lesion.

FIGURE 4.9 Biopsy site with a grossly identified otherwise nonpalpable lesion. This nonpalpable lesion is relatively obvious after slicing. Its margins are poorly demarcated and the center shows blood due to recent needle biopsy.
Once the specimen has been serially sectioned, the biopsy cavity or a scar with the clip serves as the area of localization. The specimen can then be treated as a lumpectomy and thoroughly sampled. The tissue taken for microscopic evaluation should include the entire area of radiographic lesion with focus on the relationship with surrounding breast tissue and surgical margins. In some cases, the area of localization is still obscure and radiographs of the sliced specimen can be helpful in directing to the area of concern.

The CAP recommends the use of tumor summary for reporting cases with DCIS without invasive cancer. The current version of the tumor summary for DCIS requires accurate estimate of the extent of DCIS. This includes information obtained from the gross and microscopic examination. The method described above for processing wire-guided excisions can help achieve consistent protocols that can meet the requirements for gross examination of cases with radiologically detected DCIS. A diagram with details regarding the areas that are submitted in each cassette is required to meet the recommendations. Either a handdrawn diagram or specimen radiograph of all the slices of the specimen may be used to mark the places from where the sections are taken. Using either method, the pathologist examining the slides can identify the number of slices involved with DCIS and calculate the extent of DCIS.

**Figure 4.10** Biopsy site with a clip. This small biopsy cavity contains a coiled metallic clip. The specimen is fatty with no obvious lesion.