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Operative Techniques in Breast, Endocrine, and Oncologic Surgery

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Wolters Kluwer

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Dedication

To my wonderful wife, Janeel, and our three beautiful children, Alex, Madison, and Lauren. Their love and understanding when family time needed to be compromised is appreciated. Also to my parents, Steven and Rhoda. Without their support, none of this would be possible.

—Michael S. Sabel

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Series Preface

Operative therapy is complex, technically demanding, and rapidly evolving. Although there are a number of standard textbooks that cover aspects of general, thoracic, vascular, or transplant surgery, *Operative Techniques in Surgery* is unique in offering a comprehensive treatment of contemporary procedures. Open operations, laparoscopic procedures, and newly described robotic approaches are all included. Where alternative or complementary approaches exist, all are provided. The scope and ambition of the project is one of a kind.

The series is organized anatomically in sections covering thoracic surgery, upper gastrointestinal surgery, hepato-pancreatico-biliary surgery, and colorectal surgery. Breast surgery, endocrine surgery, and topics related to surgical oncology are included in a separate volume. Modern approaches to vascular surgery and transplantation surgery are also covered in separate volumes.

The series editors are renowned surgeons with expertise in their respective fields. Each is a leader in the discipline of surgery, each recognized for superb surgical judgment and outstanding operative skill. Breast surgery, endocrine procedures, and surgical oncology topics were edited by Dr. Michael Sabel of the University of Michigan. Thoracic and upper gastrointestinal surgery topics were edited by Dr. Mary Hawn of the University of Alabama at Birmingham, with Dr. Steven Hughes of the University of Florida directing the volume on hepato-pancreatico-biliary surgery. Dr. Daniel Albo of Baylor College of Medicine directed the volume dedicated to colorectal surgery. Dr. Ronald Dalman of Stanford University edited topics related to vascular surgery, including both open and endovascular approaches. The discipline of transplantation surgery is represented by Dr. Michael Englesbe of the University

of Michigan. In turn, the editors have recruited contributors that are world-renowned; the resulting volumes have a distinctly international flavor.

Surgery is a visual discipline. *Operative Techniques in Surgery* is lavishly illustrated with a compelling combination of line art and intraoperative photography. The illustrated material was all executed by a single source, Body Scientific International, to provide a uniform style emphasizing clarity and strong, clean lines. Intraoperative photographs are taken from the perspective of the operating surgeon so that operations might be visualized as they would be performed. The result is visually striking, often beautiful. The accompanying text is intentionally spare, with a focus on crucial operative details and important aspects of postoperative management.

The series is designed for surgeons at all levels of practice, from surgical residents to advanced practice fellows to surgeons of wide experience. The incredible pace at which surgical technique evolves means that the volumes will offer new insights and novel approaches to all surgeons.

Operative Techniques in Surgery would be possible only at Wolters Kluwer Health, an organization of unique vision, organization, and talent. Brian Brown, executive editor, Keith Donnellan, acquisitions editor, and Brendan Huffman, product development editor, deserve special recognition for vision and perseverance.

Michael W. Mulholland, MD, PhD

Preface

Operative Techniques in Breast, Endocrine, and Oncologic Surgery was created to be a truly unique and comprehensive resource for surgical residents, fellows, and the practicing surgeon. To maximize efficiency, the chapters are presented in outline form, organized to highlight the key components of preoperative assessment and preparation, operative technique, and essential postoperative management. The procedures are broken down step-by-step, with a plethora of images including intraoperative photography and detailed, incomparable artwork. This highly visual format is particularly beneficial when viewed on electronic media devices, a necessary element of any modern textbook.

The authors featured in *Operative Techniques in Breast, Endocrine, and Oncologic Surgery* represent not only some of the preeminent surgeon-educators in breast surgery, oncology, and endocrine surgery but also innovators in the development of novel surgical techniques. Particular attention is devoted to the rapid evolution of the field, including the role of surgery in the context of multidisciplinary care and the incorporation of minimally invasive approaches in oncologic and endocrine surgery.

Special recognition is necessary for the editor-in-chief Dr. Michael W. Mulholland and the editorial and project management staff at Wolters Kluwer Health, including Brendan Huffman and Keith Donnellan. Their vision and encouraging guidance are directly responsible for the completion of what is hopefully an extremely valuable reference for surgeons of all levels.

Michael S. Sabel, MD

Contents

Chapter 1

Fine Needle Aspiration of a Breast Mass

Judy C. Pang *Claire W. Michael*

DEFINITION

- Fine needle aspiration (FNA) biopsy is a percutaneous procedure that uses a fine gauge needle with or without a syringe to sample fluid from a cyst or extract cells from a solid palpable mass for cytologic analysis.

PATIENT HISTORY AND PHYSICAL FINDINGS

- A focused history should be obtained from the patient including duration of the mass, changes in size, associated pain, or fluctuations of the mass with menstrual cycle. Prior history of trauma or malignancies should also be ascertained. On physical examination, localizing the mass as within the breast parenchyma, lower axilla, or subcutaneous/cutaneous tissue of the chest wall is important. The differential diagnoses may be different. In addition, noting any skin changes such as redness, warmth, or edema is also helpful. Determining the size and quality of the mass as well as depth and relation to other structures is essential for an adequate sample while minimizing complications. There are no absolute contraindications to FNA.

IMAGING AND OTHER DIAGNOSTIC STUDIES

- Mammographic and ultrasound findings can be helpful in arriving at an accurate diagnosis. Knowing whether a lesion is solid or cystic can help select the appropriate needle and syringe. For lesions that are nonpalpable or difficult to palpate, image-guided (i.e., ultrasound) FNA is recommended to ensure proper sampling of the mass.

DIFFERENTIAL DIAGNOSIS

- Benign (i.e., fibroadenoma, cyst)
- Malignant (i.e., carcinoma, lymphoma)
- Atypical (core biopsy or surgical excision required for definitive diagnosis)

NONOPERATIVE MANAGEMENT

- For patients who opt not to undergo a biopsy, short-term follow-up (4 to 6 months) with repeat imaging and clinical examination to document stability or changes is recommended.

SURGICAL MANAGEMENT

- Alternative procedures to FNA biopsy are core needle biopsy and surgical excision of mass.
- For solid masses, FNA biopsy provides cells for cytology, whereas core needle biopsy obtains tissue. In situations where an experienced cytopathologist is not available or tissue architecture is necessary to make a diagnosis (e.g., differentiating between in situ and invasive disease), core needle biopsy is preferred.
- Surgical excision should be reserved for cases where FNA or core needle biopsy was inconclusive. It may be considered for small breast masses where the patient is strongly desirous of excision.

Preoperative Planning

- Prior to the FNA, the location of the palpable mass should be confirmed with the patient. The mass should be examined in the upright and supine position to determine the ideal position for the biopsy.

Positioning

- The patient may be upright or supine depending on the location of the mass. The patient should be positioned to optimize palpation and sampling of the mass.

Approach

- FNA can be performed using (1) a needle, syringe, and syringe holder; (2) a needle and syringe; or (3) a needle only.

TECHNIQUES

EQUIPMENT

- Alcohol pads to cleanse the skin and gauze pads to apply pressure after completion of the procedure
- Local anesthetic is optional.
- Beveled hypodermic needles
  - A 23-gauge needle is preferred and typically the one to start with. If inadequate material is obtained, a 22-gauge needle can be used especially for lesions with minimal stroma (i.e., lymphoma, melanoma) or a 25-gauge needle for rubbery or fibrous masses (i.e., fibroadenoma).
  - The length of the needle is typically 5/8 in to 1½ in, which is just long enough to reach the target. Shorter needles are easier to manipulate because they will not bend.
- A slip-tip syringe is best as it is easy to handle and provides a good seal. A Luer lock syringe may also be used, but it can be difficult to remove the needle. A 10-mL syringe is preferred as it allows the hand to be closer to the target and only 2 to 4 mL of suction is needed for aspiration. For larger cystic lesions, a 20-mL syringe may be advantageous.
- A syringe holder allows for one-handed grip and application of suction leaving the other hand free to stabilize the target.
- Glass slides and cover slips

- Slide holder for air-dried slides
- Ninety-five percent ethanol (EtOH) in a jar for fixation of slides or spray fixative. If the jar is not slotted for separating slides, using paper clips on alternating slides can achieve the same goal.
- There are different rapid stains that can be used for adequacy checks including toluidine blue, rapid hematoxylin and eosin, rapid Papanicolaou for fixed slides, and Giemsa and Diff-Quik for air-dried slides.
- Needle rinses can be performed in RPMI (cell block or flow cytometry for lymphoma), 10% buffered formalin (cell block), or CytoLyt (thin prep).

FINE NEEDLE ASPIRATION USING NEEDLE, SYRINGE, AND SYRINGE HOLDER[1,2]

- Carefully palpate the mass to estimate the size and depth as well as assess the structures nearby to avoid (i.e., major blood vessels, bone, and lung especially with small breasts).
- Fix the mass firmly in place with the fingers.
  - For large lesions, use the thumb and opposing finger (FIG 1).

FIG 1 • Fixation of a large mass using the thumb and opposing finger.

  - For smaller lesions, place the forefinger and middle finger on top of the mass and then spread them apart, stretching the skin (FIG 2).

FIG 2 • Fixation of smaller mass using forefinger and middle finger.

- Plan the angle of the needle at the entrance point of the skin and determine the depth of penetration.
  - If the needle enters at 90 degrees to the mass, the needle should penetrate the skin on top of the mass (FIG 3A,B).

FIG 3 • **A,B.** Needle entering 90 degrees to the mass should penetrate the skin on top of the mass.

  - If the needle enters at a 30- to 45-degree angle, which is oftentimes more comfortable and practical, compensate for the acute angle by penetrating

the skin adjacent to the mass and not on top of the mass (FIG 4A,B).

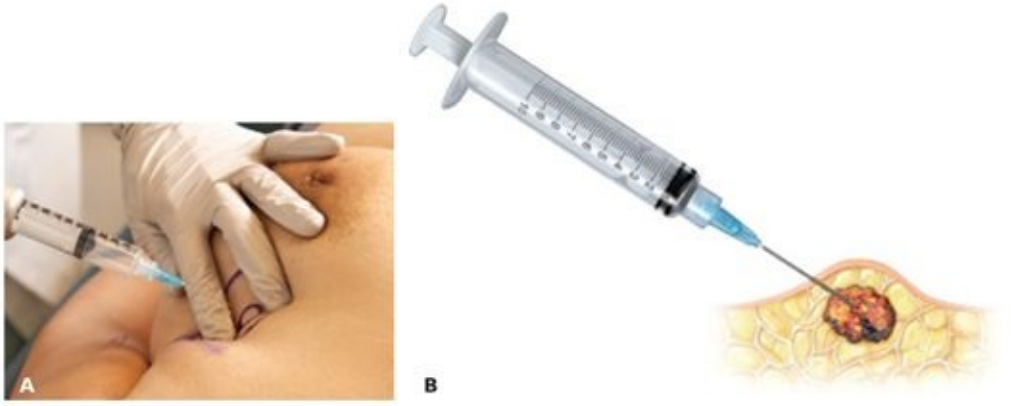

FIG 4 • **A,B.** Needle entering 30 to 45 degrees to the mass should penetrate the skin adjacent to the mass and not on top of the mass.

- When entering at 90 degrees, penetrating too deep with the needle can potentially result in a pneumothorax. If this is a concern (e.g., mass near the chest wall), a 30- to 45-degree angle is preferred.
- To stabilize the instrument, rest the barrel of the syringe on the forefinger of the palpating hand or use the thumb to stabilize the syringe as you enter the mass. Once the needle is in the mass, the thumb can be removed (FIG 4A).

- Extracting material
  - For cystic lesions, applying suction without back and forth movement is sufficient.
  - For solid masses, 15 to 20 excursions are made before suction is released and the needle is removed from the mass. If blood is seen at the hub, the number of excursions should be limited and suction released before reaching 15 to 20. Always release the suction before pulling the needle out of the patient; otherwise, all the material will flow into the barrel of the syringe, which will be very difficult to extract (FIG 5).