

**30**

FINE NEEDLE ASPIRATION CYTOLOGY

30.1 INTRODUCTION

The use of fine-needle aspiration (FNA), a method of aspiration biopsy cytology, continues to grow throughout the World. Improvements in imaging, computed tomography scan (CT), and ultrasound (USG) have fueled the growth of FNA among both radiologists and clinicians. The dominant clinical sites for FNA still remain breast, thyroid, and lymph nodes among superficial tissues.



OBJECTIVES

After reading this lesson, you will be able to:

- describe the techniques of fine needle aspiration cytology
- arrange the clinic for performing FNAC
- assist the pathologist in performing FNAC
- make smears and collect any fluids obtained from FNAC and process appropriately.

30.2 CLINICAL SKILLS REQUIRED

Aspiration biopsy may be indicated whenever there is a palpable tumor mass or a lesion visualized within any organ. For the physician or more specifically for the pathologist performing FNA, some familiarity with general anatomy is essential. For the physician or more specifically for the pathologist performing FNA, some familiarity with general anatomy is essential. For the pathologist performing this biopsy some sharpening of clinical skills, both obtaining a

**Notes**

focused clinical history and performing a physical examination are required. Clinicians performing aspiration biopsy obviously lack this essential ingredient of experience and knowledge of morphology. Despite the recognized participation and value of cytotechnologists to an aspiration biopsy service, the pathologist must be actively involved in the aspiration biopsy, making both the initial and final evaluation of the smears.

The Thin-needle Aspiration Method

Thin needle generally 22, 23, 25, and 27 gauge, are used for the performance of aspiration biopsy, most often 1.5 in. in length. Special situations may dictate shorter needles and even higher gauge. For example, the very small cutaneous metastasis of breast carcinoma on the chest wall may be sampled more easily with a 27-gauge, 1-in. or even ½-in. needle and with a small, 3.0- to 5.0-mL syringe, approaching the nodule in a plane perpendicular to the skin surface, in the manner of performing a tuberculin skin test. Radiologists most often use the Chiba needle of 21 and 22 gauge for transthoracic and transabdominal aspirations. If one employs only the thin-needle technique, there are virtually no complications, the exceptions being FNA of the thorax (pneumothorax) or some cases of excessive bleeding with transabdominal aspiration biopsy.

Basic Equipment

The basic equipment used for rapid and efficient performance of thin-needle aspiration biopsy are as follows.

1. Cameco Syringe Pistol, Aspir-Gun, or other type aspiration handle;
2. 10 or 20-mL disposable plastic syringe with LuerLok or straight tip, depending on aspiration gun handle size;
3. 22 to 27-gauge, 0.6- to 1.0-mm external diameter disposable needles, 3.8 and 8.8 cm, 15 and 20 cm long, with or without stylus; the needle hub should be clear;
4. Alcohol skin preparation sponges; betadine skin sponges for deeper aspirations, transabdominal, transthoracic, bone (where the cortex is not intact or the periosteum is elevated), or deep soft tissue;
5. Sterile gauze pads;
6. Microscopic glass slides with frosted ends;
7. Small vial of balanced salt solution and/or RPMI tissue culture transport media;
8. Suitable alcohol spray fixatives for immediate fixation of wet smears

9. 10 or 20 mL capped tube with 10% neutral buffered formalin for cell-block
10. Optional vial of local anesthesia, 1-2% lidocaine; topical spray anesthesia for aspirates in children or intraoral aspirates; vials of lidocaine that dentists use for local anesthesia and the dispensing equipment may be useful;
11. Small vial of buffered glutaraldehyde for fixing aspirate for electron microscopy if required or anticipated.

A small plastic tray easily holds all the equipment. Majority of the smears are to be air-dried and later stained with a Romanowsky method, the Diff-Quik stain being preferred. Some smears are usually wet-fixed in 95% ethyl alcohol.

Aspiration Technique

To be successful with an aspiration biopsy, it is important to follow the preliminary steps listed here:

1. Review the history of the patient. Determine the clinical problem and its relevance to the lesion to be biopsied.
2. Determine whether the biopsy is justified.
3. Palpate the mass, attempting to determine its location in relation to surrounding structures. Estimate its depth. Decide on the optimal direction of the needle to accomplish the aspiration biopsy. A mass located deeply in tissue is usually best approached perpendicularly to the skin surface. Small and superficially lying tumors are best approached by penetrating the skin at or very close to a horizontal plane, then feeling for the mass with the needle tip.
4. The patient should be placed in a comfortable position for the aspiration biopsy, but the mass must be easily palpable and immobilized during the biopsy.

Step 4 is very important for head and neck lesions. The prominence of an enlarged lymph node, or lump, may sometimes depend on whether the patient is supine or erect. The sternocleidomastoid muscle bulk and its close proximity to the cervical lymph nodes require positioning the patient such that the biopsy needle passes through only a minimum of soft tissue and muscle before reaching the target. Avoid aspirating a mass by traversing the sternocleidomastoid muscle. For the aspiration of thyroid lesions, it is usually helpful to place a small pillow under the patient's upper back, extending the neck with the head tilted back.

5. Take time to examine the patient thoroughly. Discuss your preliminary assessment of the patient's lesion. This is an opportunity to describe what



MODULE

Histology and Cytology



Notes

Fine Needle Aspiration Cytology

will take place during the aspiration and what is to be accomplished with it.

6. Obtain informed consent. This consent should indicate that name of the patient who is having the aspiration, the name of the doctor performing the aspiration and a listing of discussed complications.

30.3 PERFORMING THE FNAC

It is essential that the FNAC be performed by a doctor who has knowledge of anatomical structures and pathological lesions expected in the particular region.

Smear Preparation

1. Immediately after completing the aspiration biopsy, the needle should be quickly removed from the syringe; pulled back on the syringe pistol to fill the syringe with air.
2. The needle should be reattached and placed near the center and touching the surface of a plain glass slide.
3. Advancing the plunger of the syringe, will express a small drop of the sample, approximately 2–3 mm in diameter, onto the slide.
4. This procedure should be quickly continued over a series of five to six slides.
5. Invert another plain glass slide over the drop; as it spreads from just the weight of the slide, pull the two slides apart horizontally in a single gentle motion.
6. As an alternative, when the drop spreads in a circular fashion, again from the weight of the slide, pull the two slides apart vertically (compression or pop smears).
7. Repeat the above procedure for all slides; fix some of the slides immediately in 95% ethyl alcohol, or other suitable fixatives, depending on stain preferences, as you make each smear.
8. Allow unfixed smears to air-dry.

Smears are appropriately stained later in the cytology laboratory.

30.4 ORGANIZATION OF THE ASPIRATION BIOPSY SERVICE

Sufficient space to examine patients is required. For the in-hospital clinic it should be located close to the pathology department but should be a separate designated area that is quiet and comfortable for patients and with sufficient

support staff to register patients, provide assistance to the pathologist performing the aspiration, and take care of all clerical matters.

There are a number of considerations in developing and planning a free-standing clinic.

1. Location

- a. Convenience
- b. Ground floor
- c. Within an established medical facility
- d. Near offices of physicians referring the majority of the patients

2. The facility

- a. Two examining rooms, one somewhat larger than the other
- b. Some counters at waist level for standing
- c. Examining table pointed toward outside windows and away from aspiration instruments and smear preparation area



TERMINAL QUESTIONS

1. What are the equipments required for FNAC?
2. Enumerate the various points to consider while planning an FNAC clinic.
3. Describe the method of smear making in FNA laboratory.
4. What are the usual stains used for staining FNA smears and their fixatives?

MODULE

Histology and Cytology



Notes