Fine Needle Aspiration - Thyroid

Basic Principles

- Small gauge needle (#22-25g)
- Proper aspiration technique
- Making good smears
- Rinsing the needle
- Multiple passes

Small Gauge Needle With Long Bevel

Strategy: To sample thyroid follicular epithelium with minimal collection of blood.

Long Beveled Needle: Allows maximum amount of tissue to enter the cannula lumen with each cutting insertion (throw) of the needle.

InRad© Needles: 23g, long bevel, anticoagulated needle (allows time to prepare smears, rinse the needle, etc.)

Fine Needle Aspiration Technique:

- Before beginning the procedure, verify patient identification using at least two patient identifiers, the procedure site, and the procedure to be performed
- If the pathologist performs FNA procedures, there is a written procedure to verify patient identification using at least two patient identifiers, the procedure site, and the procedure to be performed.
- Once the needle is inserted into the target lesion, rapid in-out (sewing-machine) movement.
- Keep the needle in one plane. Do not change direction, spin the needle between the fingertips, or trace a cone-shaped or non-planar insertion of needle.
- Each throw should be about 0.5 to 0.8 cm of needle penetration.
- Biopsy cadence = 3 seconds at 3 piercings per second.
- Stop in-and-out motion when blood is visible in needle hub.

Should a syringe be used to aspirate cells?

The thyroid is very vascular and – usually – the needle will fill on its own by capillary action alone. Sometimes (in fibrous lesions or just...because) the needle alone does not work by itself and, in this setting, it may be helpful to add suction to the procedure. Suction causes bleeding. After suction is applied, all subsequent passes will be bloody and the sample becomes hemodiluted.

Using suction with FNA: If the needle is attached directly to syringe: "Dagger" hold then grasping the cylinder of the syringe and straighten thumb to lift plunger and to apply suction. Only a small amount of suction (5-10 cc) is needed when aspirating the thyroid. Remember, the sample collection is achieved by the in-and-out motion of the needle, not by the suction of a syringe.

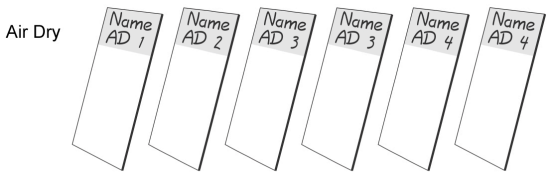
With the use of extension tubing, an assistant can apply syringe suction. The non-sterile operator can handle the male end of the extension tubing, while the non-sterile assistant grabs and connects the female end of the extension tubing. The operator will tell the assistant when to apply and when to discontinue suction on the syringe. It is important to halt suction before the needle is removed from the skin. After the pass, the needle, tubing, and syringe can all be handed to the assistants to prepare smears and/or rinse the tubing and needle.

Helpful Hints

Instruct the patient not to swallow once the needle is inserted in a thyroid lesion/mass, especially those smaller than 2 cm; because the trachea can be entered accidentally. If this occurs, the patient might cough. Instruct the patient to signal if a cough is imminent so that the aspiration can be terminated. Apply local pressure as soon as the needle is withdrawn. This prevents a hematoma from developing under the skin.

How many passes?

It usually takes at least three passes to sample a thyroid nodule with a fine gauge needle. Some literature states that at least six passes are required. This can be minimized with rapid assessment.



Lay out and label slides prior to aspiration

What if rapid assessment doesn't show follicular cells on the prepared slides?

- Keep trying.
- Consider adding suction by syringe.
- A spring-loaded cutting needle (e.g. 20g Temno) might be considered. This type of needle usually obtains an adequate sample when properly localized in the thyroid target lesion.

What if rapid assessment cannot be provided where the needle FNA/ biopsy is being performed?

Possible solutions to this problem:

- Ultrasound/radiology technicians can be trained to make smears.
- An in-service can be arranged. Please contact Incyte Diagnostics Client Representative.
- If smears cannot be prepared, we have found that two 20g needle core biopsies provide excellent harvest material. Needle cores are placed directly into cytology fixative (without preparation of smears).

Please remember that information about *how aspirated follicular epithelium behaves* when it is smeared on the glass slide is important to the pathologist. This "shear test" also creates a monolayer that maximizes cytologic nuclear detail. Although a core biopsy can be very useful, "shear test" information is not provided if smears are not prepared.

Helpful Hints

- Label slides IN PENCIL before procedure begins.
- Try using needle alone (no syringe) for vascular (e.g., thyroid) targets.
- Have 10-cc syringe of cytology fixative available to expel needle contents into vial and rinse needle at same time.
- If a cyst is encountered, evacuate, and expel into equal parts cytology fixative (make no smears), palpate for a residual nodule for subsequent needle passes.

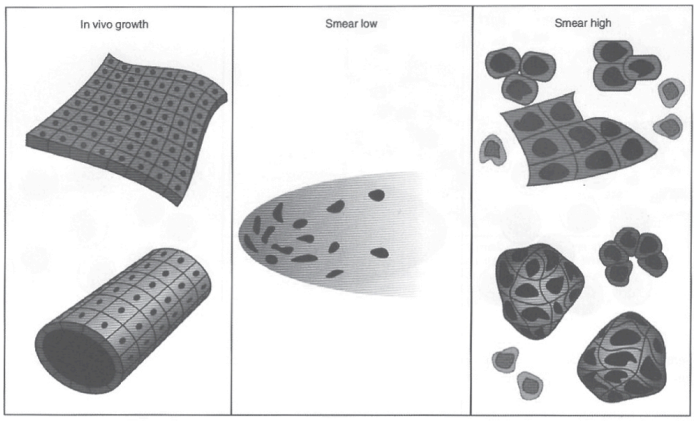


FIGURE 1. Epithelial tissues. Epithelial tissues come in different forms, but all share two characteristics: they are bound to each other by cell surface connections and they have distinct cell membranes. On a smear, squamous tissues form sheets (*upper cells*). Tubular epithelium frequently forms balls (lower cells). Papillary epithelial tissues form papillary structures on smears.

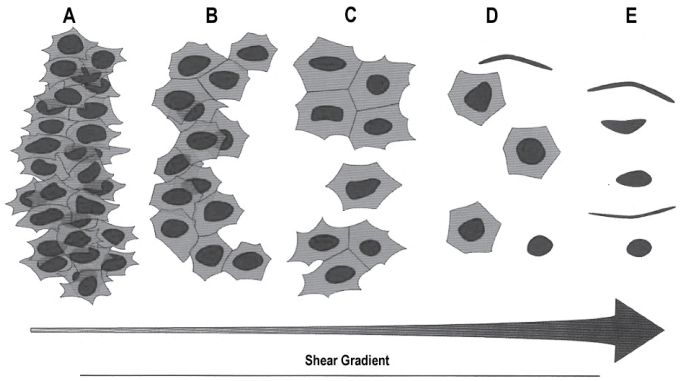


FIGURE 2. Shearing force gradient during smear. While tissue is crushed and pulled apart, its surface cells touching glass will adhere to the slide. In a characteristic manner, these anchored cells remain connected to the other cells deeper within the tissue. As the remaining cells are pulled further along, shearing forces will sever these connections and produce a gradient of cellular density, from **A** to **E**. The greatest diagnostic information about the tissue lies in the region just before the cells completely dissociate (**C**). There, they form a monolayer but still remain attached to their neighbors.

What information is provided by a smear that would not be available from an aspirate placed directly into fixative? Cells smeared on a glass slide create patterns of information (see illustrations above).

How the cells behave under the shearing force of the smearing process provides clues about the characteristics of the tissue source. Smearing cells, therefore, provides "shear test" information that cannot be provided by cells placed directly into fixative.

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