

## Fine Needle Aspiration

The procedure of fine needle aspiration (FNA) has been used for decades to sample and diagnose both superficial palpable lesions as well as deep-seated visceral lesions. FNA is a simple, rapid, inexpensive, safe and accurate procedure. While the technique is quite easy to perform, if basic steps are not followed, a non-diagnostic (unsatisfactory) specimen will be obtained (*see table on back*).

First, the skin is thoroughly cleaned with alcohol wipes. Gowning and draping of the site are not necessary. Use of a syringe holder (*see below*) is highly recommended. A syringe holder allows the aspirator to have one hand completely free during the procedure to stabilize the target lesion and guide the needle into even small, mobile nodules. Syringes may be 10cc, 12cc or 20cc. Larger syringes do not provide significantly more suction pressure and are more cumbersome to use. FNA utilizes small (23-27 g) needles which are typically 1½" in length. Because the needle diameter is so small, there is an extremely low complication rate and negligible patient discomfort or pain. Local anesthesia is not necessary, and may in fact lead to suboptimal specimens (secondary to altered palpation characteristics of small lesions and Lidocaine-induced artefactual changes of the aspirated cells).

It is recommended that 2-3 separate aspirations be performed in order to sample different parts of the palpable lesion. Additional passes frequently are not productive due to trauma from the initial passes leading to intralesional

hemorrhage. Each aspiration should be performed within 5-10 seconds or until a flash of cellular material is seen within the plastic hub of the needle, whichever occurs first. If the procedure takes longer than this to perform, or if fluid/blood is drawn up into the syringe, the specimen likely will clot within the needle and syringe. During the aspiration, the tip of the needle must be repeatedly moved within the mass in various directions (called "oscillations"). These oscillations of the needle cause tissue microfragments to be dislodged, allowing aspiration of diagnostic cells into the needle. Merely sticking a needle into a mass and providing suction will result in a non-diagnostic specimen.

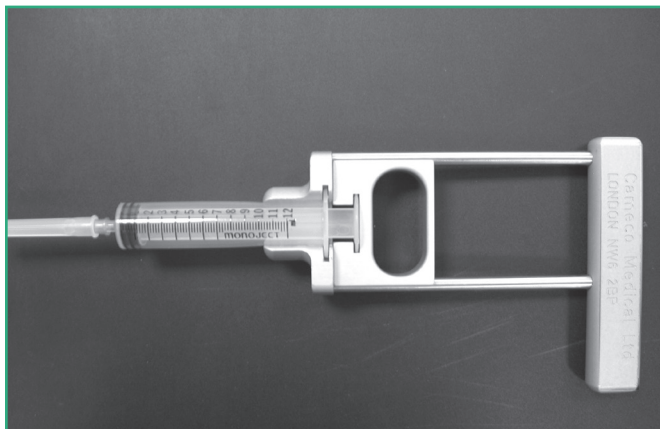
After the specimen has been procured, 1-2 drops are expressed onto a slide and then smeared into a monolayer preparation, similar to preparing a peripheral blood smear. This technique can be demonstrated to those not familiar with the technique by either a hematology laboratory technician or a cytopathologist. Proper technique is essential for optimal cellular preservation. From each aspiration pass, it is recommended that only 1-2 air-dried smeared slides be prepared. The remainder of the aspirated material should be rinsed into an alcohol-based preservative fluid, CytoLyt®.

Fine needle aspiration can be performed on virtually any palpable nodule — thyroid gland, salivary gland, lymph node, subcutaneous nodules and breast masses being the most common sites aspirated. It is an especially valuable technique to

document recurrent or metastatic disease in a patient with a prior diagnosis of malignancy. Even if a specific diagnosis is not possible, FNA can be valuable to categorize a lesion or guide additional diagnostic workup:

- Infectious/inflammatory lesion — culture, TB skin test, serologic studies
- Reactive lymphadenopathy — follow patient, excise if persists/enlarges
- Possible lymphoma — flow cytometry or excise for additional ancillary testing
- Metastatic tumor of unknown primary — clinical and radiographic correlation

While superficial FNAs can be performed by virtually any clinician, the Pathology department at Bronson Methodist Hospital recommends referral of all superficial FNAs to one of the cytopathologists, either Dr. Bill Walker or Dr. Karla Dunning. Multiple studies have shown that for those physicians who perform FNAs on only an occasional basis, less than optimal results are frequently obtained (Cancer 1986; 58:1491-1498 and Human Pathology 1983; 14:9-28). As with all medical procedures, a sufficient number of FNAs must be continually performed in order to maintain proficiency. The Bronson cytopathologists have performed several thousand procedures over the last 20 years. Optimal FNA results are obtained when the individual performing the aspirate interprets the material microscopically (Arch Pathol Lab Med 1986; 110:813-817). One large study of 795 patients undergoing thyroid nodule FNA showed inadequate aspirations were obtained in 32% of cases performed by community clinicians, 15% of cases performed by medical center clinicians, and 6% of cases performed by cytopathologists (Cancer 1989;63:718-725). The Bronson experience shows similar non-diagnostic (unsatisfactory) FNA rates — 33% for clinician performed cases and (*continued*)



*A syringe holder allows the aspirator to have one hand completely free during the procedure to stabilize the target lesion and guide the needle into even small, mobile nodules.*

## Fine Needle Aspiration (*continued*)

less than 10% for cytopathologist performed cases.

There are multiple reasons for a higher diagnostic yield for those procedures performed by a cytopathologist. Aspiration smears are immediately stained and microscopically examined on-site to determine specimen adequacy. Complete history and physical exam findings can be immediately correlated with the FNA smear findings. In this way, the characteristic “feel” of many lesions (e.g. salivary gland pleomorphic adenomas, metastatic disease in lymph nodes and sub-cutaneous nodules, malignant breast lesions, goitrous thyroid nodules, etc.) is quickly appreciated. After performing and examining an initial aspiration, the

cytopathologist may then be able to perform additional aspirations for special stains and ancillary testing (e.g. alcohol fixed smears, flow cytometry, immunohistochemical stains, and molecular genetic testing). In addition, patients are frequently anxious about a possible diagnosis of malignancy and they may request an on-site preliminary diagnosis, which the cytopathologist may be able to share with the patient. Lastly, cytopathologists have been trained in a variety of special techniques to procure specimens and prepare ideal monolayer smears from difficult, hypervascular lesions most commonly thyroid lesions.

Inpatient or outpatient FNAs can be performed by the cytopathologists, Drs.

Walker or Dunning, anytime Monday through Friday. For the convenience of outpatients, FNA procedures can be performed immediately after a clinic visit (thus saving the patient a return visit to the hospital or outlying clinic). These procedures are performed in the Outpatient Testing blood drawing area and can be scheduled by calling the Pathology department at (269) 341-8997. Inpatient procedures are performed at the patient’s bedside and are scheduled by calling the same number.

— *William P. Walker, MD*

**Table: Summary of Steps in Basic Fine Needle Aspiration**

Procedure Setup	Suction Applied
1. Cleanse area with alcohol wipes	
2. Locate, palpate and stabilize target lesion	
3. Pass needle through the skin	No
4. Advance needle into the lesion	No
5. Apply suction	Yes
6. Move needle repeatedly through the mass in various directions (“oscillations”)	Yes
7. Release suction	No
8. Remove needle from the patient	No
9. Detach needle from the syringe	
10. Fill syringe with air	
11. Replace needle on syringe	
12. Touch needle tip to a microscope slide	
13. Express 1-2 drops of specimen onto slide (may require rapid, forceful expression of air from syringe)	
14. Prepare 1-2 monolayer smears from each pass and allow smears to air dry	
15. Rinse needle after each pass in CytoLyt®	
16. Re-examine the puncture site before patient leaves	
17. Send slides and CytoLyt® to pathologist for diagnosis	

## Sending Blood Samples through the Pneumatic Tube System

Studies at Bronson and other hospital laboratories have demonstrated that blood tubes sent through the pneumatic tube system without padding are hemolyzed by the trauma to the red blood cells as the blood sample is knocked around in the carrier. The tube system manufacturer recommends blood samples be sent with padding. When we first obtained the system, prefit foam pads and heavy vinyl envelopes were used. As they became soiled or worn, they were discarded and not replaced.

The level of hemolysis caused by the tube system is generally not enough to cause a redraw for samples that were not hemolyzed when collected. However, for samples that were slightly hemolyzed during collection, the additional hemolysis caused during transport may push the level over the threshold for redrawing. These extra blood draws not only take more time and resources, but go against our blood conservation philosophy.

Please send all blood samples to the lab in the biohazards bags as before.

## Lactic Acid Specimen Requirements Change

The laboratory has implemented a new method for lactic acid (lactate) testing. The reference ranges remain unchanged. A separate gray top tube is no longer required for the test. The new sample requirement is 1 ml of heparinized whole blood. A tube with a green or mint top should be used. The test may also be performed from a heparinized blood gas syringe. If other tests are ordered at the same time on these tubes, an additional sample is not required for the lactic acid. All samples for lactic acid testing must be received in the lab within 30 minutes of collection.

## Clarification on Specimen Requirements for Prealbumin

The only acceptable sample requirement for prealbumin is serum. Either a gold or red top tube may be submitted. Previous versions of the red laboratory requisition incorrectly listed heparinized samples as acceptable. A resource for any questions concerning which tubes to draw for a test is on the Bronson intranet at [inside.bronsonhg.org](http://inside.bronsonhg.org). In the Links section on the left, click on the “Manuals” link, then choose “Bronson Laboratory Services Reference Guide” in the Manual Links section at the bottom of the page.

The lab has begun loading the carriers with folded sheets of bubble wrap. The bubble wrap is inexpensive, and if soiled can be discarded. If the bubble wrap is not available, other padding, including foam squares or cloth towels may be used instead.

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