Fine-Needle Aspiration Cytology: The Nurse's Role

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This highly useful and cost-effective procedure works best when an experienced nurse leads the team performing it. This article provides an overview of FNAC and the ways in which nurses can contribute to its success.

A literature search on the roles of nurses in health care yields evidence of a host of new functions and responsibilities. One topic heretofore not well documented is the nurse's role in fine-needle aspiration cytology (FNAC).[1]

FNAC refers to the aspiration of cell material from a mass or apparent lesion for diagnostic evaluation. It is a simple, accurate, fast, economical procedure that offers an alternative diagnostic modality to surgery.[2–4] The success of a given FNAC procedure is greatly dependent upon the team of clinicians that performs it. Nurses are vital members of these teams.

In this article, we offer a brief introduction to FNAC, with a particular focus on the roles and responsibilities that nurses assume in this diagnostic activity.

OVERVIEW OF FNAC

FNAC utilizes a fine-bore needle (gauge 21 to 25), either alone or attached to a syringe. In the latter case, the syringe often is stabilized by a syringe holder. The needle is introduced into the targeted lesion, and several passes are made in different directions to optimize sampling. If a syringe is utilized, suction may be attempted to increase the cellular harvest.

The entire procedure, which includes preliminary evaluation of the material, usually takes no more than 30 minutes. The discomfort to the patient is of the same order of magnitude as a venipuncture, particularly during a superficial FNAC.[2–5]

A wide array of imaging techniques—such as fluoroscopy, ultrasound, and computed tomography (CT)—and endoscopic procedures can be used to help locate small, deep, mobile lesions that would otherwise be difficult to visualize or palpate. Thanks to the availability of these modalities, there are now very few organs or body sites that may not be readily reached by an aspiration needle.[2–5]

When FNAC is performed properly by experienced practitioners, it can lead to a specific diagnosis in more than 95% of cases.[2–5] In most of the remaining cases, the differential diagnosis can be narrowed to two or three likely possibilities. In only 1% of cases is the sample too limited for accurate diagnosis. If a specific diagnosis cannot be made, FNAC may be repeated or a surgical biopsy or other collateral tests may be pursued.[1–6]

The false-negative rate of FNAC is 3% to 5%. False-negative results generally are due to sampling problems rather than interpretative error. Thus, follow-up may be required when clinical suspicion remains high despite negative FNAC results.[2–4]

Minor complications of FNAC—such as vasovagal reaction, small hematoma, or mild pain persisting for a few hours—are possible. Application of ice packs and administration of a mild analgesic (such as acetaminophen) generally are sufficient to treat such complications. Major complications are rare. Infection and bleeding occur much less frequently with FNAC than with large-core cutting needle biopsy or open surgical biopsy. In fact, in aspiration biopsies of deep abdominal masses, the needle may traverse loops of small and large intestine without infectious complications. This is because the needle gauge used in FNAC is smaller than that of most suture needles used routinely in surgery. Likewise, in experiments using dogs, bowel contents could not be expressed from fine-needle puncture sites, even with manual squeezing. Thus, clinically significant bowel perforation or soiling of the peritoneum is extremely rare.[7] Moreover, large studies have failed to show any adverse effects of FNAC on treatment or survival in patients diagnosed with cancer.[2–4]

Given the low risk of morbidity and mortality, low costs, and minimal discomfort to the patient, it is possible to sample a lesion using FNAC as soon as a clinic or emergency department provider discovers it. This prompt use of FNAC can help

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promote early diagnosis and timely planning and initiation of definitive, rational therapy.

THE NURSE'S ROLE

In FNAC, the nurse takes a leading role. The nurse is involved in the care of such patients throughout the entire process, from the first contact until discharge.

Initially, the nurse's functions include patient education, screening (for coagulation problems), and informed consent. First, the nurse explains the procedure and answers any questions the patient might have. In deep FNAC involving the liver or lung, the nurse ensures that coagulation tests, such as prothrombin time or activated partial thromboplastin time, are conducted and the results reviewed prior to the procedure. Additionally, the nurse asks the patient about any medications that could affect platelet function or coagulation, such as aspirin, warfarin, or clopidogrel. (The presence of such medications is not necessarily a contraindication to superficial FNAC, as this type of procedure may be performed without serious risk of bleeding even in patients taking anticoagulants.) A full list of the patient's medications should be obtained. Once these issues are addressed, the nurse, along with the cytopathologist or other involved physician, has the patient sign a consent form.

Following this interview, the nurse documents clinical data in the patient's chart and prepares and manages the supplies that the team will use. In cases of radiographically guided FNAC, the nurse typically will complete these tasks while the CT or ultrasound technician locates the site to be biopsied.

Once the procedure starts, the nurse is responsible for monitoring the patient. If conscious sedation is required, the nurse administers the appropriate drugs and monitors the patient according to the hospital's protocol for standard of care. Vital sign monitoring is required when the patient is undergoing any type of sedation—but generally unnecessary in the majority of superficial FNAC procedures. Even when sedation is not used, however, most patients are monitored digitally for blood pressure, electrocardiographic tracing, and oxygen saturation. The nurse also provides emotional support to the patient, as needed, during application of the aspiration needle.

Figure. A nurse (left) assists a pulmonologist in Wang's transbronchial fine-needle aspiration cytology of a mediastinal lymphadenopathy.

In specimen triage, the nurse's role is to direct the specimen and to request the tests deemed necessary by the specialist provider. If a nonpathologist collects the specimen, the cytopathologist assumes responsibility for triaging the cellular aspirate. The procedure is completed only when the cytopathologist is satisfied with the adequacy and quality of the sample.

The nurse then dresses the puncture site with antibiotic ointment and an adhesive bandage and continues to assess the site for bleeding or swelling. If the FNAC procedure involves a major organ, or if sedation is used, the patient will need to recover for at least 30 minutes. The nurse is likewise responsible for checking the patient's vital signs until discharge. Once the patient is ready to go home, the nurse provides the discharge instructions and answers any questions.

OTHER TEAM MEMBERS

In superficial FNAC, the cytopathologist meets and talks with the patient, obtains a clinical history, performs a physical examination, reviews radiographic imaging studies if available, and provides and discusses the preliminary diagnosis with the patient. Having the cytopathologist observe and examine the gross lesion to be biopsied, obtain the specimen, and evaluate the microscopic material

greatly improves the turnaround time and accuracy of diagnosis.

The ideal in deep FNAC procedures is for a specialist physician to conduct the procedure while the nurse and a cytopathologist assist in securing good specimens. Transthoracic biopsy, for instance, is best performed by a radiologist, with the guidance of either ultrasound, CT, or fluoroscopy. (The CT-guided procedure is used most commonly.) Similarly, Wang's transbronchial biopsy is best performed by a pulmonologist in the bronchoscopy suite (Figure). Endoscopic ultrasound–guided FNAC procedures require the expertise of a gastroenterologist or, in the case of stereotatic or direct brain biopsy, a neurosurgeon.

SPECIMEN TRIAGE AND ANALYSIS

Specimens from superficial and deep FNAC are triaged first by staining an air-dried smear immediately with a Romanowsky stain for an on-site evaluation to determine specimen adequacy and, possibly, a preliminary diagnosis at the point of care. Later, alcohol-fixed smears are stained using the Papanicolaou technique for confirmation and final diagnosis. Special stains and immunostaining also may be performed with the alcohol-fixed smears when indicated.

For adjunctive procedures, the syringe and needle are rinsed in a methanol-water solution for liquid-based analysis and cell block histologic evaluation. The rinsing may then be placed in a transport medium for flow cytometry to evaluate monoclonality of lymphoid cell phenotypes in the diagnosis of lymphoma and other lymphoproliferative disorders.

With fluid aspirate, chemical analysis for some tumor markers (such as lactic acid dehydrogenase, amylase, or hormones) may be indicated. When an infectious process is suspected, the specimen is placed in microbial transport medium for culture.[3]

Successful FNAC, defined by the collection of adequate specimens and the preparation of high quality smears, is greatly facilitated by the participation of an experienced aspirator or cytopathologist and a specialist nurse. Additionally, there is now a consensus that intraprocedural consultation or on-site evaluation of the FNAC materials by a cytopathologist is cost-effective, allows for optimal sampling, and minimizes the result of unsatisfactory specimens.[8] The beneficial impact of such assessment is perhaps greatest for the more complex procedures—deep FNAC and FNAC guided by CT, ultrasound, bronchoscopy, or endoscopy—that are not as easily repeated as superficial FNAC. Thus, it may be desirable for institutions to budget funds to support on-site cytopathology.

THE FUTURE OF FNAC

The practice of FNAC continues to evolve, with investigation and innovation focused on several areas, including the evaluation of new tumor markers; flow cytometry of aspirated cellular material; pulmonologist involvement in Wang's transbronchial FNAC; gastroenterologist involvement in endoscopic ultrasound–guided FNAC; the use of stereotatic-guided core-needle biopsy of breast instead of FNAC; genomics and proteomics in DNA and protein typing; and such molecular technologies as fluorescent in-situ hybridization, polymerase chain reaction, gel-based analysis, and diagnostic chip technology.[2–6]

IN SUMMARY

FNAC is a simple, accurate, fast, economical procedure that frequently offers a viable alternative diagnostic modality to surgery. The presence of a nurse during FNAC helps ensure a positive experience for the patient and other health care professionals involved. As in all patient care arenas, the nurse's primary concern in FNAC is ensuring the patient's comfort and safety. Additionally, as team leader, the nurse can be instrumental in guiding the evolution of the procedure toward a successful outcome. ●

Author disclosures

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