

FNAC : An Aid to Diagnosis of Head and Neck Masses

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Fine needle aspiration cytology (FNAC) is a technique for obtaining cells from a lesion for cytological examination and evaluation¹. Initially it was conceived as a means to confirm a clinical suspicion of local recurrence or metastasis of known cancer without subjecting the patient to further surgical intervention.³

Kun reported the use of aspiration cytology as early as 1847. Hirschfield published the first diagnosis of a solid tumor, a lymphoma, using aspiration cytology in the year 1919. Martin and Ellis were the ones to suggest aspiration cytology as a routine procedure for the diagnosis of solid tumors. Their use in the head and neck area was advanced in the 1950s and 1960s by Enroth et al.¹

The success of FNAC depends on³

1. Samples must be representative of the lesion investigated.
2. Samples must be adequate in terms of cells and other tissue components.
3. Samples must be correctly smeared and processed.
4. The biopsy must be accompanied by relevant and correct clinical/radiological information.

Armamentarium Needles

22 to 27 gauge long (30mm to 50mm) needles are used for superficial lesions. The smears made after using thinner gauge needle are seen to be better as compared to thicker gauge ones. 27 gauge needles are preferred for cell rich tissues like lymph nodes and thyroid gland, for children and also in sensitive areas like orbit, eyelids and some intracutaneous lesions. In case of hypocoellular, fibrotic lesions 22-23 gauge needles give a better cell yield. 22gauge 90mm lumbar puncture needle may be used for deep lesions. If a core of tissue has to be obtained a core cutting needle of 22-14 gauge is used. Especially in cases of fibrotic hypocoellular lesions core needles will provide tissue for paraffin embedding and

sectioning.

Syringes and Syringe Holder

5ml to 20 ml syringes suffice which produce a good negative pressure. The holder lets the operator have one hand free to immobilise and to feel the target lesion and thus allowing more precision in placing the needle.

Sterile Containers

Small containers with normal saline or Hank's balanced salt solution should be kept handy to rinse needles and syringes if material for culture or for preparation of cell suspension or cell block is needed.

Slides

Clean, dry, grease free glass slides should be used. A coverslip may be used to make a smear which provides a better control over smearing pressure and also helps in more perfect spread.



Armamentarium

Fixatives

70 to 90 % ethanol is most commonly used fixative. Gluteraldehyde and 10% formalin has to be available in case tissue fragments for paraffin embedding or electron microscopy are obtained.

Stains, Microscope

A set of stains regularly used and a portable microscope should be present for adequacy of smear to be checked or a preliminary diagnosis to be given.

Others

Skin disinfectants, sterile dressings, local anesthetic, tongue depressors, torch etc should be available on the biopsy tray.

The Fnac Procedure

STEP 1: Skin disinfection and surgical draping of the patient

STEP 2 : Local anaesthesia is not required in superficial biopsies. A topical spray anaesthetic may be used for targets in mouth or pharynx. Mainly given to prevent unwanted jerks or movements by the patient.

STEP3:-Stabilising the mass with one hand

STEP 4 : Insertion of the needle. With practice the operator acquires the ability to feel the consistency of the tissue through the needle. This allows in accurate positioning of the needle without technical aids. Nearer vertical approaches tend to be less painful and allow better appreciation of depth rather than a tangential track.



Insertion of Needle

STEP 5 : Needle is moved back and forth in the mass

STEP 6 : Aspiration. The negative pressure does not aid in tearing the tissue but merely holds the tissue against the sharp cutting edge of the needle which scrapes or cuts softer tissue components along the track as the needle advances through the tissue³. Many passes are sometimes necessary to sample a sufficient number of cells. One should never wait to see material enter the hub of the needle or the syringe, except when evacuating a cyst or an abscess. The ideal aspirate has a creamy consistency due to high cell content in a small amount of fluid and

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remains inside the needle.



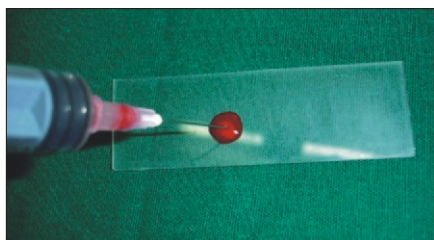
Aspiration

STEP 7: The negative pressure has to be released before withdrawing the needle outside, since a maintained negative pressure can also cause contamination of the sample by material aspirated during withdrawal of the needle, most commonly ultrasound gel in Ultrasonography guided FNAC.

STEP 8: Needle is withdrawn.

STEP 9: Needle is detached and air is drawn into the syringe.

STEP 10 : Sample is blown onto the microscopy slide. Smear is prepared.



Blowing The Sample Onto The Slide

Discussion

A mass occurring in head and neck region presents with a diagnostic dilemma considering the heterogeneity of tissues present.¹ A lesion could be inflammatory, infective, vascular, cystic, benign, malignant neoplasm, or a metastatic tumor.¹ FNAC samples can be used for microbiological and biochemical analysis in addition to

cytological preparations. It is now increasingly being used as a diagnostic tool as an adjunct to clinical and radiological assessment of a mass. It is also a quick method of obtaining cellular material in a minimally invasive way, is easy to perform on an outpatient basis and is also well tolerated causing minimal discomfort to the patient.

In head and neck it is mostly indicated in salivary glands, thyroid glands and cervical lymph nodes. There are controversies about the use of FNAC in the diagnosis of salivary gland tumours. The issues include the possibility of complications arising from the procedure, such as tumour dissemination, injury of the VII nerve and haemorrhage, among others². However, the most important point is to establish whether the technique is a reliable enough to allow planning of appropriate treatment². A salivary gland mass may be inflammatory rather than neoplastic and non-neoplastic lesions such as a chronic sialadenitis are difficult to diagnose on cytological grounds alone. FNAC does not give a type specific diagnosis especially in case of salivary gland diseases. It is used in conjunction with clinical and radiological findings to rapidly provide the best possible initial assessment based on which management decisions can be based.³

A study was conducted in Spain between January 1989 and December 1995 to evaluate the use of FNAC in diagnosis of salivary gland tumors. Cytologic diagnoses were compared with the final histological diagnoses of the surgical specimens. The sensitivity and specificity were 84.8% and 93.7% respectively, and the accuracy was 91.1%. It was concluded that FNAB by itself does not provide total security because of the high percentage of false-negatives. It is nevertheless useful when combined with an adequate clinical history, examination and radiological tests.²

FNAC has not gained universal acceptance because of reported complications of hemorrhage, tumor seeding within the needle tract, infection and lack of

confidence in diagnostic accuracy. Tumor implantation with FNAC has been seen to be very rare.

The various imaging modalities that can aid as a guide of FNAC are Ultrasonography, Magnetic Resonance Imaging (MRI) and Computed Tomography (CT). Previously inaccessible lesions can be safely sampled and many more areas of the body are now routinely biopsied under guidance. Ultrasound provides real-time guidance which allows exact location of the needle tip to be visualised during sampling, thus increasing the accuracy of the yield. Extremely small lesions can be sampled using CT control and also the location of the needle is very accurate. MRI is more useful in obtaining cells from soft tissue lesions. Needles with low ferromagnetic properties are used for this purpose. MRI guided FNAC has been shown to be helpful and accurate in the diagnosis of deep lesions in head and neck.⁴

FNAC can be simply used as a triage or a screening method to obtain a maximum of pretreatment information regardless of effort and cost. It has very good efficacy and also accuracy making it a investigation of choice which is both minimally invasive and can be done on outpatient basis.

Although the use of FNAC has widened there are limitations like not being able to provide type specific diagnosis. Further research and specialisation in this discipline has to be carried out for it to occupy a unique place.

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