Cytology

Diagnostic cytology is a minimally invasive, cost effective and rapid diagnostic tool suited to a variety of tissues and lesions. Preanalytical factors significantly impact the ability to obtain a meaningful diagnosis. This guide provides suggestions for minimising sources of error and details the pricing structure for cytological specimens from a variety of sites.

Obtaining samples for cytological evaluation

FNA
Fine needle aspiration can be performed on superficial lumps and bumps, lymph nodes and internal organs. Overall, there is good agreement between cytology and histopathology, although then lack of architectural detail on cytological preparations can limit interpretation.

FNA samples may be obtained by aspiration, during which a 2-10mL syringe is used to apply negative pressure while a 20G or smaller needle is advanced through the tissue to be sampled.
"Needle only" or fenestration techniques are also useful, particularly in highly vascular lesions or tissues. In the fenestration technique a needle is redirected through the lesion or tissue 3-4 times, across several planes to maximise cell harvest. The needle is withdrawn with a finger covering the hub, a syringe is attached, and the contents gently expelled onto a glass slide.

Impression smear
This technique may be useful for ulcerated or eroded lesions, or the cut surface of a tissue/biopsy sample.

Gently blot debris, surface blood and fluid from the surface to be sampled. A clean glass slide is then gently pressed against the lesion, leaving an imprint on the slide.

Swabs and scrapings
Draining tracts, ears, the conjunctiva, the cornea and lower urogenital tract may be successfully sampled by means of swabs and scrapings.

If a swab is obtained, this should be gently rolled across a glass slide several times. It is preferable to submit 2 slides so that both Wight's and gram-stained preparations can be evaluated, as lesions sampled in this manner are often associated with an infectious aetiology.

Fluid filled lesions
Full fluid evaluation is typically not performed on cystic lesions but restricted to evaluation of effusions. Routine cytological evaluation is usually sufficient; however, the laboratory may include other parameters such as a cell count if this is likely to assist with the diagnosis.

If fluid is obtained during FNA then this fluid should be transferred to a plain/ red top tube for transport to the laboratory. Depending on the volume of fluid obtained, an aliquot may also be placed into an EDTA tube. One or two smears may also be made (using the line technique-

see below), and if there is a significant solid tissue component to the lesion then additional smears obtained using the fenestration technique described above may also be submitted. Very bloody or liquid samples (with the exception of body cavity and synovial samples) often yield limited diagnostic material, as the small number of relevant cells may be diluted out.

Making slides

The perfect cytological preparation contains a monolayer of well-preserved cells with limited blood contamination and foreign debris. It is preferable to wipe slides with clean paper towel prior to obtaining the aspirate. Lay slides out with the frosted slide up. This prevents material from being placed on the wrong side of the slide where it can subsequently be lost or damaged during staining.

Material from FNA samples is gently expelled onto a clean glass slide. If there is a large amount a second slide can be backed into the material, allowing a small amount to run along the short edge of the slide. This can then be moved onto a fresh slide. Otherwise, if there is only a small amount, then this can be spread directly.

There are a number ways in which material from the aspirate can be spread on the glass slide to create a monolayer. These are described below.

Blood smear technique
This technique is useful for material that is slightly fluid or bloody. Fragile cell populations such as those encountered in lymph node aspirate have a greater chance of remaining intact with this method.
The material from the FNA is expelled slightly in front of the frosted section of the slide. The short end of the spreader slide is then drawn backwards into the sample and the material is allowed to spread along the edge of this slide. Using a 45 degree angle the spreader slide is advanced smoothly ensuring to finish approximately 0.5cm from the end of the slide.

Squash technique
This technique is good for thick or sticky material but may damage fragile cell populations. In this technique two slides are placed at right angles to one another, centred over the sample droplet. The material should gradually spread across both slides. Once this has occurred the top slide is smoothly slid towards the bottom of the other slide, stopping approximately 0.5cm from the end of the bottom slide. It is best if both slides are held in the air during this process to avoid exerting too much pressure, which may damage the cells.

Line preparations
This technique may be useful in very fluid sample as it creates areas where cells are concentrated.
The process is very similar to the blood smear technique, however, the spreader slide is lifted approximately two thirds of the way down the smear and then tapped down on the slide 2-3 times, moving very slightly down the slide each time, to create 2-3 “lines”.

Guide to pricing

Cytology routine 1-6 slides
This is applied to skin and other soft tissue lumps and bumps, peripheral lymph nodes, mammary glands and other lesions outside of the thoracic or abdominal cavity. Up to six slides may be submitted. In the case of lymph nodes, aspirates may be submitted from a number of peripheral lymph nodes e.g. prescapular, popliteal to make up the six slides. There are occasions when the clinician suspects that the patient has a number of similar lesions located at different sites e.g. multiple lipomas or mast cell tumours. In these cases cytology is billed on a "per report basis". What this means is that if all the lesions turn out to be similar on cytological review, and a single report can be issued, this will be billed as a single cytology, provided no more than six slides have been submitted across all lesions. If the patient has a number of different lesions, these will be reported and billed separately. Unfortunately this cannot be determined prior to review of the slides and clinicians should discuss this with the client prior to submission.

Cytology routine 7-12 slides
Pricing is similar to that described above, with the exception that more slides can be submitted under this charge.

Cytology cystic fluids (fluid submitted)
This refers to submissions when a fluid sample from an external mass is submitted. Cytological preparations will then be made in the laboratory, often using techniques to concentrated cellular material. Up to 6 additional slides may also be submitted for evaluation (see fluid filled lesions above).

Cytology Eye/ Ear/ Skin
This is suitable for impression smears, sticky tape preparations, corneal and conjunctival scrapings and slides prepared from ear swabs. Skin scrapings for suspected ringworm or mite infestations should be submitted for a KOH preparation.

Urine cytology
Urine cytology is advised when a neoplastic lesion of the lower urogenital tract is suspected. For cases of haematuria, crystalluria and urinary tract infection, urinalysis with wet microscopy will usually be sufficient for diagnosis and no further information is provided by cytological evaluation.

Respiratory cytology
Respiratory cytology is suitable for specimens obtained by bronchoalveolar lavage, tracheal wash or nasal flush.