FNA CYTOLOGY, SAMPLING TECHNIQUES & SPECIMEN PREPARATION – FOR RADIOLOGISTS

GENERAL POINTS

- Use 25 gauge. Larger needles give more blood.
- It is rapid up and down movement of the needle tip within tissue (eg. 2mm) which dislodges cells. Slow movement through tissue or rotation of the needle is less effective.
- If a syringe is used as a handle on the needle, remove the plunger to allow for cellular tissue to enter the needle (Fig 1).
- Use the non-aspiration technique for vascular tissues (especially thyroid) and small neck lymph nodes. Blood is the enemy of cytology, and non-aspiration reduces the amount of blood-staining (Fig 2). However, if very little material is obtained with non-aspiration, repeat FNA with aspiration is recommended.
- Use “3-second” rapid technique for thyroid to minimize blood.
- Aspiration does increase cell yield and is appropriate for most tissues. Apply negative pressure with a 10 or 20 cc syringe while moving the needle up and down rapidly within the lesion. Release the negative pressure before withdrawing the needle.
- At least 3 needle passes are needed for optimal sampling.
- Stop the needle pass if blood appears in the hub of the needle and make the smears, cell block etc. before proceeding with additional needle passes. More aspiration gives more blood.
- Don’t discard any blood or cyst fluid. Send all material to the laboratory.

MAKING SMEARS

- Express a 2mm droplet of material near the frosted end of slide (Fig 3).
- Use another slide to spread the material and use the weight of the slide only to spread the material (Figs 4, 5). Do not apply any pressure.
- Maximum of two smears per needle pass and remainder kept for ancillary tests.

“FIXING” THE SMEAR

- Air-dry all smears: Use a hair dryer on cool or low heat held at 30 cm, to hasten the process. Slow air-drying produces artefacts.
- IMPORTANT: Ensure the slides are completely dry before packing.
- Alcohol or spray-fixed smears are not needed.

ANCILLARY TESTS

- Accurate tumour diagnosis and typing usually requires one or more of the following: cell-block for immunohistochemistry (Fig 6), flow cytometry sample in RPMI fluid (Fig 8), molecular testing (performed on cell block).
- IMPORTANT: At least 1 dedicated needle pass for each of the following: cell block, RPMI, micro culture.

AVOIDING COMPLICATIONS

- Don’t use a multi-angled or vigorous technique in thyroid, salivary gland or lymph node. This may result in incomplete fixation of tumours.
- For thyroid lesions, pressure on the puncture site after each needle pass minimises haematomas and allows further aspirations. This is recommended during ultrasound guided procedures.

SMEAR TECHNIQUES

- Pre-label the slide with the patient’s name and date of birth.

- Fig. 1. Syringe used as a handle on needle.
- Fig. 2. The non-aspiration technique.
- Fig. 3. Making the smear.
- Fig. 4. Making the smear.
- Fig. 5. The optimal smear.

- Fig. 6. Making a cell block by rinsing the needle in formalin.
- Fig. 7. Tubes for cyt fluid. Tube for flow cytometry.

CHECKLIST

- Slides and specimen containers labelled: name; date of birth; site.
- Request form completed including referring/copy doctor details.
- Cell block packaged in separate plastic bag from the glass slides

WHAT TO TAKE FROM WHERE

- BREAST, THYROID
  • Multiple needle passes for air dried smears.
  • If a neoplasm is suspected, smears and cell block recommended. One separate entire needle pass should be dedicated for the ancillary tests.

- LYMPH NODE
  These samples require the greatest care to minimise blood.
  • Suspected malignancy (either metastatic or lymphoma): multiple needle passes for air-dried smears, RPMI sample and a cell-block.
  • Suspected reactive node: multiple needle passes for air-dried smears and RPMI sample.
  • Suspected infection (eg. TB): multiple needle passes for air-dried smears, fresh material for culture and separate RPMI sample.

- SALIVARY GLAND, LUNG, LIVER, OTHER SITES
  • Multiple needle passes for air-dried smears.
  • Additional material for ancillary tests is also recommended.

- ADDITIONAL ANCILLARY TECHNIQUES
  • Parathyroid: needle rinse in 0.5ml saline for PTH levels.
  • Suspected metastatic papillary thyroid carcinoma in nodes: needle rinse in 0.5ml saline for thyroglobulin levels.
  • Molecular testing (eg. EGFR, BRAF, KRAS, ALK): requires a cell block containing ample tumour cells.

AVOIDING CONTAMINATION & ARTEFACTS

- SPLATTER CROSS-CONTAMINATION
  • Discard any unused slides after each procedure. DO NOT save slides for next patient.
  • If multiple sites are sampled, only slides for one site at a time should be laid out on bench to avoid cross-contamination.

- FORMALIN VAPOUR ARTEFACT
  • Formalin vapour damages cells on air-dried smears. Containers with BNF for cell blocks or biopsies need to be in a separate plastic bag from the glass slides.

- SLOW AIR DRYING ARTEFACT
  • This results in marked cellular enlargement which may mimic malignancy. It occurs particularly with fluid or blood-stained samples. Use a hair dryer at 30 cm on cool or low heat to prepare air-dried smears.

- TRAUMATISATION ARTEFACT
  • Cells will disrupt if any pressure is used when making smears. The weight of the glass slide should be the only pressure applied.

- ULTRASOUND GEL
  • This obscures cells. Consider using chlorhexidine 0.5% in 70% alcohol during US guided FNA.

- LOCAL ANAESTHETIC ARTEFACT
  • Local is toxic to cells; avoid aspirating the anaesthetic field.

FOR ANY QUERIES PLEASE PHONE
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