Advances in FNA Cytology
The History of FNA Cytology

- 1850
- 1900: FNA Described
- 1920: Dudgeon & Patrick in UK
- 1930: NY Memorial Hospital
- 1940s: Forgotten
- 1950s: Resurrected in Sweden
- 1960: BSCC formed
- 1961: 1980 Immunos
- 1980s: ROSE & Flow
- 1990s: ROSE & Flow
- 2000s: Ancillary Tests

1847 FNA Described
Good
- Easy
- Quick
- Not painful
- Few Complications
- Collect unfixed material

Bad
- Adequacy
- Hard to interpret
- Architecture lost
- Topology unseen
The Gross Appearances of FNA Specimens
A cellular smear
A necrotic cellular smear
Colloid nodule of thyroid
A pleomorphic adenoma
A lipoma
A lipoma: fat droplets lost in the methanol
An epidermoid cyst
Suture debris
Pigmented material
FNA Gross Appearances
FNA Gross Material Grade
Grade 1 - probably inadequate diagnostic material
Grade 2 - possibly contains diagnostic material
Grade 3 - probably contains diagnostic material
Grade 4 - material suggesting a specific diagnosis
e.g. “Grade 4: suggests a pleomorphic adenoma”
FNA Gross Material Grade of 123 Cases:

Grade 1  9  All inadequate
Grade 2  42 All adequate
Grade 3  46 All adequate
Grade 4  26 All adequate (24 correct; 2 necrotic Ca mistaken as “pus”)

Developments in Cell Block Technology
The Poor Man’s Cell Block
The Poor Man’s Cell Block

Frederick Mayall, Ann Darlington

ABSTRACT

The authors describe a simple method for making formalin-fixed cell blocks from fine-needle aspiration cytology specimens that we refer to as “The Poor Man’s Cell Block.”

The utility of fine-needle aspiration cytology can be enhanced by the collection of cell blocks for immunohistochemical and other molecular studies. We describe a method for making vapour-fixed cell blocks that we have developed over the last 10 years. This technique, which we refer to as “The Poor Man’s Cell Block,” requires no equipment or reagents that are not available in an endoscopy department or a radiology department. It has been used from a method that we described in 2006. The material is expelled from the fine-needle aspiration needle to form a bulb on the inocula of the inverted lid of a universal container. The cell block can be then inserted into a petri dish, with the inocula in the center of the petri dish. The lid is then inverted and fixed with a small amount of formalin. The sections are then cut and stained with a microscope. The sections show dense cellularity.

Figure 1. Images demonstrating the main steps in the preparation of a vapour-fixed cell block. (a) The fine-needle aspiration material is expelled to form a bulb. (b) The universal container is inverted to allow the reagents to fixate. (c) The reagents are then fixed. (d) The block is then sectioned. (e) The block is then sectioned and stained with a microscope. The sections show dense cellularity.
Gelatin Foam Cell Blocks
Gelatin Foam
Gelatin Foam Cell Blocks

Gelatin foam cell blocks made from cytology fluid specimens
Frederick G Mayall, Ian Wood

Abstract
This report describes a simple method of preparing cell blocks from fluids submitted for cytology, using collagen of gelatin foam surgical dressing material.

Immunohistochemistry is an important aid in the diagnosis of serum fluid cytology specimens. However, conventional methods for the preparation of cytology cell block specimens from serum fluids, such as agar blocks, HistoGel (Thermo Scientific, Longthorpe, UK) and a multitude of other methods, can be time consuming and technically difficult. We have developed a simple method that requires no special reagents or equipment other than a container of gelatin foam, such as Gelofusin (Ferrer, New York, USA), of the type that is used for wound dressings. This organic foam is highly absorbent and, being organic, is compatible with conventional histology tissue processing. The method is depicted in figures 1. Resin, the serum fluid is centrifuged and the supernatant is removed by pipette to leave a deposit of cells at the base of the universal container. A corona of gelatin foam,

Figure 1 (A) Resolved cytology fluid sample after resins has been taken for tissue preparations. (B) The sample is centrifuged and the supernatant is removed. (C) Resin blocks of gelatin foam are cut using a sheer of dressing material and dispersed. (D) Force is applied to form a solid block. (E) The solid cell block is wrapped in tissue paper for processing. (F) High-power field of the gelatin bubbles are visible. (G) High-power field with TUNEL staining and CAM5.2 cytokeratin staining of lung adenocarcinomas cells.
Experience with Gelfoam Biopsy in Routine Cancer Diagnosis

ALFRED ANGRIST, M.D., AND ANN POLLAK, M.D.
Queens General Hospital and Jewish Memorial Hospital, Jamaica, N. Y.

Tissue and aspirated fluids are very easily handled by means of Gelfoam. Large volumes of fluid are allowed to sediment. The supernatant is poured off and the sediment placed in a Petri dish. Several pieces of Gelfoam are grasped in a mouse-tooth forceps, squeezed and then immersed in the fluid.

The Medical Benefits of Cigarettes
Poly Vinyl Alcohol Cell Blocks
PVA Foam
26 Immunostains
An FNA cytology foam core device for making cell blocks

SHORT REPORT
Cell block immunohistochemistry (IHC) and other molecular studies are often requested for fully characterized tumours diagnosed by fine-needle aspiration (FNA) cytology. These supplementary investigations are best done on cell blocks. We describe a device that allows cell blocks to be collected while performing FNAs with little extra effort or reduction in the quality of the cytological tissue specimens. Experienced FNA operators will recognize that often, a significant amount of the sample is left behind in the lumen of the needle when the specimen is suctioned on the slide (Fig 1A).

We have designed a device that collects this material during the FNA procedure. It consists of a plastic adapter that has a row of small polyurethane (PU) foam protruding from its lumen at the end that fits onto the hub of the needle (Fig 1B). The top of the foam core expands into the apices of the needle’s hub. The other end of the adapter then fits onto the syringe. If a syringe injection technique is used (Fig 1C). As the FNA is being performed, the sample material flows up the lumen of the needle’s shaft and, if a sufficient volume is collected, expands into the hub of the needle where it is anchored into the tip of the foam core (Fig 1D). When FNA sampling is finished, stems are made by sentencing the specimen from the needle onto a slide in the usual way by suction from an attached syringe. The air spaces through the foam containing none in the foam cores down the needle but some remain behind. The device is then removed, placed in a formaldehyde fixative and sent for histopathology. Once fixed, the needle is removed from the adapter (Fig 1E), processed and mounted as for normal histology specimens (Fig 1F). On microscopic examination, smears are made to the smear then mounted as for normal histology specimens (Fig 1G). IHC and other molecular investigations can be performed (Fig 1H) as for normal histology specimens. An adequate cytological specimen (and cell block) specimen can usually be collected by the same FNA attempt. Some samples may be too minute to make, to trim the needle onto the hub. However, we have found that this difficulty can be overcome by operating the needle onto a slide and then clipping the top of the slide with the tip of the device (Fig 1I). There should be at least 15% of tumour Excision; less than yield undetectable IHC, particularly for molecular markers such as TTF1 and P450.

If preservation of high-quality DNA is a priority then it may be worthwhile to cut into two parts of the core leaving the sample with a wedge,-freezing part of it for DNA extraction and trimming the rest for paraffin processing. Sometimes there is only a small amount of sample in the tip of the foam. In this case it is best to remove the foam core proximal to the tip after Excision and then closed so that the tip is cut to a common section, as to maximize the number of cells in the section. When there is an abundant sample, for example a cystic lesion, it is advisable that the larger amount of material should be used for microscopy and that the smaller amount of material should be used for molecular investigations.

Figure 1 (A) Fielded fine needle aspiration (FNA) cytology specimen is trapped in the hub of the needle when the specimen has been suctioned. (B) The foam needle device consists of a row of polyurethane foam protruding from a low polyurethane tube. (C) The device is attached to the needle and syringe. (D) The sample is collected into the tip of the foam core. (E) After excision the core is removed from the specimen, pieces prepared and mounted as for normal histology specimens. (F) The specimens from the foam core can be used for molecular investigations. (G) The tip of the foam core can be used to collect material from the method of choice.

FNA Foam Core Device
Free D Path

The Free Diagnostic Pathology Software Project
LABCENTRE

LABORATORY MANAGEMENT INFORMATION
Patient History Enquiry

1. Dept: HI Histopathology
   Spm:

2. Pat No.:
   Source: ANH

3. Spm No.:
   Con/GP:

Status “DP”
GAB
Specimen:
Gastric.
Clinical History:
Known gastric Maltoma. ? has healed. ? still active.
REPORT
Macro:
Five biopsies, together 8mm.
Micro:
The specimen consists of fragments of non specialized

Move the pointer to a request and enter “R” to view the report.

Page 1 of 19 : Multivalue Action
Lean
What do we want?
Pro-forma reporting

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**CLINICAL DETAILS:**
- History from Grade 3 IBC: 3/6 CM. To any spread. Chem. Now clearance.

**MACROSCOPIC FEATURES:**
- Site (Left / Right): Left
- Specimen type: Node procedure, no breast specimen
- Weight (gms):
- Dimensions (mm):
- Guide wire present: No
- Previous malignant histology: Yes
- Auxiliary Procedure: None

**ORTHOTAXIC MARKERS:**
- Skin collapse:
- Orientation markers:

**SURGERY S-X-RAY:**
- Received: No
- Moire test: 
- Appearance of cut surface: 
- Maximum dimension of lesion: 

**DISTANCE FROM MARGIN:**
User defined templates

- An ellipse of skin * x * x * mm.
  The surface shows *.

- FM-Lipoma: Lobulated adipose tissue consistent with tissue
- Hyperplastic polyps: These are hyperplastic polyps. There is no
- LW - endometrial pipe line: These are fragments of functional endometrium
- LW Barrett: These are fragments of glandular mucosa with
- LW BCC excision: This is sun-damaged skin bearing basal cell
- LW cervical biopsy TZ: This biopsy is from the transformation zone of
- LW normal endometrium: These are fragments of functional endometrium
- LW normal small intestine: These are fragments of histologically normal

To insert template text into a Report Text field that already contains text first type >= at the insertion point

Replacing * with text:

  a nodular lesion
  a region of discoloration
“One-click” extra-work
Visual process control

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Exportable data-sets
Process supported by software design

Enter demographics → Complete breast proforma → Software generates report

Edit report & authorise report → PDF report generated → Breast screening data form
Easy enhancement
NHS Improvement now closed

NHS Improving Quality (NHS IQ) now exists to bring together the wealth of knowledge, expertise and experience of a number of former NHS improvement organisations.

NHS IQ is hosted by NHS England, previously known as the NHS Commissioning Board.

As a consequence, NHS Improvement has now closed. However, elements of the following programmes will continue within NHS Improving Quality:

- Children and young people cancer survivorship
- Endoscopy
- Enhanced recovery
- Interventional radiology
- Seven day services

The work on these parts of our website form part of the work to continue within NHS IQ and therefore will be updated going forward.

Website, materials and publications

Access to this website and the resources on it will be available for a limited time. Please access and retain the materials you require. We will signpost on this site as soon as we can where our publications and resources can be accessed in the future.

Find out more

For more information, please visit the NHS Improving Quality website

Or download NHS Improving Quality: Our Strategic Intent

Contact: enquiries@nhsiq.nhs.uk
The Free Diagnostic Pathology Software Project

Try the Free D Path V4.1 software online straight away by clicking this link. Please do not enter any real patient data.

Username: path
Password: path

To download the software to use on your own PC, Mac, or server click this link. There are instructions for installing and using the software below.

The Free Diagnostic Pathology Software Project arose from the...
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>5000 Downloads of the software
The Best Use of IT to Support Clinical Treatment and Care
FREE D PATH

PCs, Macs, Browsers, iPads, iPhones
## Histopathology

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## Non-gynaecological Cytology

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Award winning reporting software developed for PCs, Macs, iPads and iPhones
I am writing to give you advance warning that in the next few weeks I expect a formal communication to be sent from the Chair of the COSD Governance Board to data providers’ CEOs to advise them of the following:

1. From March 2015 (i.e. January 2015 data) any data submitted from a cancer management system that is not in XML format will be flagged as red. If a provider continually fails to provide an XML feed from their main cancer management system from March 2015 onwards they risk contractual sanctions at the discretion of their local commissioner.

If you are already submitting data in XML this does not apply to you.

2. There is an extension of the deadline for Pathology XML reporting in acknowledgement of the challenges of slow progress with agreeing structured reporting and the lack of (perhaps reasonably priced) interest from system suppliers to offer a reporting module. Providers will now be required to achieve the standard for cases diagnosed from January 2016 (for submission in March 2016) any submitted pathology data not in XML format will be flagged as red.

If you are already submitting data in XML this does not apply to you.

3. By March 2015, Providers will be required to submit a credible plan outlining how they intend to deliver the 2016 standard. Failure to submit such a plan will result in a red rating for 2015 pathology data submissions. Submission of a credible plan will achieve an amber rating for 2015 data submissions. A green rating with only be given to Providers delivering the pathology XML standard.
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The Cytology of Circulating Tumour Cells

1. Primary tumor
2. Cancer cells shed into bloodstream
3. Circulating tumor cell (CTC)
4. Secondary tumor

White blood cell
Red blood cell
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</tr>
<tr>
<td>$10^3 \mu l$</td>
<td>CECs</td>
</tr>
<tr>
<td>$10^2 \mu l$</td>
<td>CD34+CD38- Cells</td>
</tr>
<tr>
<td>$10^1 \mu l$</td>
<td>EPCs</td>
</tr>
<tr>
<td>$10^2 L$</td>
<td>CTCs</td>
</tr>
</tbody>
</table>
Tumour and not-tumor cells present in blood. Tumour cells are marked by arrows. Adapted from Hofman et al., Clinical Cancer Research, 2011 (8) a, b, c: Tumor cells. d, e, f: Atypical cells. g, h, i: Normal cells.
CTC isolation
- Low cell spike was then performed (10 and 50 cells).

- 500 CaOV3 (ovarian cancer) cells were spiked into whole blood, separated and stained for CK7 and MNF116.
Initial data with Cytofoam (ovarian cancer samples)

- PT0214KE1 (clear cell carcinoma (ovarian) stage 2B) - one cell found
- PT0233KE1 (serous (tubo-ovarian) high grade stage 4B) - one cell found
- PT0234KE1 (serous (tubo-ovarian) high grade stage 3B) - cells found

MNF116 (broad spectrum cytokeratin) positive cells