Transport media for fine needle aspiration cytology

We were interested to read Nye and Patou’s letter\(^1\) as we share their concern about the hazards of human immunodeficiency virus and other group 3 pathogens in cytological preparations. We have been developing a technique for fine needle aspiration cytology (FNAC) from lymph node specimens that would reduce the risk of contracting these infections. Our aim was to reduce the problems associated with aerosols produced in the preparation of an air dried smear for Romanowsky staining, but at the same time maintain the technical standard needed for diagnostic cytology. To do this we investigated systems of transporting aspirates to the laboratory, where they can be handled safely.

Boon and Lykles\(^2\) evaluated one transport medium in FNAC from various sites and were able to use both Papanicolaou and Romanowsky stains. They pointed out some of the advantages, but the medium they used was expensive and they made no comparison with other methods. Preliminary work in this department has examined the feasibility of this approach to transportation of FNAC so that this can be applied to breast and thyroid aspirates (Cross HJ, FIMLS course project report, Sheffield City Polytechnic, 1986). This need has arisen partly due to the inadequacy of some of the air dried smears performed by a changing population of junior medical staff, with problems of cellular damage on smearing and incorrect air drying. Early studies assessed Cytospin collection fluid as a transport medium for FNAC and showed adequate cytocentrifuge preparation for Papanicolaou stains but air dried Romanowsky stains were uninterpretable. The lack of air dried preparations has been a particular problem in the diagnosis of thyroid aspirates.

Recently we assessed eight different transport media for FNAC prepared from 10 fresh tonsils. The media used were: 1/1000 normal human serum in isotonic saline; Hanks’s balanced salt solution (Gibco); Cytospin collection fluid (Shandon Southern Products Ltd); isotonic saline; modified Michael’s medium; 3% glutaraldehyde in cacodylate buffer; 2.5% isopropanol in isotonic saline; and 2.5% formaldehyde in isotonic saline.

After leaving the aspirates in the medium for a minimum of one hour cytocentrifuge preparations were made in a class 1 microbiological safety extraction cabinet using a Shandon Cytospin 2 (Shandon Southern Products Ltd). Cellularity was adjusted by dilution where necessary. Cytospin specimens for Romanowsky staining were then air dried and fixed in methanol for 10 minutes before being stained by the May–Grünwald Giemsa method. Papanicolaou stains were carried out at the same time being fixed in ethanol for 10 minutes.

The slides were assessed blind by two of us independently (AJH and SCH), and each slide was assessed for cellularity of interpretative cells and nuclear and cytoplasmic detail on both Papanicolaou and May–Grünwald Giemsa stained preparations. Each variable was scored on a scale of 0–5. The results are summarised in the table.

Four of the eight media scored highly, indicating good staining by both Papanicolaou and May–Grünwald Giemsa stains. These media were all saline based. This observation was noted by both the pathologists. Overall, the best results were obtained with the saline containing 1/1000 normal human serum, with good cellularity and nuclear and cytoplasmic detail with May–Grünwald Giemsa stain; nuclear detail was also good with Papanicolaou staining and surpassed the results obtained using Cytospin collection fluid. As we have noted previously Cytospin collection fluid gave uninterpretable cytology with May–Grünwald Giemsa stain. Media containing glutaraldehyde and formaldehyde gave a poor cellular yield and very poor cytological detail.

Cytoplasmic detail was seen far better with the May–Grünwald Giemsa stains, although comparison with immediate air dried smears showed some mild loss of nuclear chromatin clarity. Another disadvantage of the saline based media was the presence of a mild degree of cytolsis which may be more pronounced on samples with a lower cellularity.

Our conclusions were that:
1. Transport media can be used for lymph node FNAC.
2. These media allow lymph node FNAC to be taken safely.
3. Immediate air dried smears do not have to be prepared, thus eliminating the risks associated with aerosols.
4. MLFOS and cytopathologist need not be present at the aspiration.
5. The four saline based transport media give good cytological detail with Papanicolaou and May–Grünwald Giemsa staining.
6. The safety advantages of aldehyde based fixatives are outweighed by the poor cytological detail of preparations.
7. Immunocytochemistry, flow cytometry, and electron microscopy can be performed using these media.

We are now studying the suitability of these four transport media on FNAC from breast and thyroid.

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References

Table Transport media assessed for cytological detail and cellularity

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<thead>
<tr>
<th>Transport media</th>
<th>May–Grünwald Giemsa</th>
<th>Papanicolaou</th>
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<tr>
<td></td>
<td>Cellularity</td>
<td>Nucleus</td>
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<tr>
<td>1/1000 normal human serum in isotonic saline</td>
<td>4</td>
<td>2</td>
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<tr>
<td>Hanks’s balanced salt solution</td>
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<tr>
<td>Cytospin collection fluid</td>
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<tr>
<td>Isotonic saline</td>
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<td>Modified Michael’s medium</td>
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<td>3% glutaraldehyde in cacodylate buffer</td>
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<tr>
<td>2.5% isopropanol in isotonic saline</td>
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<tr>
<td>2.5% formaldehyde in isotonic saline</td>
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