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Perspective

The Mellifluous Aetiology: Liquid Based Cytology Critiqued

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Abbreviations

LBC: Liquid Based Cytology; HIV: Human Immunodeficiency Virus; PCR: Polymerase Chain Reaction; LSIL: Low Grade Squamous Intraepithelial Lesion; HSIL: High Grade Squamous Intraepithelial Lesion

The approach to a cytological sample with a brush (electric or manual) and its removal to a vial with a standardized fixative/preservative is the modicum of expression at the cited Liquid Based Cytology [1,2]. As opposed to the conventional Fine Needle Aspiration/Papanicolaou test with direct smears, fixed and stained and observed under the microscope, the viscous samples have the accessory mucus/blood removed and a monolayer of well dispersed, well stained cells ready for evaluation under the light microscope, at the first instance.

The liquid based cytology is primarily used for cervical screening. The attention is on augmenting the sensitivity and specificity of the popular Papanicolaou test Manual or automated screening techniques are adopted depending upon the sample quantity and the applicable disbursement. The gynaecological specimens have evolved to the point that they exceed the conventional Papanicolaou stained smears due to improved fixation, reduced obliterations and homogenized cell transfer. Operator dependent aberrations are minimized. The samples are amassed with a brush and deported to a vial. In the conventional method, the dispatch and spread may not be depictive and the better part of the scrapings may be adherent to and be cast aside with the sampling device.

The liquid based cytology is adopted as a screening measure to evaluate cervical conversions. The cervical tissue is consumed in a conserving fluid prior to being fixed on a slide, the advantages being bypassing anhydration and curtailing the bulk of illegible material. The batches can be arranged with manual (as in the developing countries) or automated approach (developed countries), also dependent on the sample size and content. The expenditure is larger, however. The balance material can be expended for molecular techniques and testing of infection/DNA ploidy, DNA cytometry, preparation of additional slides etc. Supplementary samples can be used for delineating diagnosis, assessing imprecise nuclear atypia, ambiguous lesional grading, exuberance or dearth of addenda such as blood, mucus, exudates etc.

A variety of convenient LBC cervical testing modalities are i) Surepath cervical samples are whirled, strained, laminated to a density gradient and centrifuged, the slides then smeared in a circle 12.5 mm in diameter. ii) The Thin Prep necessitates instrumentation and polycarbonate filters which are bathed in the vial and rotated for sample homogenization. Cells are aggregated onto the filter covering followed by a vacuum, the filter then crowded to a glass slide to form a 20 mm diameter circle. A well preserved, well dispersed, well stained monolayer of cells is obtained with a backdrop bereft of mucus, RBC's, anucleates. iii) The spin thin process in which a modified electric toothbrush is appropriated to assemble and deliver the cells in the suspension from the apparatus, to be spun into an area of 10x 20 mm on the glass slide using cytospin. The results are comparable to the conventional smears and follow-up histology. iv) In the method patented by Johnson., *et al*. cervical scrapings are compiled in an equipment with a proprietary preservative of buffer, emulsifier, formalin. alcohol, swirled and strained through tulle, centrifuged and the sediment, mixed with proprietary fixative to maintain the morphology and three-dimensional structures, air dried, stained and observed. Batch processing and contraption reusability are of benefit to ecology and expenditure.

The various LBC channels affirm lesser number of interpretative erratum, cogent lesional diagnosis, an accelerated result, effortless assimilation of the slides, a downgrading in the count of unsuitables and an increment in the diagnosed LSIL/HSIL For a cumulative screening programme the expenditure is elevated for the LBC variants.

Cytopreparatory LBC modalities augmenting Fine Needle aspiration (FNAC) doctrines on the cell agglomerations on viscous fixatives, concoct an appropriately stained monolayer fit for microscopy. The existence of the fluid facilitates in accumulating the unconsumed cells in the needle, instant fixation in alcohol makes useful the cell preservation and reduces markedly the haemorrhagic attainments. This may i) aid in the visual and automatic delineations of the cells of concern. ii) cultivate quality and clonality of the immunocytochemistries iii) conserve nuclei acid especially DNA. Nevertheless flow cytometry, cytological cytogenetics, molecular assays and gene expression studies rooted on RNA quantification demand fresh constituents.

Molecular Liquid Based Estimations, include Linear array Human Papilloma Virus Genotype test function well with the remaining samples from the prophylactics and is a quantitative criterion to ascertain low and high risk papilloma viruses (6, 11, 16, 18, 26, 31, 33, 35,39, 51-56, 66-73, 81-84 etc). There is specimen accordance with i) PCR amplification ii) hybridization of the amplified by- product iii) colorimetric expose' of the hybrids by a strip. The approved guidelines for Papanicolaou testing are every three years for non-immunocompromised women, and twice a year and subsequent annual inspections for HIV positives and immunocompromised individuals. Direct visualization of the cervix is recommended in patients with cervical bleeding, dyspareunia, foul smelling, bloody discharge etc. Overt cancer can be conjured up without magnification. Abnormal cytology needs workup with colposcopy (magnification 10x16) and histology from areas delineated with 3% - 5% glacial acetic acid. Screening for anal cancers and precancers are debatable. However high risk HIV positive MSM are recommended for anal cytologic screening and digital rectal exams as are women with CIN 3.

Parasitic Manifestation of Liquid Cytology include wet exhibits for Trichomonas Vaginalis and direct microscopy for the motile parasite (sensitivity 36 - 60%). Culture with one specimen (sensitivity 85%), two or more specimens add to the sensitivity by 10% or more. Rapid antigen testing is a flow strip that distinguishes the T. Vaginalis membrane protein, is usable in direct smears and wet preparations (sensitivity 83% - 90%) Transcription Mediated Amplification (TMA): uses analyte specific reagents and has a sensitivity of 96% and specificity of 97%.

Negative wet mounts are to be followed by culture in suspected cases or with history of repeated contact with tested positive individuals or h/o substance use. The diagnostic conclusions are i) All women with STD, a wet mount with primary, additional swabs. ii) Wet mount negative- Rapid test with primary swabs. iii) If i and ii are negative, a culture with saved smears. iv) In men, a urethral smear and a urine sample can be computed for direct microscopy and culture, along with a seminal representation.

Bibliography

1. Liquid Based Cytology Encyclopedia
2. Liquid Based Cytology Overview with Science Direct

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