Review Article

"HOW LIQUID BASED CYTOLOGY SURPASSES CONVENTIONAL CYTOLOGY? " A REVIEW ARTICLE

Abstract

Pap smear is the most widely used test for screening of cervical cancer and precancerous lesions.. Liquid-based cytology is a cervical cancer screening technology that inspects cells by dissolving them in liquid and is used as a main screening tool for invasive cervical cancer.The purpose of this article is to demonstrate how fluid-based cytology has surpassed conventional cytology in the interpretation of cervical smear biopsy results in order to identify early cervical lesions in a more efficient and convenient manner, allowing for early diagnosis and treatment of cervical cancer patients and thus improving patient wellbeing.

INTRODUCTION:

Exfoliative cytology was invented around 1800's. Cytopathology is gaining massive success all over the world due to its accurate results,easier, cost effective and time consuming properties. Few decades back, the use of exfoliative cytology was restricted to gynaecological diagnosis. Recently, newer methods of collecting specimens, staining and reporting of the smears have been invented mainly in the field of cervical cytology because of the contribution from Papianacolaou after whom pap smear and stain was named. Cytopathology includes two branches, exfoliative cytology and aspiration biopsy. Among exfoliative cytology, pap smear has gained more importance in cervical cytology screening as a major tool for screening of females to rule out HPV infection, early precursor lesions of cervical cancer and invasive cervical carcinoma. The incidence of cervical cancer deaths have been dropped tremendously in the recent years as the Papanicolaou smears screening programs had started as a revolution in the field of Gynaec-path. There are two types of taking the pap smears, one is conventional cytology and another one is liquid based cytology. Nowaadays conventional Papanicolaou smears has become less famous compared to fluid-based technology as they can provide more accurate interpretation on the cervial epithelial status and allows for molecular testing for the human papilloma virus infection.

ABBREVIATIONS:

LBC-Liquid based cytology

HPV-Human papilloma virus

FDA-Food and drug administration

ASCUS-Atypical squamous cells of undetermined significance

LSIL-Low grade squamous intraepithelial lesion

HSIL-High grade squamous intraepithelial lesion

DISCUSSION:

Liquid-based cytology is a fantastic process in cytopathology, especially when it comes to interpreting cervical cytology in the context of cervical cancer screening. It increases the accuracy of diagnostics. In contrast to liquid-based cytology, conventional cytology requires manual sample preparation. The patient's name is properly labelled on the slide. In cytology preparations, three-dimensional structures such as glands are highly visible, allowing direct linkage between histological and cytological properties. ThinPrep and SurePath are two popular systems that have been authorised by the US Food and Drug Administration (FDA). ThinPrep has a higher detection rate of ASCUS/LSIL/HSIL than conventional screening, which is almost twice as high. Another benefit of liquid cytology is the availability of residual material, which can be used for auxiliary tests such as the identification of oncogenic human papillomavirus DNA. The liquid-based technique allows for improved cell imaging, making diagnosis more accurate and efficient. Furthermore, computer systems can analyse data in a similar way to human observers. Humans and automated systems can screen liquid-based cytology specimens at a faster rate than conventional cytology specimens. The basic premise is to place cell samples in a liquid fixative solution and then stain them to generate a monolayer of cells suitable for microscopic examination. The presence of liquid aids in collecting cells that have remained in the needle, whereas quick fixation due to the presence of methanol or ethanol in the fixative maximises cell collection. Liquid cytology has its own set of drawbacks. It is mostly required to receive specialised training in screening and reporting. The cells are arranged in thin layers rather than monolayers and are thicker than sections of some conventional smears. In SurePathTM samples, it's critical to focus through the entire thickness of the layer of cells during screening. It is important to realise that the cellularity of the slide does not necessarily reflect the cellularity of the original specimen due to the nature of the specimen processing. The cells are increasingly distributed, and while cell clusters are still common, they are becoming smaller. In cell groups, some architectural elements are more subtle. In LBC preparations, cell dispersion causes some cell groups to disintegrate into single dissociated cells that are unrelated to one another. The centre bristles on the broom-like device used to sample the cervix are meant to catch the blood.The cell sample is much smaller, and quicker and easier to screen than that of a conventional smear. Conversely, because only a representative sample of cells is present, dyskaryotic cell populations may be represented by many fewer cells in an LBC preparation. It's vital to focus across the entire thickness of the layer of cells when screening SurePathTM samples. It's vital to remember that due to the nature of specimen processing, the cellularity of the slide does not always mirror the cellularity of the original specimen. Cell clusters are becoming smaller, and while they are still prevalent, they are becoming more dispersed. Some architectural aspects are more subtle in cell groupings. Cell dispersion in LBC preparations leads to the disintegration of some cell groupings into single dissociated cells that are unconnected to one another. The broom-like device used to sample the cervix has bristles in the centre that are

supposed to catch the blood. The cell sample is significantly smaller than a traditional smear, therefore it is much faster and easier to screen. Dyskaryotic cell populations, on the other hand, may be represented by far fewer cells in an experiment because just a representative sample of cells is present.

CONCLUSION:

Pap smear is the most widely used test for screening of cervical cancer and precancerous lesions.One of the biggest drawback of Pap smear is that it has a high false-positive rate, making it difficult for doctors to determine whether or not a woman really does have cervical cancer. Pap smear carries another disadvantage where it does not test for all the different types and strains of HPV which can cause invasive cervical cancer but can clearly shows cellular changes occuring in the cervical cells associated with HPV infection. Liquid-based cytology is a cervical cancer screening technology that inspects cells by dissolving them in liquid and is used as a main screening tool for invasive cervical cancer. It was authorised by the FDA in 2000. As a result, the LBC sample is ideally to be considered advantageous over conventional pap smear in order to diagnose cervical precancerous lesions and invasive cervical cancer in the early stages and plan appropriate treatment options, and plays a critical role in improving a specific disease's prognosis and patient survival. The purpose of this article is to demonstrate how fluid-based cytology has surpassed conventional cytology in the interpretation of cervical smear biopsy results in order to identify early cervical lesions in a more efficient and convenient manner, allowing for early diagnosis and treatment of cervical cancer patients and thus improving patient wellbeing.

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