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Liquid-based cytology and pap smear: a comparative evaluation in cervical cancer diagnosis

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Abstract

Introduction: To increase early diagnosis and screening reliability, Liquid-Based Cytology (LBC) and Conventional Pap Smear (CPS) are essential for the detection of cervical cancer. The research's conclusions can help medical practitioners choose the most effective course of action in various circumstances, inform economic screening methods, and address global inequalities in cervical cancer outcomes. Furthermore, even when the advantages of either approach are well understood, a doctor's choice of the best technique—whether LBC or CPS—at the correct time may be influenced by various factors and clinical settings.

Purpose of the study. The investigations aim to assess the efficacy of LBC and CPS across numerous cytological parameters by evaluating the results against conventional criteria of specificity and sensitivity.

Methods and Materials: A comparative cross-sectional study involving 100 samples of Conventional Pap Smear (CPS) and 20 samples of Liquid-Based Cytology (LBC) was conducted with 120 women, whose mean age was 45±9.5 years, presenting with gynaecological complaints at the Institute of Medical Research in Kuala Lumpur. Samples are analysed using several cytological characteristics, including sensitivity, specificity, pathogenic organisms, and adequacy rates of LBC and CPS. A standardised grading system ranging from 1 to 4, indicating poor to excellent performance, is employed in accordance with the Bethesda method. Virgins, expectant mothers, known cases of gynaecological cancer, and slides in poor shape are all grounds for exclusion.

Research Result: The findings showed that LBC performed much better than CPS in terms of specificity (96% vs. 88%) and sensitivity (92%), CPS versus 15 (78% LBC) ($P<0.05$). The technological benefits of LBC, specifically its ability to produce sharper slides, are responsible

for this improved performance. The cellularity of the smears was not different between the two techniques (P>0.05). Three (15%) LBC smears and 35 (35%) Pap smears had hemorrhagic backgrounds (P<0.05). 42 (42%) of LBC smears and 19 (95%) of CPS preparations have cellular overlap. The results demonstrated a statistically significant (P<0.05) increase in cell overlap in CPS smears. Artefacts were detected in 12 (60%) of the LBC smears and 95 (95%) of the CPS smears. In CPS smears, artefacts were clearly evident (P < 0.05). The cytoplasmic parameters of cell distortion, cell shrinkage, vacuolization, boundaries, and folding were used to examine architectural and cellular morphological alterations. These parameters were observed in 22 (22%) CPS cases and 4 (20%) LBC instances (P > 0.05).

Conclusion: The LBC technique, in contrast to CPS, provides substantial advancements in evaluating morphological distinctions, hence improving diagnostic accuracy. The LBC approach offers a clearer backdrop, a more uniform cell distribution, less cell overlap, and fewer artefacts. LBC possesses multiple advantages over PAP smear, since the specimen can be utilised in molecular analyses, including the identification of high-risk Human Papillomavirus (hrHPV). Furthermore, LBC proves to be cost-effective for extensive screening for cervical cancer in the long term. However, in terms of cellular morphology, there was little difference in the detection of pathological organisms or diagnoses in satisfactory CPS smears [2].

References

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