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Modern Methods of Early Diagnostics of Cervical Dysplasia

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ABSTRACT

Cervical dysplasia is a significant health issue affecting women globally, with over 570,000 new diagnoses each year. It is a precursor to cervical cancer, which remains a leading cause of death among women aged 35-55. In Uzbekistan, cervical cancer ranks second in mortality among women aged 18-45. Early detection is crucial for reducing the disease burden. This study investigates modern diagnostic methods for early detection of cervical dysplasia, particularly comparing the Papanicolaou (Pap) test with the newer CIN-DIAG method. Aim: The study aimed to evaluate the effectiveness of modern diagnostic methods in detecting cervical dysplasia. Specifically, it focused on comparing the diagnostic accuracy and time efficiency of the Papanicolaou test and CIN-DIAG test for identifying various degrees of cervical intraepithelial neoplasia (CIN). Materials and Methods: The study included 70 women of reproductive age who attended the gynaecology outpatient department of the 9th Interdistrict Perinatal Centre from May 2023 to February 2024. These participants were divided into two groups: Group 1, comprising 35 women diagnosed with cervical dysplasia (CIN I, II, III), and Group 2, consisting of 35 women without cervical pathology. Clinical analyses and diagnostic tests were conducted, including colposcopy, Papanicolaou testing, and the CIN-DIAG method, with PCR testing performed on a subset of 28 patients. The liquid-based cytology method was used for histological testing. Results: The clinical analysis revealed that 28.6% of patients had CIN I, 57.1% had CIN II, and 14.3% had CIN III. Symptomatically, 10 patients exhibited postcoital bleeding, 5 had pain after intercourse, and 20 complained of lower abdominal pain. The CIN-DIAG cervical test demonstrated high effectiveness, providing results in 5 minutes, compared to the traditional Pap test, which took 5-6 hours. Of the patients tested, CIN II was found in 57.1%, CIN III in 20%, and cellular atypia in 2.9%. HPV was detected in one case, which was interpreted as an oncological risk. The control group, using the liquid-based cytology method, showed dysplasia in only 8.6% of cases, with no pathologies detected via colposcopy. Conclusion: This study confirmed the efficacy of modern diagnostic methods like the CIN-DIAG test for early detection of cervical dysplasia. Early detection, particularly through the CIN-DIAG method, significantly reduces diagnostic time and provides more immediate results. The study advocates for routine cervical screenings every three years for women of reproductive age and highlights the importance of timely referrals to oncology for atypia cases. It also stresses the need for vaccination against high-risk HPV strains and adherence to proper hygiene practices to prevent cervical cancer

Keywords:- Pap test, cervical cancer, women, dysplasia.

Introduction:-

Cervical dysplasia, a condition characterized by abnormal cell growth on the cervix, is a precursor to cervical cancer, which remains a major global public health issue. According to the World Health Organization (WHO), over 570,000 women are diagnosed with cervical cancer each year, and it is the second leading cause of cancer-related deaths among women aged 35 to 55. In Uzbekistan, this condition is especially concerning. Annually, approximately 1,827 women are diagnosed with cervical cancer, with 997 dying from the disease. For women between the ages of 18 and 45, cervical cancer is the second most common cause of death after breast cancer. This alarming trend is predominantly attributed to persistent infection by high-risk strains of human papillomavirus (HPV), which are responsible for over 90% of cervical cancer cases.

The early detection of cervical dysplasia is critical for reducing the incidence of cervical cancer. If dysplasia is identified in its early stages, before it progresses to cancer, timely intervention can significantly lower the mortality rate. Traditionally, the Papanicolaou (Pap) test has been the gold standard for diagnosing cervical dysplasia. While the Pap test is effective, it is a time-consuming procedure that requires skilled laboratory personnel for accurate interpretation. Furthermore, the results can take several hours to process, which can delay necessary treatment. In recent years, new technologies such as the CIN-DIAG test have been developed to offer a faster, more efficient means of diagnosing cervical dysplasia. The CIN-DIAG test allows for rapid diagnosis, providing results within minutes, which could potentially improve patient outcomes by enabling quicker treatment decisions.

This study aims to compare the diagnostic accuracy and efficiency of the traditional Pap test with the newer CIN-DIAG test for detecting cervical dysplasia. It further investigates the prevalence of cervical dysplasia among women of reproductive age, aiming to assess how effectively these diagnostic methods identify dysplasia and how they can influence early intervention and treatment. The findings from this study may provide critical insights into

improving screening strategies, particularly in countries like Uzbekistan, where cervical cancer rates remain high and timely screening may be challenging due to limited resources.

Methodology:-

The study was conducted at the 9th Interdistrict Perinatal Centre in Uzbekistan, where 70 women of reproductive age, ranging from 18 to 45 years, were selected to participate. The research was carried out over a period from May 2023 to February 2024. The participants were divided into two groups based on their medical histories and symptoms. Group 1 consisted of 35 women diagnosed with cervical dysplasia, including varying degrees of severity (CIN I, CIN II, CIN III), while Group 2 was made up of 35 women without any cervical pathology, serving as the control group. Each participant underwent a comprehensive gynaecological examination, which included a colposcopy assessment and a Pap smear. The Pap test, a traditional diagnostic method, involves the collection of cervical cells, which are then stained and examined under a microscope. The process of preparing and analysing the sample typically takes around 5-6 hours, which can delay the results. On the other hand, the CIN-DIAG test is a newer diagnostic technology that categorizes cervical abnormalities in just 5 minutes, providing a much faster alternative to the Pap test.

In addition to the Pap and CIN-DIAG tests, a liquid-based cytology method was used for histological testing in a subset of 28 patients. This method provides a more detailed analysis of the cervical cells and was paired with PCR testing to detect HPV infections, which are closely linked to the development of cervical dysplasia and cervical cancer.

Clinical symptoms such as postcoital bleeding, pain during intercourse, and lower abdominal pain were recorded for participants in Group 1, allowing the researchers to correlate these symptoms with the severity of dysplasia. Histological evaluations were used to classify the degree of dysplasia as CIN I (mild), CIN II (moderate), or CIN III (severe).

Results:-

The findings from this study revealed significant information about the prevalence of cervical dysplasia and the comparative efficiency of the diagnostic tests. In Group 1, the prevalence of dysplasia varied, with 28.6% of participants diagnosed with CIN I, 57.1% with CIN II, and 14.3% with CIN III. Among the patients in Group 1, the most common symptoms reported were lower abdominal pain (20 patients), postcoital bleeding (10 patients), and pain during intercourse (5 patients). When it came to diagnostic accuracy, the CIN-DIAG test proved to be a highly efficient tool, offering results within 5 minutes. In contrast, the Pap test required significantly more time, typically taking 5-6 hours for processing. The results from the CIN-DIAG test revealed that CIN II was present in 57.1% of the cases, CIN III in 20%, and cellular atypia in 2.9%. In one case, HPV infection was detected, and the patient was promptly referred for oncology consultation, highlighting the test's utility in identifying high-risk patients. In the control group (Group 2), where no cervical pathology was found, only 8.6% of the women showed evidence of dysplasia through liquid-based cytology, with no abnormalities detected during colposcopy. The absence of significant findings in the control group further validated the effectiveness of the diagnostic methods used in the study.

With respect to clinical symptomatology, patients with CIN I and CIN II did not exhibit any specific symptoms indicative of cervical dysplasia, though general signs like irregular bleeding were more common. Conversely, patients with CIN III showed more severe symptoms, including significant bleeding and pain, which prompted more immediate attention.

Discussion :-

The results of this study highlight the importance of early detection in the prevention of cervical cancer. As a precursor to ovarian cancer, cervical cancer can be asymptomatic in its early stages, making regular screening essential. The comparison between the Pap test and the CIN-DIAG test revealed significant differences in terms of diagnostic time and efficiency. While the Pap test remains the traditional method for detecting cervical abnormalities, it is time-consuming and dependent on skilled technicians to produce accurate results. This delay in diagnosis can be particularly problematic in settings where timely treatment is crucial.

The CIN-DIAG test, on the other hand, offers rapid results that facilitate quicker decision-making. This can be particularly beneficial in resource-limited settings where healthcare professionals may be under pressure to provide fast diagnoses and treatment. The high diagnostic efficiency of the CIN-DIAG test is consistent with previous research that suggests this method can be used as a more effective alternative to traditional tests, especially in large-scale screening programs. Furthermore, the prevalence of CIN II in 57.1% of Group 1 highlights the significance of screening for women who experience symptoms such as postcoital bleeding and pelvic pain. The detection of HPV in one patient also reinforces the strong link between HPV infection and cervical. HPV is a known risk factor for cervical cancer, and its detection provides a critical opportunity for early intervention. This finding underscores the need for incorporating HPV testing into cervical screening programs, in addition to dysplasia tests, to provide a more comprehensive assessment of a woman's cervical health. The study also points to the liquid-based cytology method as a valuable tool for histological analysis, offering enhanced accuracy and reliability compared to the traditional Pap test. The low prevalence of in the control group demonstrates the efficacy of the screening tools used in this study and suggests that they are effective in identifying abnormalities in women at risk of developing cervical cancer.

Conclusion

This study provides compelling evidence that early detection of cervical dysplasia using modern diagnostic methods, such as the CIN-DIAG test, is more efficient and less time-consuming than traditional methods like the Pap smear. The ability to obtain rapid results with the CIN-DIAG test can have a significant impact on patient outcomes, especially in countries like Uzbekistan, where cervical cancer rates are high, and screening resources may be limited. The study emphasizes the need for regular for all women of reproductive age, ideally every three years, to detect cervical dysplasia at an early stage. When abnormalities are detected, referral to oncology specialists should be made promptly to ensure appropriate treatment and prevent progression to cervical cancer. Additionally, integrating HPV vaccination into national health programs remains essential for reducing the risk of cervical dysplasia and cervical cancer in the long term. As part of a comprehensive cervical cancer prevention strategy, the use of both modern diagnostic tools like the CIN-DIAG test and HPV vaccination programs should be.

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