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Original Research Article

Histopathological Examination of Cervical Tissue Biopsy in a Tertiary Care Hospital

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Abstract:

Background: Histopathological examination of cervical tissue biopsies is a critical procedure for diagnosing cervical lesions and malignancies. This study aims to evaluate the diagnostic accuracy and histopathological patterns observed in cervical biopsies.

Materials and Methods: This retrospective study was conducted on 200 cervical tissue biopsies collected from women aged 25-60 years presenting with abnormal Pap smear results between January 2018 and December 2019. The tissue samples were fixed in 10% formalin, processed, and stained with Hematoxylin and Eosin (H&E). Histopathological evaluation was performed by two independent pathologists, and data were analyzed using SPSS software.

Results: Out of 200 biopsies, 122 (61%) showed benign lesions, 48 (24%) exhibited pre-malignant changes, and 30 (15%) were diagnosed with malignant tumors. The most common benign lesion was chronic cervicitis (45.5%), followed by cervical polyps (15.5%). Among pre-malignant cases, cervical intraepithelial neoplasia (CIN) I, II, and III accounted for 12%, 7.5%, and 4.5%, respectively. Squamous cell carcinoma was the predominant malignant finding, constituting 12.5% of the cases, while adenocarcinoma was observed in 2.5% of the cases. Inter-observer agreement between the pathologists was high, with a kappa value of 0.85.

Conclusion: Histopathological examination remains an indispensable tool for the accurate diagnosis of cervical lesions. The high prevalence of benign and pre-malignant lesions underscores the importance of regular screening and timely intervention. This study highlights the necessity of skilled histopathological evaluation to guide appropriate clinical management and improve patient outcomes.

Keywords: Cervical Histopathology, Pre-Malignant Changes, Cervical Cancer, Inter-Observer Agreement.

Introduction

Cervical cancer remains a significant public health concern globally, particularly in developing countries where it ranks as the second most common cancer among women [1]. The early detection and accurate diagnosis of cervical lesions are crucial for effective management and improved prognosis. Histopathological examination of cervical biopsies is the gold standard for diagnosing cervical lesions, ranging from benign conditions to pre-malignant changes and invasive carcinomas [2,3].

The transformation zone of the cervix is particularly susceptible to neoplastic changes, making it a critical area for biopsy and histopathological evaluation. Chronic cervicitis, cervical polyps, and cervical intraepithelial neoplasia (CIN) are commonly encountered lesions during histopathological examination [4]. The progression from CIN to invasive cervical cancer underscores the importance of identifying and treating pre-malignant lesions early [5].

Despite advances in screening methods, such as the Pap smear and HPV DNA testing, histopathological examination remains essential for confirming diagnoses and guiding treatment plans [6,7].

Accurate histopathological assessment can significantly impact patient management, particularly in cases of pre-malignant and malignant lesions where early intervention is critical [8].

This study aims to evaluate the histopathological patterns observed in cervical biopsies and assess the diagnostic accuracy of these examinations. By analyzing the distribution of various cervical lesions and the inter-observer agreement between pathologists, this research seeks to contribute to the existing knowledge on the effectiveness of

histopathological evaluations in cervical cancer prevention and management.

Materials and Methods

Study Design and Setting

This retrospective study was conducted examining cervical tissue biopsies collected between January 2018 and December 2019 in the department of Pathology, Nalanda Medical College, Patna.

Sample Collection

A total of 200 cervical tissue biopsies were obtained from women aged 25-60 years who presented with abnormal Pap smear results. The biopsies were performed using a cervical punch biopsy instrument under colposcopic guidance.

Tissue Processing and Staining

The collected tissue samples were fixed in 10% neutral buffered formalin for 24 hours. Following fixation, the tissues were dehydrated in ascending grades of ethanol, cleared in xylene, and embedded in paraffin wax. Serial sections of 4 micrometers were cut from the paraffin blocks using a microtome.

The sections were stained with Hematoxylin and Eosin (H&E) according to standard protocols. Briefly, the sections were deparaffinized in xylene, rehydrated through graded alcohols, stained in hematoxylin for 5 minutes, differentiated in acid alcohol, blued in running tap water, counterstained with eosin for 2 minutes, dehydrated, cleared, and mounted.

Histopathological Examination

Histopathological evaluation of the stained sections was performed independently by two experienced pathologists who were blinded to the clinical details. Each biopsy was assessed for the presence of benign, pre-malignant, or malignant lesions. The lesions were classified based on the World Health Organization (WHO) classification system for cervical neoplasia.

Data Analysis

The data were analyzed using SPSS software version 26.0. Descriptive statistics were used to summarize the distribution of different types of cervical lesions. The inter-observer agreement between the two pathologists was assessed using Cohen's kappa coefficient.

Statistical Methods

The prevalence of benign, pre-malignant, and malignant lesions was calculated as percentages of the total number of biopsies. The kappa coefficient was interpreted as follows: values ≤0.20 indicated poor agreement, 0.21-0.40 fair agreement, 0.41-0.60 moderate agreement, 0.61-0.80 substantial agreement, and 0.81-1.00 almost perfect agreement.

Results

Histopathological Findings

Out of the 200 cervical tissue biopsies examined, the distribution of histopathological findings is summarized in Table 1.

Table 1: Distribution of Histopathological Findings in Cervical Biopsies

Lesion Type	Number of Cases (n=200)	Percentage (%)
Benign Lesions	122	61
Pre-malignant Lesions	48	24
Malignant Lesions	30	15
Total	**200**	**100**

Among the benign lesions, chronic cervicitis was the most common finding, followed by cervical polyps, as detailed in Table 2.

Table 2: Breakdown of Benign Lesions

Benign Lesion Type	Number of Cases (n=120)	Percentage (%)
Chronic Cervicitis	91	45.5
Cervical Polyps	31	15.5

The distribution of pre-malignant lesions is shown in Table 3. Cervical intraepithelial neoplasia (CIN) was categorized into CIN I, II, and III.

Table 3: Breakdown of Pre-malignant Lesions

Pre-malignant Lesion Type	Number of Cases (n=50)	Percentage (%)
CIN I	24	12
CIN II	15	7.5
CIN III	9	4.5

For malignant lesions, squamous cell carcinoma was the predominant type, followed by adenocarcinoma, as outlined in Table 4.

Table 4: Breakdown of Malignant Lesions

Malignant Lesion Type	Number of Cases (n=30)	Percentage (%)
Squamous Cell Carcinoma	25	12.5
Adenocarcinoma	5	2.5

Inter-observer Agreement

The inter-observer agreement between the two pathologists was high, with a Cohen's kappa coefficient of 0.85, indicating almost perfect agreement. This high level of concordance underscores the reliability of the histopathological evaluations performed in this study.

Discussion

The histopathological examination of cervical tissue biopsies remains a cornerstone in the diagnosis and management of cervical lesions. In this study, we observed a significant prevalence of benign, pre-malignant, and malignant lesions, underscoring the importance of regular screening and early intervention.

Our findings indicated that 61% of the biopsies showed benign lesions, with chronic cervicitis being the most common (45.5%). This high prevalence aligns with previous studies that have identified chronic cervicitis as a frequent finding in cervical biopsies [1]. Cervical polyps, though less common, also represented a significant portion of benign lesions (15.5%). These findings highlight the importance of recognizing benign conditions that may present with symptoms similar to more severe pathologies.

Pre-malignant lesions, including CIN I, II, and III, accounted for 24% of the cases. The distribution of CIN grades observed in our study is consistent with other reports, which emphasize the progression from low-grade lesions (CIN I) to high-grade lesions (CIN III) and the potential for these lesions to develop into invasive cancer if left untreated [2,3]. This progression underscores the critical need for early detection and management of pre-malignant changes.

Malignant lesions were present in 15% of the biopsies, with squamous cell carcinoma being the predominant type (12.5%), followed by adenocarcinoma (2.5%). These results are in line with global data, which indicate that squamous cell carcinoma is the most common type of cervical cancer, accounting for approximately 70-80% of cases [4]. The identification of adenocarcinoma, although less frequent, is clinically significant due to its distinct etiology and potential for more aggressive behaviour [5]. The high level of inter-observer agreement (kappa = 0.85) between the pathologists in our study confirms the reliability of histopathological evaluations. This level of agreement is comparable to other studies that have reported kappa values ranging from 0.70 to 0.90 in the diagnosis of cervical lesions [6,7]. The consistency in diagnostic outcomes highlights the effectiveness of standardized histopathological criteria and the importance of experienced pathologists in achieving accurate diagnoses.

The significant proportion of pre-malignant and malignant lesions detected in our study reinforces the value of histopathological examination as an essential diagnostic tool. Regular cervical screening programs, such as Pap smears and HPV testing, should be complemented with histopathological evaluation to confirm diagnoses and guide treatment decisions [8]. Early intervention in pre-malignant stages can prevent the progression to invasive cancer, thereby reducing morbidity and mortality associated with cervical cancer.

While our study provides valuable insights into the histopathological patterns of cervical lesions, it is limited by its retrospective design and the potential for selection bias. Additionally, the study was conducted in a single institution, which may limit the generalizability of the findings. Future research should aim to include larger, multi-center cohorts to validate our results and explore the impact of different demographic and clinical factors on cervical lesion prevalence.

Conclusion

In conclusion, this study highlights the critical role of histopathological examination in the diagnosis and management of cervical lesions. The high prevalence of benign and pre-malignant lesions underscores the importance of regular screening and early intervention. The high inter-observer agreement further validates the reliability of histopathological assessments. Continued emphasis on histopathological evaluation, alongside advancements in screening technologies, is essential for improving cervical cancer outcomes.

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