

HISTOPATHOLOGICAL STUDY OF CERVICAL BIOPSY LESIONS: A RETROSPECTIVE STUDY

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ABSTRACT

Background: Cervical cancer remains a leading cause of morbidity and mortality among women worldwide, particularly in developing nations. Early detection of cervical lesions is crucial for reducing the incidence and mortality associated with cervical cancer. Histopathological examination of cervical biopsies plays a key role in diagnosing and managing these lesions, differentiating between benign, pre-malignant, and malignant conditions. This retrospective study aimed to assess the spectrum of histopathological lesions in cervical biopsy specimens, providing insights into the prevalence and distribution of different cervical pathologies. **Materials and Methods:** Conducted in a tertiary care hospital from January 2016 to December 2018, the study included 450 cervical biopsy specimens. The biopsies were processed, stained with Hematoxylin and Eosin, and analyzed by two pathologists for diagnostic accuracy. Lesions were classified into benign, pre-malignant, and malignant categories based on the World Health Organization (WHO) classification of cervical tumors. Descriptive statistics were used to evaluate the data. **Results:** Non-neoplastic lesions were the most prevalent, constituting 84.89% of cases, with chronic nonspecific cervicitis being the most common (52.89%). Pre-invasive lesions, including Cervical Intraepithelial Neoplasia (CIN), were observed in 3.11% of cases. Invasive lesions, including squamous cell carcinoma, accounted for 3.33% of cases. The age group most affected by cervical lesions was 41-50 years. **Conclusion:** Histopathological evaluation is essential for the accurate diagnosis of cervical lesions, particularly in distinguishing benign from malignant conditions. The findings highlight the need for enhanced cervical cancer screening programs, especially in high-risk populations, to improve early detection and patient outcomes.

Keywords: Cervical cancer, Histopathology, Cervical biopsy, Non-neoplastic lesions, Cervical Intraepithelial Neoplasia (CIN), Squamous cell carcinoma.

INTRODUCTION

Cervical cancer is a major health concern affecting women worldwide, ranking as one of the most common cancers among females, particularly in developing countries (1). The World Health Organization (WHO) estimates that over 570,000 new cases and 311,000 deaths occur annually due to cervical cancer, highlighting the urgent need for effective screening and diagnostic techniques (2). Early detection of cervical lesions plays a critical role in reducing mortality and improving patient outcomes, as most cervical cancers are preventable through timely identification and intervention (3).

Histopathological examination of cervical biopsies remains a cornerstone in diagnosing and managing

cervical lesions. It provides a definitive diagnosis, allowing for differentiation between benign, pre-cancerous, and malignant conditions (4). While the Pap smear and HPV testing are widely used for initial screening, histopathology offers more accurate characterization of lesions, enabling clinicians to establish appropriate treatment plans (5). This retrospective study aims to assess the spectrum of histopathological lesions observed in cervical biopsies, with an emphasis on understanding the distribution of various types of cervical pathology within the study population (6).

Cervical lesions range from benign conditions such as chronic cervicitis to more severe conditions like high-

grade squamous intraepithelial lesions (HSIL) and invasive carcinoma (7). The progression from normal epithelium to dysplasia and carcinoma is influenced by several risk factors, including persistent infection with high-risk human papillomavirus (HPV) strains, early onset of sexual activity, and multiple sexual partners (8). HPV is recognized as the primary etiological agent in the development of cervical cancer, with high-risk strains such as HPV-16 and HPV-18 accounting for approximately 70% of cases (9). Understanding the histopathological changes associated with HPV infection is essential for early detection and prognosis of cervical cancer (10).

This study retrospectively analyzes cervical biopsy specimens to evaluate the prevalence and types of cervical lesions encountered. By analyzing patient demographics, lesion types, and histological findings, the study seeks to provide valuable insights into the pattern of cervical pathologies within the population and to contribute to the existing literature on cervical cancer diagnosis and management (11). Such data are instrumental in designing better screening and management strategies for patients at risk of developing cervical cancer (12). The findings from this research may also help identify trends in histopathological diagnoses and contribute to the formulation of targeted public health policies aimed at reducing the incidence and burden of cervical cancer (13).

This study highlights the significance of histopathological evaluation in understanding the spectrum of cervical lesions and underscores its role in guiding clinical decisions, ultimately improving patient care and outcomes. The retrospective nature of this study allows for a comprehensive review of cervical biopsy specimens over a defined period, providing a deeper understanding of the histopathological patterns prevalent in the studied population.

MATERIALS AND METHODS

This retrospective study was conducted in the Department of Pathology at our tertiary care hospital, spanning a period of January 2016 to December 2018. The primary objective was to evaluate the histopathological patterns of cervical biopsy specimens received during the study period and to analyze the prevalence of different cervical lesions within the study population. Approval for this study was obtained from the Institutional Review Board (IRB), and all procedures adhered to ethical guidelines and patient confidentiality standards.

Study Population and Sample Collection: The study included a total of 450 cervical biopsy specimens collected from women presenting with symptoms such as abnormal vaginal bleeding, pelvic pain, post-coital bleeding, or abnormal findings on routine Pap smear screening. Only specimens with complete clinical information and adequate tissue samples were included in the analysis. Cases with incomplete data or inadequate biopsy material were excluded. The patients' demographic details, including age, clinical history, and presenting symptoms, were retrieved from medical records and documented systematically.

Histopathological Evaluation: All biopsy specimens were fixed in 10% neutral buffered formalin for 24 hours and then processed using standard histological techniques. The processed tissues were embedded in paraffin, sectioned at 3-5 micrometers thickness, and stained with Hematoxylin and Eosin (H&E). The stained sections were independently reviewed by two experienced pathologists to ensure diagnostic accuracy. Discrepancies, if any, were resolved through a consensus meeting.

The histopathological diagnoses were categorized according to the World Health Organization (WHO) classification of tumors of the uterine cervix. The lesions were broadly classified into benign, pre-malignant, and malignant categories. Benign conditions included chronic cervicitis, nabothian cysts, and endocervical polyps. Pre-malignant lesions were classified based on the Cervical Intraepithelial Neoplasia (CIN) grading system, as CIN I (low-grade squamous intraepithelial lesion), CIN II, and CIN III (high-grade squamous intraepithelial lesions). Malignant lesions included invasive squamous cell carcinoma, adenocarcinoma, and other rare subtypes.

Data Analysis: Data were entered and analyzed using (insert software name, e.g., SPSS version 25.0). Descriptive statistics were used to summarize the demographic and clinical characteristics of the patients. The prevalence of different histopathological diagnoses was calculated, and results were presented as frequencies and percentages. Age distribution was analyzed to identify the age group most affected by specific cervical lesions.

The study was conducted in compliance with the principles outlined in the Declaration of Helsinki. Due to the retrospective nature of the study and the use of anonymized data, the need for individual informed consent was waived by the IRB. All patient data were kept confidential, and no identifying information was

disclosed in any part of the research or publication process.

RESULTS

The results of this study provide an in-depth analysis of the spectrum of cervical lesions observed in 450 biopsy specimens. By categorizing these lesions into non-neoplastic, pre-invasive, and invasive types, the findings highlight the prevalence of chronic nonspecific cervicitis and emphasize the importance of early detection in preventing cervical cancer.

In this study of 450 patients, the majority were aged between 41 and 50 years, accounting for 41.56% of the total cases. The second largest age group was 31-40 years (21.33%), followed by 20-30 years (17.33%). Fewer cases were observed in the older age groups, with 10.44% in the 51-60 years range, 6.67% in the 61-70 years range, and only 2.67% between 71 and 80 years.

Table 1: Age Distribution

Age (in years)	No. of cases	% of cases
20-30	78	17.33%
31-40	96	21.33%
41-50	187	41.56%
51-60	47	10.44%
61-70	30	6.67%
71-80	12	2.67%
Total	450	100%

The clinical presentations of the patients are presented in the table below. The most common complaint was white discharge, followed by backache and abdominal pain. The most common clinical complaint was white discharge, reported by 69.33% of the patients. Backache and abdominal pain were the second most frequent, present in 22.67% of cases. Bleeding per vagina (3.33%), pelvic pain (3.11%), and dyspareunia (1.56%) were less common complaints. (Table 2)

Table 2: Clinical Complaints

Clinical Features	No. of cases	% of cases
White discharge	312	69.33%
Backache + Abdominal pain	102	22.67%
Bleeding per vagina	15	3.33%
Pelvic pain	14	3.11%
Dyspareunia	07	1.56%
Total	450	100%

Among the 450 cervical specimens, 84.89% were non-neoplastic lesions, making them the most common. Benign lesions accounted for 7.56% of cases, while pre-invasive lesions represented 4.22%, and invasive lesions, including malignancies, made up 3.33% of cases. (Table 3)

Table 3: Distribution of Cervical Lesions

Cervical Lesions	No. of Cases	% of Cases
Non-neoplastic	382	84.89%
Benign lesions	34	7.56%
Pre-invasive lesions	19	4.22%
Invasive lesions	15	3.33%
Total	450	100%

Table 4: Histopathological Distribution of Non-Neoplastic, Pre-Invasive, and Invasive Cervical Lesions

Cervical Lesions	No. of Cases	% of Cases
Chronic nonspecific cervicitis	238	52.89%
Chronic papillary endocervicitis	82	18.22%
Endocervical polyp	35	7.78%
Erosive cervicitis	23	5.11%
Pseudoepitheliomatous hyperplasia	15	3.33%
Cervical leiomyoma	18	4.00%
Carcinoma in situ	6	1.33%
CIN 1	8	1.78%
CIN 2	6	1.33%
CIN 3	4	0.89%
Squamous cell carcinoma	12	2.67%
Adenocarcinoma	3	0.67%
Total	450	100%

The table shows the distribution of cervical lesions in 450 patients, with chronic nonspecific cervicitis being the most common (52.89%), followed by chronic papillary endocervicitis (18.22%). Endocervical polyps (7.78%) and erosive cervicitis (5.11%) are also notable. Pre-cancerous conditions like CIN 1 (1.78%) and CIN 2 (1.33%) are less frequent, while squamous cell carcinoma (2.67%) and adenocarcinoma (0.67%) represent malignant cases. The majority of lesions are non-neoplastic, with inflammation being the predominant diagnosis. (Table 4)

DISCUSSION

The histopathological analysis of cervical biopsy specimens in this study provides significant perceptions into the spectrum of cervical lesions, demonstrating a diverse range of pathologies with varying degrees of severity. Among the 450 cases examined, the majority were non-neoplastic lesions, accounting for 84.89% of the total cases. Chronic nonspecific cervicitis emerged as the most prevalent condition, present in 52.89% of cases. This finding aligns with existing literature that identifies chronic cervicitis as a common benign condition affecting women, often associated with persistent inflammation and infection such as the studies done by Avani J et al (14) and Srivani S et al (15) in which non-neoplastic lesion were 73% and 79.7% respectively.

The second most frequent non-neoplastic condition was chronic papillary endocervicitis, which was observed in 18.22% of cases. Endocervical polyps, though less common, accounted for 7.78% of cases. These benign conditions are usually non-cancerous, yet they can contribute to a variety of clinical symptoms, such as abnormal vaginal bleeding and discharge, which were prominent complaints among the study population. Non-neoplastic lesions of the uterine cervix constitute a significant portion of gynecological specimens received by histopathology departments.

These lesions are of great clinical and pathological importance, yet they are often overlooked. Therefore, a more structured approach towards diagnosing these conditions is essential. Non-neoplastic lesions, such as cervical inflammatory disorders, can be either acute or chronic, and may arise due to infectious or non-infectious causes (16,17). Chronic non-specific cervicitis, in particular, is a common condition with various underlying etiologies, as noted by Paavonen et al. (18). This condition requires careful attention since it can lead to complications such as endometritis, salpingitis, and pelvic inflammatory disease due to the ascending spread of infection. Additionally, it may contribute to chorioamnionitis and could potentially initiate or promote the development of cervical neoplasia (19). Furthermore, HPV-related cervicitis has been observed to be on the rise globally, signaling an increasing trend that requires continuous monitoring and appropriate management (20).

In terms of pre-invasive lesions, the prevalence was relatively low, with Cervical Intraepithelial Neoplasia (CIN) detected in 1.33 % of cases. CIN is an important precursor to cervical cancer, with the progression from CIN 1 to CIN 3 marking an increasing risk for invasive

cancer. The histopathological findings of this study showed that CIN 1 (low-grade squamous intraepithelial lesion) was the most frequently encountered pre-invasive lesion (1.78%), followed by CIN 2 (1.33%) and CIN 3 (0.89%). These results underscore the importance of early detection and intervention in pre-invasive lesions to prevent the progression to invasive carcinoma, a critical component in reducing cervical cancer incidence (21).

Invasive lesions, while representing a smaller percentage of cases (3.34%), are of particular concern due to their association with cervical cancer. Squamous cell carcinoma, the most common type of cervical cancer, was identified in 2.67% of the biopsy specimens. Adenocarcinoma, though rare, accounted for 0.67% of cases. These findings are consistent with global statistics, where squamous cell carcinoma remains the predominant histological type of cervical cancer, particularly in populations with high-risk human papillomavirus (HPV) exposure (22). The association between high-risk HPV strains, particularly HPV-16 and HPV-18, and the development of cervical cancer is well-established, and this study highlights the necessity of robust screening programs for early detection of HPV-related lesions.

The study also analyzed patient demographics and clinical presentations. The age group most affected by cervical lesions was 41-50 years, which accounted for 41.56% of the cases. This is consistent with epidemiological studies showing that the peak incidence of cervical cancer occurs in women aged 35-50 years, emphasizing the need for targeted screening in this age group (23). The most common clinical symptom reported by the patients was white discharge, present in 69.33% of cases, followed by backache and abdominal pain. These symptoms, though often non-specific, are frequently associated with both benign and pre-malignant cervical conditions, further supporting the need for thorough histopathological examination in symptomatic patients.

In the study conducted by Thirukumar M et al. (24), patients with non-neoplastic cervical lesions presented with a variety of symptoms. Around 20.4% of the patients experienced whitish per vaginal discharge, while 18.9% presented with a mass in the vagina. The most common symptom was abnormal uterine bleeding, reported by 48.9% of the patients, and 6.1% had post-coital bleeding. Abdominal pain, although less frequent, was observed in 5.7% of the patients.

Similarly, in the study by Manoja et al. (25), the most common clinical complaint was white discharge, affecting 52% of the patients (130 cases). This was followed by

backache and abdominal pain, which were reported by 28% of patients (70 cases). Bleeding per vagina was observed in 12% of the cases (30 patients), and pelvic pain was present in 8% of the patients (20 cases).

This study, being retrospective in nature, has certain inherent limitations. The reliance on available medical records may have resulted in incomplete or missing data, particularly regarding patient history and clinical details. Additionally, the sample size, though significant, was confined to a single tertiary care hospital, which may limit the generalizability of the findings to broader populations. The absence of long-term follow-up data also restricts our ability to assess the progression of lesions or the effectiveness of subsequent treatments. Furthermore, since the study did not include molecular analysis, such as HPV typing, its contribution to understanding HPV-related lesions is limited.

CONCLUSION

The study underscores the importance of histopathological examination in diagnosing cervical lesions, as it remains a critical tool for distinguishing between benign, pre-malignant, and malignant conditions. Chronic nonspecific cervicitis was the most prevalent condition, while pre-invasive and invasive lesions, though less frequent, highlight the need for early detection and management. These findings emphasize the significance of regular cervical cancer screening, particularly in high-risk populations. By providing a clearer understanding of the spectrum of cervical lesions, this study contributes to improving clinical decision-making and potentially shaping public health strategies aimed at reducing the burden of cervical cancer.

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