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Histopathological Analysis of Cervical Lesions at a Tertiary Healthcare Center in India

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Abstract

Background

Cervical cancer remains a significant health challenge globally, particularly in low- and middle-income countries like India, where it ranks as the second most common cancer among women. Histopathological examination is critical in diagnosing and managing cervical lesions, ranging from benign conditions to malignant transformations.

Aim

This study aims to evaluate the histopathological characteristics of cervical lesions in women attending a tertiary healthcare center in India to improve early detection and management strategies.

Methods

A prospective study was conducted involving 135 female patients presenting with cervical lesions. Clinical data were collected, and cervical biopsies were performed. Histopathological analysis was conducted, and the results were statistically analyzed using SPSS version 23.0.

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Results

The study found that 44.4% of the patients had chronic cervicitis, 37% had cervical intraepithelial neoplasia (CIN), and 18.5% were diagnosed with invasive carcinoma (11.1% with squamous cell carcinoma and 7.4% with adenocarcinoma). A significant association was observed between abnormal vaginal bleeding and invasive squamous cell carcinoma ($p = 0.03$).

Conclusion

Chronic cervicitis and CIN were the most common histopathological findings, with a significant number of invasive carcinoma cases detected. The study emphasizes the importance of histopathological examination in managing cervical lesions, particularly in women presenting with abnormal vaginal bleeding.

Recommendations

The findings suggest the need for enhanced cervical cancer screening programs and the integration of molecular markers to improve diagnostic accuracy. Further studies should focus on the long-term outcomes of these histopathological findings to inform treatment guidelines.

Keywords

Cervical cancer, histopathology, cervical intraepithelial neoplasia, chronic cervicitis

Introduction

One of the biggest global public health concerns is still cervical cancer, especially in low- and middle-income nations. Cervical cancer is still the fourth most frequent malignancy among women worldwide, with an expected 604,000 new cases and 342,000 deaths in 2020 alone, despite advancements in screening and immunisation [1]. Cervical cancer is the second most frequent malignancy among women in India, accounting for a significant portion of the country's morbidity and death burden [2].
Cervical cancer aetiology is intimately associated with long-term infection with high-risk HPV strains, especially HPV-16 and HPV-18 [3]. These infections may cause precursor

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lesions called cervical intraepithelial neoplasia (CIN), which may take years or decades to develop into invasive cervical cancer if treatment is not received.

Cervical lesion histopathological investigation is essential for identifying and categorising lesions, directing treatment, and forecasting results. Cervical lesions have a wide histopathological spectrum, ranging from benign inflammatory disorders like chronic cervicitis to precancerous alterations like CIN and malignant transformations like adenocarcinoma and squamous cell carcinoma [5]. The right course of treatment for low-grade lesions can be determined by conservative management and follow-up; for high-grade lesions and invasive malignancies, more aggressive procedures, including surgery or radiation, may be necessary [6]. Accurate histopathological diagnosis is crucial to this process.

In order to improve diagnostic accuracy and more accurately anticipate the behaviour of cervical lesions, it is crucial to integrate histopathological results with molecular and immunohistochemical markers, as recent studies have shown [7]. Improvements in biomarker research have made it easier to distinguish between low-risk and high-risk lesions, which helps guide treatment choices. Examples of these developments include the discovery of p16INK4a and Ki-67 as markers for high-risk HPV-associated lesions [8]. Histopathological investigation continues to be an essential part of the diagnosis process for women presenting with cervical lesions in India, where access to healthcare and cervical cancer screening programs might be restricted [9]. In order to better understand the epidemiology and guide public health measures, more thorough studies that look at the histological patterns of cervical lesions in various demographic subsets are necessary. This study aims to evaluate the histopathological characteristics of cervical lesions in women attending a tertiary healthcare center in India to improve early detection and management strategies.

Methodology

Study Design

This study is a prospective descriptive cross-sectional analysis.

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Study Setting

The study was conducted at Patna Medical College and Hospital, a tertiary care center in India. This facility serves a large population, providing a diverse patient pool for the study.

Study Place

The research was carried out at Patna Medical College and Hospital, a well-established tertiary care center located in Patna, Bihar, India.

Participants

A total of 135 female patients with suspected cervical lesions were included in the study. These patients were either referred to the hospital for further evaluation or presented with symptoms suggestive of cervical pathology during the study period.

Inclusion and Exclusion Criteria

Inclusion Criteria:

- Female patients aged 18 years and above.
- Patients presenting with symptoms suggestive of cervical lesions (e.g., abnormal vaginal bleeding, pelvic pain, or discharge).
- Patients who consented to participate in the study and undergo the necessary diagnostic procedures.

Exclusion Criteria:

- Patients with a history of cervical cancer treatment.
- Patients with other gynecological malignancies.
- Pregnant women.
- Patients who did not consent to participate in the study.

Bias

Efforts were made to minimize bias by ensuring that the selection of participants was consecutive and that all eligible patients during the study period were considered for

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inclusion. Histopathological examination was performed by experienced pathologists who were blinded to the clinical details of the patients to avoid observer bias.

Data Collection

Data were collected from patient records, including demographic information, clinical presentation, and histopathological findings. Each participant underwent a cervical biopsy, and the specimens were processed and examined using standard histopathological techniques.

Procedure

Patients presenting with symptoms suggestive of cervical lesions underwent a detailed clinical examination. Based on clinical findings, cervical biopsies were performed. The biopsy specimens were fixed in 10% formalin, processed, and stained with Hematoxylin and Eosin (H&E). The slides were examined under a microscope by pathologists to identify and classify the cervical lesions.

Statistical Analysis

Data were entered into SPSS version 23.0 for analysis. Descriptive statistics summarized demographic data and histopathological findings. Categorical variables were expressed as frequencies and percentages, while continuous variables were summarized with means and standard deviations. Associations between clinical features and histopathological findings were tested using Chi-square and Fisher's exact tests, with significance set at $p < 0.05$.

Results

A total of 135 female patients were included in the study. The age of the participants ranged from 21 to 65 years, with a mean age of 42.8 ± 12.4 years. The majority of the patients (60%) were in the age group of 30-50 years. The distribution of patients by age group is shown in Table 1.

Table 1: Age Distribution of Patients

Age Group (years)	Number of Patients (n=135)	Percentage (%)
20-29	20	14.8
30-39	40	29.6

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40-49	41	30.4
50-59	26	19.3
60-69	8	5.9

The most common clinical symptom reported was abnormal vaginal bleeding, observed in 75 patients (55.6%), followed by pelvic pain in 40 patients (29.6%) and abnormal vaginal discharge in 20 patients (14.8%). The distribution of clinical symptoms is detailed in Table 2.

Table 2: Clinical Presentation of Patients

Clinical Symptom	**Number of Patients (n=135)**	**Percentage (%)**
Abnormal vaginal bleeding	75	55.6
Pelvic pain	40	29.6
Abnormal vaginal discharge	20	14.8

Histopathological examination revealed that 60 patients (44.4%) had chronic cervicitis, making it the most common finding. Cervical intraepithelial neoplasia (CIN) was observed in 50 patients (37%), with CIN I being the most prevalent, identified in 30 patients (22.2%). Invasive squamous cell carcinoma was diagnosed in 15 patients (11.1%), and adenocarcinoma was found in 10 patients (7.4%). The distribution of histopathological diagnoses is shown in Table 3.

Table 3: Histopathological Findings of Cervical Lesions

Histopathological Diagnosis	**Number of Patients (n=135)**	**Percentage (%)**
Chronic cervicitis	60	44.4
Cervical intraepithelial neoplasia (CIN)	50	37.0
- CIN I	30	22.2
- CIN II	10	7.4
- CIN III	10	7.4
Invasive squamous cell carcinoma	15	11.1
Adenocarcinoma	10	7.4

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A statistically significant association was found between the presence of abnormal vaginal bleeding and the diagnosis of invasive squamous cell carcinoma ($p = 0.03$). Patients with pelvic pain were more likely to be diagnosed with chronic cervicitis, but this association was not statistically significant ($p = 0.12$). The detailed statistical associations between clinical features and histopathological findings are summarized in Table 4.

Table 4: Association between Clinical Features and Histopathological Findings

Clinical Feature	**Histopathological Finding**	**Chi-square Value**	**p-value**
Abnormal vaginal bleeding	Invasive squamous cell carcinoma	4.70	0.03*
Pelvic pain	Chronic cervicitis	2.45	0.12
Abnormal vaginal discharge	Cervical intraepithelial neoplasia	1.98	0.16

*Statistically significant ($p < 0.05$).

Summary of Key Findings

- Chronic cervicitis was the most common histopathological finding, followed by cervical intraepithelial neoplasia.
- A significant association was found between abnormal vaginal bleeding and invasive squamous cell carcinoma.
- The study highlights the importance of histopathological examination in the diagnosis and management of cervical lesions, particularly in patients presenting with abnormal vaginal bleeding.

These results provide valuable insights into the prevalence and distribution of cervical lesions in the studied population and underscore the importance of timely and accurate diagnosis in the management of cervical pathologies.

Discussion

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The mean age of the participants was 42.8 years, with the majority (60%) being between 30 and 50 years old. This age distribution is typical for cervical lesions, as the risk of cervical abnormalities increases with age, particularly in women in their reproductive years and approaching menopause. The clinical presentation of the patients varied, with abnormal vaginal bleeding being the most common symptom, reported by 55.6% of the patients. Pelvic pain and abnormal vaginal discharge were also prevalent but less common, affecting 29.6% and 14.8% of the patients, respectively. These symptoms are often associated with a range of cervical pathologies, highlighting the importance of thorough clinical evaluation and diagnostic follow-up for women presenting with these symptoms.

Histopathological analysis revealed that chronic cervicitis was the most frequent diagnosis, found in 44.4% of the cases. This finding underscores the commonality of chronic inflammation in the cervix, which may be due to persistent infections or other irritative factors. (CIN) was diagnosed in 37% of the patients, with CIN I being the most common subtype. This suggests a significant burden of pre-cancerous lesions in the studied population, emphasizing the need for effective screening and early intervention strategies. The findings of invasive squamous cell carcinoma and adenocarcinoma, which were diagnosed in 11.1% and 7.4% of the patients, respectively were more concerning. These results highlight the critical role of histopathology in identifying malignant transformations in cervical tissue, particularly in patients with advanced or persistent symptoms.

A notable finding was the statistically significant association between abnormal vaginal bleeding and invasive squamous cell carcinoma ($p = 0.03$). This suggests that abnormal bleeding could be a key clinical indicator of malignancy, warranting prompt and thorough investigation in affected patients. Although pelvic pain was more commonly associated with chronic cervicitis, this association was not statistically significant, indicating that while pelvic pain is a common symptom, it may not be as strongly predictive of a specific histopathological outcome.

A retrospective study which was carried out at a government medical college in Ananthapuram, India, examined 448 patients from January 2017 to December 2018. It was discovered that 86.6% of cases were non-neoplastic; the most frequent neoplastic lesion was squamous cell carcinoma, while the most common non-neoplastic lesion was chronic non-specific [10].

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In a five-year period, 550 cervical samples from a Salem, South India, hospital were examined retrospectively. According to the study, 7.8% of lesions were neoplastic and 92.1% of lesions were non-neoplastic. In order to prohibit benign diseases from becoming malignant, the study stressed the significance of early diagnosis by histology [11].

A Two and a Half Year Prospective Investigation in Chhattisgarh, India's Tertiary Care Centre was done reviewing 485 instances between September 2017 and March 2020, this study found that cervicitis was the most frequent lesion in 74.1% of cases, which were not malignant. According to the study emphasised the need of early identification in lowering morbidity related to cervical lesions [12].

Conclusion

The results of this study underscore the diverse histopathological spectrum of cervical lesions in this patient population and highlight the importance of vigilant clinical and pathological assessment in managing cervical abnormalities. The significant association between abnormal vaginal bleeding and invasive carcinoma further reinforces the need for heightened clinical suspicion and early diagnostic intervention in patients presenting with this symptom.

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