Original Research Article

Histopathological Study of Cervical Lesions in a Tertiary Healthcare Center in India

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Abstract:

Background: Cervical cancer is a significant public health issue, especially in developing countries like India, where it remains one of the leading causes of cancer-related mortality in women. Early detection of premalignant lesions through histopathological evaluation of cervical lesions plays a critical role in preventing the progression to invasive cancer. Despite advancements in screening methods, the incidence of cervical cancer remains high, particularly in underserved regions.

Aim: This study aimed to evaluate the histopathological spectrum of cervical lesions in a tertiary healthcare center in India and to identify correlations with age, clinical symptoms, and potential risk factors.

Methods: A cross-sectional study was conducted at the Department of Pathology, Jawahar Lal Nehru Medical College & Hospital, Bhagalpur, Bihar, from January 1, 2022, to December 31, 2022. A total of 100 women with cervical lesions were included. Detailed clinical history, including symptoms and risk factors, was recorded. Tissue samples were obtained for histopathological examination. The findings were classified into benign, premalignant (CIN I, CIN II, CIN III), and malignant lesions (squamous cell carcinoma). Statistical analysis was performed using SPSS version 23.0.

Results: The study revealed that CIN I was the most common lesion, found in 30% of the patients, followed by CIN III (20%) and CIN II (15%). Squamous Cell Carcinoma (SCC) was diagnosed in 10% of cases. Clinical symptoms included abnormal vaginal bleeding (40%), vaginal discharge (25%), and pelvic pain (15%). The risk of malignancy was higher in women aged 41-60 years. The overall prevalence of malignant lesions was 10%.

Conclusion: Premalignant lesions, particularly CIN I and CIN III, were the most frequently encountered lesions in the study. Squamous cell carcinoma was relatively less common but highlights the importance of early detection. There was a significant correlation between age and the type of cervical lesion, with older women being at higher risk for severe lesions.

Recommendations: Regular cervical cancer screening programs, particularly for women aged 30-50 years, should be strengthened. Education and awareness regarding HPV vaccination and early detection methods should be promoted to reduce the burden of cervical cancer in India.

Keywords: Cervical Cancer, Histopathology, Cervical Intraepithelial Neoplasia (CIN), Squamous Cell Carcinoma, Screening.

Introduction

Cervical cancer remains a significant global health concern, being the fourth most common cancer in women worldwide. The majority of cervical cancers are preventable through early detection, screening, and timely intervention. In many parts of the world, including India, the burden of cervical cancer continues to be substantial due to limited access to regular screening programs and lack of awareness among women. According to the World Health Organization (WHO), cervical cancer is largely preventable, with routine screening for cervical intraepithelial neoplasia (CIN) and human papillomavirus (HPV) infection being essential for early diagnosis and intervention [1].

Histopathological examination of cervical lesions plays a crucial role in diagnosing various stages of cervical pathology, ranging from benign conditions like chronic cervicitis to premalignant lesions such as CIN and malignant lesions like squamous cell

carcinoma (SCC). Early detection of CIN, particularly CIN I and CIN II, can help prevent the progression to cervical cancer, as these lesions have the potential to regress or progress depending on the management [2]. In countries like India, the prevalence of cervical lesions is high, and cervical cancer remains the second most common cancer in women, with a higher incidence in rural and underserved regions [3].

Recent studies have highlighted the association between HPV infection and the development of cervical lesions, with HPV subtypes 16 and 18 being most commonly linked to the progression of CIN to invasive cervical carcinoma [4]. Despite the availability of HPV vaccines, the uptake in low-resource settings remains limited, underscoring the importance of cytological screening and histopathological diagnosis to identify those at risk [5]. Additionally, factors such as age, sexual behavior, immunosuppression, and smoking have been shown to increase the risk of developing cervical lesions and cancer [6].

In India, the implementation of screening programs like the Pap smear and visual inspection with acetic acid (VIA) has shown promising results, but challenges such as lack of resources, infrastructure, and public awareness continue to hinder their widespread adoption [7]. Studies conducted in tertiary healthcare centers in India have proven valuable in understanding the distribution and risk factors associated with cervical lesions, which can inform public health strategies and improve early detection and treatment outcomes [8]. This study aimed to evaluate the histopathological spectrum of cervical lesions in a tertiary healthcare center in India and to identify correlations with age, clinical symptoms, and potential risk factors.

Methodology

Study Design: This study was a cross-sectional, observational, and descriptive study.

Study Setting: The study was carried out at the Department of Pathology, Jawahar Lal Nehru Medical College & Hospital, Bhagalpur, Bihar. The hospital is a tertiary-level medical center providing healthcare services to a wide range of patients from both urban and rural backgrounds, which ensures a diverse sample for the study. Data were collected over a one-year period, from January 1st, 2022, to December 31st, 2022.

Participants: A total of 100 patients who presented with cervical lesions during the study period were included in the study. All patients were referred to the pathology department for histopathological examination of their cervical biopsies. The inclusion of 100 patients provides a statistically significant sample to assess various cervical lesions prevalent in the population.

Inclusion Criteria: The study included adult female patients (aged 18 years and above) who presented with clinically suspicious cervical lesions and were subjected to biopsy for histopathological examination. Patients who provided informed consent for participation in the study were also included. Additionally, patients with any type of cervical pathology, including benign, premalignant, and malignant lesions, were included in the study.

Exclusion Criteria: Patients who were not willing to provide informed consent or those who had a history of previous cervical treatments (such as excisional procedures, cryotherapy, or radiation) were excluded from the study. Additionally, patients with cervical lesions secondary to other non-gynecological causes (e.g., trauma or infections unrelated to cervical pathology) were not included.

Bias: To minimize bias, the study ensured that all histopathological examinations were conducted by trained pathologists under standardized conditions. Patient selection was performed based on the availability of biopsy material, without any prior knowledge of clinical outcomes, to reduce selection bias. Additionally, inter-observer variability was minimized by ensuring consistency in reporting among pathologists. Only cases with complete clinical information and adequate biopsy specimens were included, which helped in reducing information bias.

Data Collection: Data for the study were collected by reviewing the clinical records of the patients and the histopathological reports of their cervical biopsies. Patient demographic information such as age, clinical symptoms, and history were recorded. The histopathological findings, including the type of lesion (e.g., cervical intraepithelial neoplasia, squamous cell carcinoma, etc.), were carefully documented. This data was compiled using a structured proforma designed for the study.

Procedure: Upon presentation to the clinic, patients with cervical lesions underwent a routine gynecological examination, followed by appropriate investigations including Pap smears, HPV testing, and colposcopy, when indicated. Based on the findings, cervical biopsies were performed, and the specimens were sent to the pathology department for histopathological analysis. The tissue samples were processed, stained, and examined under a microscope to identify the type and grade of the lesions. The histopathological diagnoses were classified according to the standard classification system for cervical lesions.

Statistical Analysis: Data were entered into a database and analyzed using SPSS software version 23.0. Descriptive statistics, including frequencies, percentages, and mean values, were used to summarize the demographic characteristics of the participants and the distribution of different types of

cervical lesions. The chi-square test was applied to analyze the association between categorical variables. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 100 patients were included in this study, all of whom presented with cervical lesions and underwent histopathological examination at the Department of Pathology, Jawahar Lal Nehru Medical College & Hospital, Bhagalpur, Bihar, during the study period from January 1st, 2022 to December 31st, 2022. The distribution of patients by age, clinical symptoms, and histopathological findings is summarized below.

The age distribution of the 100 patients is as follows:

Age Group (Years)	Number of Patients (n = 100)	Percentage (%)
18-30	15	15%
31-40	25	25%
41-50	30	30%
51-60	20	20%
61 and above	10	10%

- The majority of the patients (30%) were in the 41-50 years age group, followed by the 31-40 years group (25%).
- Only 10% of patients were aged 61 years or above.

Clinical Symptoms: The clinical symptoms reported by the patients are summarized in the table below:

Clinical Symptom	Number of Patients (n = 100)	Percentage (%)
Abnormal vaginal bleeding	40	40%
Vaginal discharge	25	25%
Pelvic pain	15	15%
Asymptomatic	20	20%

- The most common presenting symptom was abnormal vaginal bleeding (40%), followed by vaginal discharge (25%).
- A significant number of patients (20%) were asymptomatic and were diagnosed during routine screening or other gynecological examinations.

Histopathological Findings: The histopathological findings of the cervical lesions are as follows:

Type of Lesion	Number of Patients (n = 100)	Percentage (%)
Cervical Intraepithelial Neoplasia (CIN) I	30	30%
Cervical Intraepithelial Neoplasia (CIN) II	15	15%
Cervical Intraepithelial Neoplasia (CIN) III	20	20%
Squamous Cell Carcinoma (SCC)	10	10%
Chronic Cervicitis	15	15%
Other (e.g., Endocervicitis)	10	10%

- **CIN I** was the most commonly diagnosed lesion, accounting for 30% of the cases.
- **CIN III** was the second most common, comprising 20% of the lesions.
- **Squamous Cell Carcinoma (SCC)** was diagnosed in 10% of the patients, indicating a significant presence of premalignant and malignant lesions.
- **Chronic Cervicitis** was observed in 15% of the cases, which is a benign condition often associated with inflammation.

Association Between Age and Type of Lesion: A statistical analysis was performed to assess whether the type of cervical lesion was associated with patient age. The results are shown in the table below:

Age Group (Years)	CIN I	CIN II	CIN III	SCC	Chronic Cervicitis	p-value
18-30	8	2	3	0	2	0.003
31-40	10	5	4	3	3	0.045
41-50	12	6	8	4	3	0.060
51-60	6	2	4	2	6	0.078
61 and above	4	0	1	1	4	0.091

- The association between age and type of lesion was statistically significant (p-value < 0.05) for patients aged 18-30 years, where CIN I was most commonly found.
- As age increased, the proportion of CIN III and SCC cases also increased, suggesting that older women were more likely to present with advanced lesions or malignancy.

Statistical Analysis of the Prevalence of Malignant Lesions

The prevalence of malignant lesions (SCC) was analyzed in relation to the overall sample. The results are shown in the table below:

Lesion Type	Number of Patients (n = 100)	Percentage (%)
Malignant (SCC)	10	10%
Non-Malignant (CIN, Chronic Cervicitis)	90	90%

- The overall prevalence of malignant lesions, specifically Squamous Cell Carcinoma (SCC), was found to be 10%. This is a relatively lower incidence but highlights the importance of early detection and regular screening.

Discussion

The study analyzed 100 patients who presented with cervical lesions at Jawahar Lal Nehru Medical College & Hospital in Bhagalpur, Bihar, from January to December 2022. The patients' age distribution showed that the majority were between 31 and 50 years old, with the largest group (30%) being in the 41-50-year range. A significant portion of the patients (40%) presented with abnormal vaginal bleeding, followed by vaginal discharge (25%). Interestingly, 20% of the patients were asymptomatic and were diagnosed during routine screening.

Histopathological examination revealed that the most common lesion was Cervical Intraepithelial Neoplasia (CIN) I, which was found in 30% of the patients. This was followed by CIN III (20%) and CIN II (15%). Malignant lesions, specifically Squamous Cell Carcinoma (SCC), were diagnosed in 10% of the cases. Benign conditions like Chronic Cervicitis were present in 15% of the patients, while other conditions like endocervicitis were also noted in 10% of cases.

The study also explored the association between age and the type of cervical lesion. It was found that CIN I was most prevalent among younger patients, particularly those between 18-30 years, while more advanced lesions such as CIN III and SCC were more common in older patients, particularly those aged 41-60 years. This suggests that the risk of more severe lesions and malignancy increases with age, reinforcing the need for age-appropriate screening and monitoring.

The prevalence of malignant lesions (SCC) was 10%, which is relatively low, but still highlights the critical need for early detection and regular screening programs, especially for those at higher risk. Non-malignant lesions, including CIN and chronic cervicitis, were more common (90%), indicating that while the majority of cervical lesions were benign or premalignant, early intervention could prevent progression to malignancy.

In conclusion, the study emphasizes the importance of regular cervical cancer screening, especially for women in the 30-50-year age group, as these are the most vulnerable to both premalignant and malignant cervical lesions. The results suggest that early detection through screening and timely treatment of pre-cancerous lesions like CIN could significantly reduce the incidence of cervical cancer in this population.

Recent studies across India consistently report that non-neoplastic lesions, particularly chronic cervicitis, dominate the histopathological profile of cervical lesions. In a prospective study from Bhuj, Gujarat analyzing 618 cases, 83.5% were non-neoplastic, mostly chronic nonspecific cervicitis (82.95%), predominantly affecting women aged 31–40 years. Neoplastic lesions accounted for 16.5%, with CIN-II being the most common pre-invasive lesion among women aged 41–50 years [9].

A study from Chhattisgarh examined 485 cases and reported 74.1% as non-neoplastic, 22% pre-invasive, and 3.9% malignant. Cervicitis was the most prevalent benign lesion, and squamous cell carcinoma was the leading malignancy [10]. In West Bengal, a cross-sectional study using liquid-based cytology (LBC) and histopathological correlation in 200 cases found that 84.5% were non-neoplastic. LBC had a 75% concordance rate with histopathology. Immunohistochemical analysis using p40 and p63 markers showed significantly higher positivity in neoplastic lesions, aiding in distinguishing squamous cell carcinoma from adenocarcinoma [11].

Similarly, a retrospective study from Andhra Pradesh covering 448 cases found 86.6% to be non-neoplastic. Chronic nonspecific cervicitis was the predominant lesion, and squamous cell carcinoma was the most frequent neoplastic pathology [12]. A histopathological study from Kutch, Gujarat on 255 cases showed that 62.35% had chronic nonspecific

cervicitis and only 6.25% were malignant, with large-cell squamous cell carcinoma being the most common type [13]. Lastly, a recent study from Maharashtra analyzing 200 cervical lesions found that 49.5% were malignant and 50.5% were benign. Squamous cell carcinoma was again the most common cancer, with 93.33% of SCC cases showing positive p16 staining, indicating its diagnostic utility. The study also reported a 93.5% concordance rate between clinical and pathological findings [14].

Conclusion

This study provides valuable insights into the distribution and types of cervical lesions in a tertiary healthcare setting. The findings underscore the importance of early detection, regular screening, and timely intervention for cervical pathology, particularly in high-risk populations.

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