Research Article

INTERNATIONAL RESEARCH JOURNAL OF PHARMACY

www.irjponline.com

ISSN 2230-8407 [LINKING]

HISTOPATHOLOGICAL SPECTRUM OF CERVICAL LESIONS IN CERVICAL BIOPSY SPECIMENS: A PROSPECTIVE OBSERVATIONAL STUDY

Dr. Pooja Kayande

Assistant Professor, Department of Pathology, SRM Medical College Hospital and Research Centre, Kattankulathur, Tamil Nadu

Email Id: waghpoojakayande@gmail.com

How to cite: Kaynade P. Histopathological Spectrum of Cervical Lesions in Cervical Biopsy Specimens: A Prospective Observational Study. International research journal of pharmacy. 2013; 4:11:91-95.

Doi: 107897/2230-8407.041120

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ABSTRACT

Background: Cervical lesions form an important group of gynecological pathology specimens and include inflammatory, premalignant, and malignant conditions. Although many cervical lesions are benign and inflammatory, premalignant and malignant lesions remain clinically significant because early diagnosis can prevent progression to invasive cervical cancer.

Aim: To evaluate the histopathological spectrum of cervical lesions in cervical biopsy specimens and correlate them with clinical presentation.

Methods: A prospective observational study was conducted in the Department of Pathology among 130 cervical biopsy specimens received for histopathological examination. Clinical details, including age, symptoms, parity, clinical findings, and provisional diagnosis, were collected from pathology requisition forms. All biopsy specimens were fixed in 10% formalin, processed routinely, stained with hematoxylin and eosin, and examined microscopically. Lesions were categorized into inflammatory, premalignant, and malignant groups.

Results: The mean age of patients was 42.8 ± 11.6 years. Most patients belonged to the 31–40-year and 41–50-year age groups. White discharge per vaginum was the most common presenting complaint, followed by unhealthy cervix and irregular bleeding. Chronic cervicitis was the most common histopathological diagnosis, followed by chronic cervicitis with squamous metaplasia and cervical intraepithelial neoplasia. Inflammatory lesions constituted the majority of cases. Squamous cell carcinoma was the most common malignant lesion. Advancing age showed significant association with malignant cervical lesions. Among patients with postcoital bleeding, high-grade cervical intraepithelial neoplasia and squamous cell carcinoma were important findings.

Conclusion: Inflammatory cervical lesions constituted the majority of cervical biopsy findings, with chronic cervicitis being the predominant diagnosis. Premalignant and malignant lesions were also identified in a clinically important proportion of cases. Histopathological examination remains essential for definitive diagnosis, grading of cervical intraepithelial neoplasia, and early detection of invasive malignancy.

Keywords: Cervical Biopsy, Cervical Intraepithelial Neoplasia, Cervical Lesions, Histopathology, Pathology, Squamous Cell Carcinoma.

INTRODUCTION

Cervical lesions are among the most common gynecological conditions encountered in clinical and histopathological practice. They include a wide spectrum ranging from benign inflammatory changes to premalignant epithelial abnormalities and invasive carcinoma. The cervix is exposed to repeated physiological, infective, hormonal, and traumatic influences, making it vulnerable to chronic inflammation, epithelial metaplasia, dysplasia, and neoplasia. The cervix is an important site for both inflammatory and neoplastic pathology, where microscopic examination plays a central role in diagnosis and classification.[1]

Cervical cancer continues to be a major public health problem among women, particularly in developing countries where organized screening coverage may be limited. Cervical cancer contributes substantially to the global cancer burden and

remains an important cause of cancer-related mortality among women.[2] The disease is largely preventable when premalignant lesions are detected early and treated appropriately. Therefore, evaluation of cervical biopsy specimens is important not only for diagnosis but also for prevention of invasive carcinoma.

Persistent infection with high-risk human papillomavirus is the most important etiological factor in cervical carcinogenesis. Human papillomavirus is present in the vast majority of invasive cervical cancers and is considered a necessary cause of cervical carcinoma.[3] However, HPV infection alone is usually not sufficient for malignant transformation. Additional factors such as persistence of infection, immune response, smoking, early sexual activity, multiple sexual partners, high parity, and lack of screening may influence progression from infection to dysplasia and invasive cancer.

The biological progression from normal squamous epithelium to cervical intraepithelial neoplasia and invasive carcinoma occurs over a period of time in many patients. Cervical carcinogenesis is a multistep process involving persistent HPV infection, epithelial transformation, and development of premalignant lesions.[4]

Patients with cervical lesions may present with white discharge per vaginum, postcoital bleeding, irregular bleeding, lower abdominal pain, backache, or an unhealthy-looking cervix on speculum examination. Some premalignant lesions may remain asymptomatic and may be detected only during screening or evaluation of abnormal cytology. Postcoital bleeding is particularly important because it may be associated with high-grade cervical lesions or invasive carcinoma and should not be ignored.

Screening methods such as Pap smear cytology, visual inspection with acetic acid, and HPV testing have contributed to early detection of cervical epithelial abnormalities. Effective cervical cancer screening programmes can reduce disease burden when they ensure adequate coverage, diagnosis, treatment, and follow-up.[5] Nevertheless, screening tests are primarily detection tools, and histopathological confirmation is necessary for definitive diagnosis and further management.

Histopathological examination of cervical biopsy specimens remains the gold standard for evaluating cervical pathology. It helps distinguish inflammatory lesions from cervical intraepithelial neoplasia and invasive malignancy. HPV-related epithelial change has a central role in cervical cancer development, but microscopic assessment remains essential for confirming the grade and extent of lesions.[6]

The present study was therefore conducted to evaluate the histopathological spectrum of cervical lesions in cervical biopsy specimens and to correlate the findings with clinical presentation.

MATERIALS AND METHODS

This prospective observational study was conducted in the Department of Pathology of a tertiary care teaching hospital during the year. A total of 130 cervical biopsy specimens received for histopathological examination were included in the study.

Cervical biopsy specimens received from patients undergoing evaluation for clinical symptoms or abnormal cervical findings were included. Specimens with inadequate tissue, autolyzed material, or insufficient clinical information were excluded from final analysis. Relevant clinical details were obtained from histopathology requisition forms and available records. These included patient age, presenting complaints, parity where recorded, clinical examination findings, appearance of cervix, provisional diagnosis, and indication for biopsy.

The presenting complaints considered in the study included white discharge per vaginum, irregular bleeding, postcoital bleeding, lower abdominal pain, and unhealthy cervix noted on gynecological examination. Special attention was given to postcoital bleeding because of its possible association with high-grade cervical intraepithelial lesions and invasive malignancy.

All biopsy specimens were fixed in 10% formalin and processed by routine paraffin embedding technique. Sections were cut and stained with hematoxylin and eosin. Microscopic examination was performed to identify epithelial changes, inflammatory infiltrate, squamous metaplasia, dysplasia, stromal invasion, glandular lesions, and malignant features. Histopathological diagnoses were categorized as inflammatory, premalignant, or malignant lesions.

Inflammatory lesions included chronic cervicitis and chronic cervicitis with squamous metaplasia. Premalignant lesions included cervical intraepithelial neoplasia grades I, II, and III. Malignant lesions included squamous cell carcinoma and adenocarcinoma. Cervical intraepithelial neoplasia was graded according to the degree of epithelial thickness involved by dysplastic changes.

Data were entered into a structured data sheet and analyzed using SPSS software version 16. Categorical variables were expressed as frequencies and percentages. The Chi-square test was used to evaluate the association between age group and malignant cervical lesions. A p-value less than 0.05 was considered statistically significant. Institutional ethical committee approval was obtained prior to commencement of the study. Patient confidentiality was maintained throughout the study.

RESULTS

A total of 130 cervical biopsy specimens were evaluated during the study period. The mean age of patients was 42.8 ± 11.6 years.

Table 1: Age Distribution of Study Participants

Age Group (Years)	Frequency (%)
<30	20 (15.4)
31–40	42 (32.3)
41–50	40 (30.8)
>50	28 (21.5)

The majority of patients belonged to the 31–40-year age group, accounting for 42 (32.3%) cases, followed closely by the 41–50-year age group with 40 (30.8%) cases. Thus, most cervical biopsy specimens were received from women in the reproductive and perimenopausal age groups.

Table 2: Clinical Presentation Among Study Participants

Clinical Feature	Frequency (%)
White discharge per vaginum	54 (41.5)
Irregular bleeding	38 (29.2)
Postcoital bleeding	22 (16.9)
Lower abdominal pain	34 (26.2)
Unhealthy cervix	48 (36.9)

White discharge per vaginum was the most common presenting complaint, observed in 54 (41.5%) patients. An unhealthy cervix was recorded in 48 (36.9%) cases, while irregular bleeding and lower abdominal pain were also frequent clinical presentations. Postcoital bleeding was reported by 22 (16.9%) patients.

Table 3: Histopathological Spectrum of Cervical Lesions

Histopathological Diagnosis	Frequency (%)
Chronic cervicitis	58 (44.6)
Chronic cervicitis with squamous metaplasia	24 (18.5)
CIN I	14 (10.8)
CIN II	10 (7.7)
CIN III	8 (6.2)
Squamous cell carcinoma	12 (9.2)
Adenocarcinoma	4 (3.1)

Chronic cervicitis was the most common histopathological diagnosis, followed by chronic cervicitis with squamous metaplasia. Among premalignant lesions, CIN I was the most frequent. Squamous cell carcinoma was the predominant malignant lesion, observed in 12 (9.2%) cases.

Table 4: Distribution of Inflammatory, Premalignant, and Malignant Lesions

Lesion Category	Frequency (%)
Inflammatory lesions	82 (63.1)
Premalignant lesions	32 (24.6)
Malignant lesions	16 (12.3)

Inflammatory lesions constituted the majority of cervical biopsy findings, accounting for 82 (63.1%) cases. Premalignant lesions were observed in 32 (24.6%) cases, while malignant lesions were diagnosed in 16 (12.3%) patients.

Table 5: Association Between Age and Malignant Cervical Lesions

Age Group	Malignant Lesions n (%)	p-value
<40 years	2 (3.2)	<0.001
41–50 years	6 (15.0)	
>50 years	8 (28.6)	

Malignant cervical lesions demonstrated a significant association with advancing age. The proportion of malignant lesions was highest among women above 50 years, where 8 (28.6%) patients had malignant pathology.

Table 6: Histopathological Findings in Patients with Postcoital Bleeding

Histopathological Diagnosis	Frequency (%)
Chronic cervicitis	6 (27.3)
CIN II/CIN III	8 (36.4)
Squamous cell carcinoma	8 (36.4)

Among patients presenting with postcoital bleeding, high-grade cervical intraepithelial neoplasia and squamous cell carcinoma were common findings. Each accounted for 8 (36.4%) cases, indicating that postcoital bleeding requires careful evaluation and biopsy when clinically indicated.

DISCUSSION

The present prospective observational study evaluated the histopathological spectrum of cervical lesions in 130 cervical biopsy specimens. Inflammatory lesions formed the majority of cases, while premalignant and malignant lesions together constituted a clinically significant proportion. Chronic cervicitis was the most common diagnosis, and squamous cell carcinoma was the predominant malignant lesion.

The majority of patients belonged to the 31–50-year age group. This finding is comparable with Anorlu, who reported that cervical pathology and cervical cancer are commonly encountered among adult women in the reproductive and perimenopausal age groups in developing regions.[7] In the present study, biopsy specimens were most frequently received from middle-aged women, which may reflect the age at which symptoms such as discharge, bleeding, and unhealthy cervix become clinically apparent and lead to gynecological evaluation.

White discharge per vaginum was the most common presenting complaint. This finding is consistent with the predominance of inflammatory lesions in the study. Chronic cervicitis commonly presents with discharge, pelvic discomfort, and an unhealthy cervix. Omoniyi-Esan et al. reported that chronic cervicitis and other benign lesions are frequently encountered in cervical biopsy specimens.[8] The high frequency of inflammatory pathology in the present study supports the need for proper clinical treatment of infection and inflammation while maintaining vigilance for coexisting dysplasia.

Chronic cervicitis was the most common histopathological diagnosis, accounting for 44.6% of cases. Chronic cervicitis with squamous metaplasia was also frequent. Squamous metaplasia is a common reparative epithelial response in the transformation zone and may occur in relation to chronic irritation, infection, and hormonal influences. Although it is usually benign, the transformation zone is also the site where HPV-related dysplastic changes commonly arise, making careful microscopic evaluation important.

Premalignant lesions accounted for 24.6% of cases. Forae et al. reported that cervical biopsies may show a wide range of lesions, with inflammatory lesions predominating but cervical intraepithelial neoplasia forming an important group requiring clinical attention.[9] In the present study, CIN I was the most common premalignant lesion, followed by CIN II and CIN III. Identification of CIN is important because these lesions represent a precursor stage in cervical carcinogenesis and can be treated before progression to invasive malignancy.

HPV-related dysplasia is central to the development of cervical cancer. Bosch et al. reviewed the relationship between HPV and cervical cancer and emphasized the role of persistent high-risk HPV infection in cervical neoplasia.[10] Although HPV testing was not performed in the present study, the presence of CIN and squamous cell carcinoma reflects the importance of HPV-associated pathology in cervical disease. Integration of cytology, HPV testing, colposcopy, and biopsy can improve early detection where facilities are available.

Squamous cell carcinoma was the most common malignant lesion in the present study. Ferlay et al. documented that cervical cancer remains an important global malignancy among women, particularly in regions where screening coverage is inadequate.[11] The predominance of squamous cell carcinoma is expected because most cervical cancers arise from the squamous epithelium of the transformation zone. Adenocarcinoma was less common in the present study but remains clinically important because glandular lesions may be more difficult to detect by routine screening.

Advancing age showed a significant association with malignant cervical lesions. Franco et al. described cervical cancer development as a progressive process influenced by persistent HPV infection, age, screening history, and other cofactors.[12] In the present study, malignancy was more frequent among women above 50 years. This may be related to delayed diagnosis, long duration of undetected premalignant disease, lack of regular screening, and late presentation after symptoms develop.

Postcoital bleeding was an important clinical symptom in the present study. Among patients presenting with postcoital bleeding, high-grade CIN and squamous cell carcinoma were common findings. Shalini et al. observed that postcoital bleeding may be associated with significant cervical pathology and should be evaluated carefully.[13] The present findings

support the need for prompt speculum examination, cytology where appropriate, colposcopic evaluation, and biopsy in women presenting with postcoital bleeding, especially when the cervix appears unhealthy.

The role of histopathology in cervical lesions remains essential despite the availability of screening methods. Cytology and HPV testing help identify women at risk, but biopsy provides tissue diagnosis, confirms the grade of intraepithelial neoplasia, and identifies invasive carcinoma. Kumar et al. emphasized that pathology of cervical disease requires careful assessment of epithelial maturation, nuclear atypia, mitotic activity, stromal invasion, and glandular involvement.[14] Histopathological diagnosis therefore directly guides further treatment.

The present study also highlights the public health importance of cervical cancer screening. Sankaranarayanan et al. demonstrated that organized screening and appropriate management can reduce the burden of cervical cancer.[15] In settings where many women present symptomatically rather than through screening, cervical biopsy plays a vital role in diagnosing lesions that may otherwise remain undetected. Strengthening awareness, screening uptake, early referral, and followup of abnormal results are essential for reducing morbidity and mortality.

CONCLUSION

Inflammatory cervical lesions constituted the majority of cervical biopsy findings in the present study, with chronic cervicitis being the most common diagnosis. Premalignant lesions, particularly cervical intraepithelial neoplasia, were observed in a significant proportion, while squamous cell carcinoma was the predominant malignant lesion. Advancing age was significantly associated with malignant cervical pathology. Postcoital bleeding was frequently associated with high-grade CIN and squamous cell carcinoma, indicating the need for careful evaluation of this symptom. Histopathological examination remains the definitive diagnostic method for cervical lesions and plays an important role in early detection, grading, and management of premalignant and malignant cervical disease.

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