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HISTOMORPHOLOGICAL SPECTRUM OF ENDOSCOPIC BIOPSIES IN COLITIS IN TERTIARY CARE CENTRE – AN INSTITUTIONAL EXPERIENCE

Dr. Anshu Gupta Devra [1], Dr. Sonam Jain [2], Dr. Neema Tiwari [3] and Dr. Vatsala Gupta [4]*

[1] Professor & Head, Department of Pathology, School of Medical Sciences & Research.
[2] Junior Resident, Department of Pathology, School of Medical Sciences & Research.
[3, 4] Assistant Professor, Department of Pathology, School of Medical Sciences & Research.
(*Corresponding Author)

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Abstract

Introduction- Inflammatory bowel diseases (IBDs) includes ulcerative colitis (UC) and crohn's disease (CD). Both are chronic recurring conditions affecting gastrointestinal tract, differing in disease course, complication and management. Accurate histopathological assessment is needed, first to distinguish IBDs from non-IBDs colitis and secondly in case of IBDs to discern between ulcerative colitis and Crohn's disease. Aims and objectives - The aim of this study is to display the histomorphological spectrum of changes observed in endoscopic biopsy specimens performed on patient with history suggestive of colitis, thereby highlighting the pertinent changes that can lead to reliable recognition of IBD from non IBD colitis and further sub classify IBDs as UC and CD. Material and methods – 30 endoscopic biopsies performed in patients suspected of IBDs for a period of 1 year were taken into account. Histomorphological changes noted were-1) Architectural abnormalities – surface ulceration, crypt distortion and crypt atrophy 2) Inflammation – lymphoplasmacytic / neutrophilic, cryptitis, crypt abscess, granuloma 3) Epithelial changes- mucin depletion. Initial diagnosis of IBD versus non IBD colitis was made. In cases likely to be of IBD further division into ulcerative colitis and Crohn's disease was attempted. Result – Out of 30 cases, 60% were IBD and 40% were categorised as non-IBD. In IBD category, 83% were subcategorised as UC, 6% as Crohn's and 11% could not be further subcategorised. Almost all IBD cases (77%) showed architectural abnormalities and 60% mucin depletion. Conclusion- Combination of architectural and epithelial changes with accompanying inflammation patterns can prove to be effective diagnostic parameters for diagnosing endoscopic biopsies in colitis patients.

INTRODUCTION

Inflammatory bowel diseases (IBD) are chronic relapsing conditions that can affect any segment of intestine that includes Ulcerative colitis (UC) and Crohn's disease. Both the conditions differ from each other with respect to their clinical presentation, endoscopic findings and disease course.(1) However, they share common etiopathogenesis of dysregulated immune response and epithelial barrier defects. It is imperative to distinguish between these two types of IBDs as they differ in their disease progression, complications, and treatment approaches. Therefore, accurate histopathological assessment is crucial to differentiate

i) Between Inflammatory Bowel Disease (IBD) and non-IBD colitis and

ii) Within IBD, Distinguishing between UC and CD.(2,3)

Correct interpretation of biopsy specimen from patients with suspected IBDs is needed for definitive diagnosis and scheduling appropriate therapy. Histopathological findings in biopsy sample can overlap between non IBD and IBD colitis including both its entities.(4) Obtaining biopsies during colonoscopy is essential regardless of added time or risks. Recent advancements in treatment now target multiple disease pathways

rather than solely focusing on endoscopic remission. However, despite endoscopic healing, a significant number of patients might still have microscopic disease, emphasising the importance of histological assessment.(5)

AIMS AND OBJECTIVES

The aim of this study is to display the histomorphological spectrum of changes observed in endoscopic biopsy specimens performed on patient with history suggestive of colitis, thereby highlighting the pertinent changes that can lead to reliable recognition of IBD from non IBD colitis and further sub classify IBDs as UC and CD.

MATERIAL AND METHODS

Total of 30 endoscopic biopsies were received in the department during the period of 1year (July 22 to July 23). All the biopsies received were processed by routine paraffin embedding and stained with H&E stain. Microscopic slides thus prepared were examined under the microscope for changes falling into 3 broad categories –

1) Architectural abnormalities – surface ulceration, crypt distortion and crypt atrophy
2) Inflammation – type of inflammation – lymphoplasmacytic or neutrophilic and its distribution in lamina propria (diffuse or basal plasmacytosis), presence of crytitis, crypt abscess& granuloma
3) Epithelial changes like mucin depletion.

Based on the clinical history provided, colonoscopic findings suggestive of provisional diagnosis and the histomorphological changes thus observed the initial diagnosis of IBD versus non IBD colitis was made. In cases likely to be of IBD further distinction was attempted to subcategorise them into ulcerative colitis and Crohns disease.

RESULTS

It was observed that age range of the patient with colitis varied from 11 to 72 years. IBD was predominant in 4th decade of life. Overall M: F ratio was 1.7:1. Among the 30 cases analyzed, 60% were classified as inflammatory bowel disease (IBD), notably prevalent between the fifth and eighth decades, while 40% were categorized as non-IBD, primarily observed between the fifth and seventh decades.

The most frequent biopsy site in IBD cases was the colon, accounting for 73% of instances. Within the IBD category, 83% were identified as ulcerative colitis (UC), 6% as Crohn’s disease, and 11% could not be further subcategorized. Rest of non-IBD cases 12 in number (40%) based on histomorphology, changes suggestive of infective etiology was rendered.

In 16(88.9%) out of 18 cases of IBD architectural abnormalities were observed. 15 (93.7%) of the cases showing architectural distortion were classified as UC. The architectural changes observed in UC were surface ulceration (9 cases, 60%), crypt distortion (12 cases, 80%) and crypt atrophy (11 cases, 73%).

All these cases showed accompanying inflammation which was classified on the basis of type of inflammatory cell. 12 cases (80%) of UC had mixed-lymphoplasmacytic infiltrate,10 cases 66% had classical basal plasmacytosis accompanied with architectural changes,4 cases (26%) showed neutrophilic infiltration,4 cases (26%) showed eosinophils, while classical features like crypt abscess was seen in all 15

cases (100%), cryptitis was seen in 12 (80%) out of 15 cases of UC. Accompanying the above findings of architectural changes and inflammation in cases classified as UC, epithelial changes like mucin depletion were also noted in 9 cases (60%).

Only 1 out of the 18 cases classified as IBD was diagnosed as Crohns Disease and showed architectural changes like crypt atrophy, no crypt distortion or surface ulceration was seen. The architectural changes were accompanied by mixed lymphoplasmacytic infiltrate and granuloma formation. No mucin depletion was noted.

2 cases were labelled as IBD-Unclassified and showed only lymphoplasmacytic inflammation without crypt distortion or mucin depletion. Such cases were correlated with clinical and radiological findings.

DISCUSSION

The incidence of IBD has been increasing steadily in western world with quoted incidence of 1 in 200 individuals (10). Histological evaluation has emerged as a more comprehensive measure of disease activity.

In the study conducted by Banerjee et al. in their cross-sectional study (5), involving 30,835 patients with a median age of 44 years (67% male), the final diagnoses included various conditions, among which Inflammatory Bowel Disease (IBD) constituted 5.4%. Within the IBD category, 2.2% were diagnosed with Ulcerative Colitis (UC) and 3.2% with Crohn's Disease (CD). In contrast, our study observed an age range among colitis patients from 11 to 72 years. The prevalence of IBD was notable specifically in the fourth decade of life. The overall male-to-female ratio was 1.7:1, and among the 30 cases analyzed, 60% were classified as IBD, particularly prevalent between the fifth and eighth decades. Non-IBD cases were predominantly observed between the fifth and seventh decades.

In 16 (88.8%) out of 18 cases of Inflammatory Bowel Disease (IBD), architectural abnormalities were observed in our study. Among cases showing architectural distortion, 15 (93.7%) were classified as Ulcerative Colitis (UC). The observed architectural changes in UC included surface ulceration (60% of cases), crypt distortion (80% of cases), and crypt atrophy (73% of cases). While study conducted by Vincenzo et al (6) and Langner et al (7) showed In Ulcerative Colitis (UC), distorted crypt architecture with crypt branching and atrophy is present in 57–100% of cases. Within the IBD category, the majority (83%) were identified as ulcerative colitis (UC), showcasing distinct architectural abnormalities like surface ulceration, crypt distortion, and crypt atrophy. Our results are in concordance with the other studies. These histological changes were predominantly present in UC cases, indicating their potential significance in the diagnosis of this specific condition.

Accompanying inflammation in UC cases displayed varied types of inflammatory cell infiltrates, with mixed-lymphoplasmacytic infiltrate being the most prevalent which was also seen in the studies conducted by Stange EF et al(8), Theodossi A et al(9), Bentley E et al (10) Additionally, architectural abnormalities were consistently linked with inflammation, especially classical features like crypt abscess and cryptitis. These changes were observed in our study as well.

However, a single case classified as Crohn’s Disease displayed distinct architectural changes, primarily crypt atrophy, accompanied by mixed lymphoplasmacytic infiltrate and granuloma formation, highlighting the distinguishing features of this condition

compared to UC. Granuloma formation and focal or patchy lamina propria chronic inflammation (rather than diffuse/continuous) was seen in studies by Theodossi et al (11), Surawicz CM et al (12),Bentley et al(10),and Cross SS, Harrison RF (13)

The study conducted by Vincenzo et al. (6) highlighted that in about 5% of suspected cases of Inflammatory Bowel Disease (IBD), a clear diagnosis of either Ulcerative Colitis (UC) or Crohn's Disease (CD) cannot be definitively established. This uncertainty often arises due to insufficient clinical, radiological, endoscopic, or pathological data, or the presence of overlapping features between the two conditions. Various labels such as "indeterminate colitis" (IC), "inflammatory bowel disease unclassified (IBDU)", "chronic inflammatory bowel disease unclassified", and "chronic idiopathic inflammatory bowel disease not otherwise specified" are utilized to classify such ambiguous cases. In our study, we encountered two cases labeled as IBD-Unclassified, aligning with the aforementioned scenario. These cases exhibited solely lymphoplasmacytic inflammation without identifiable crypt distortion or mucin depletion. To establish a more accurate classification, we correlated these cases with clinical and radiological findings, emphasizing the importance of integrating multiple diagnostic aspects to characterize such uncertain IBD cases.

CONCLUSION

Histomorphological parameters of architectural distortion, inflammation and epithelial changes are effective diagnostic parameters in pathological diagnosis of IBD

In our case architectural abnormalities were evident in nearly all IBD cases (77%), and mucin depletion was observed in 60%. Lymphoplasmacytic inflammation was present in 83% of IBD cases. Among these, 66% exhibited basal plasmacytosis, and 53% displayed acute inflammation, leading to a diagnosis of Ulcerative colitis. All cases of UC (100%) exhibited both cryptitis and crypt abscess.

Our study highlighted several key features that proved to be highly reliable in diagnosing inflammatory bowel disease (IBD) in endoscopic biopsies in colitis patients. The most dependable indicators included:

1. Architectural Changes: Specifically, crypt distortion and atrophy, indicating chronic reparative changes.
2. Inflammatory Findings: Particularly, the presence of Basal plasmacytosis.
3. Epithelial Changes: Notably, the observation of Mucin Depletion.

The combination of these architectural and epithelial changes, coupled with specific inflammation patterns, emerged as effective diagnostic parameters for accurately diagnosing IBD in endoscopic biopsies in individuals with colitis. However the gold standard for a complete IBD diagnosis remains the clinic-radiological, endoscopic and histopathological correlation.

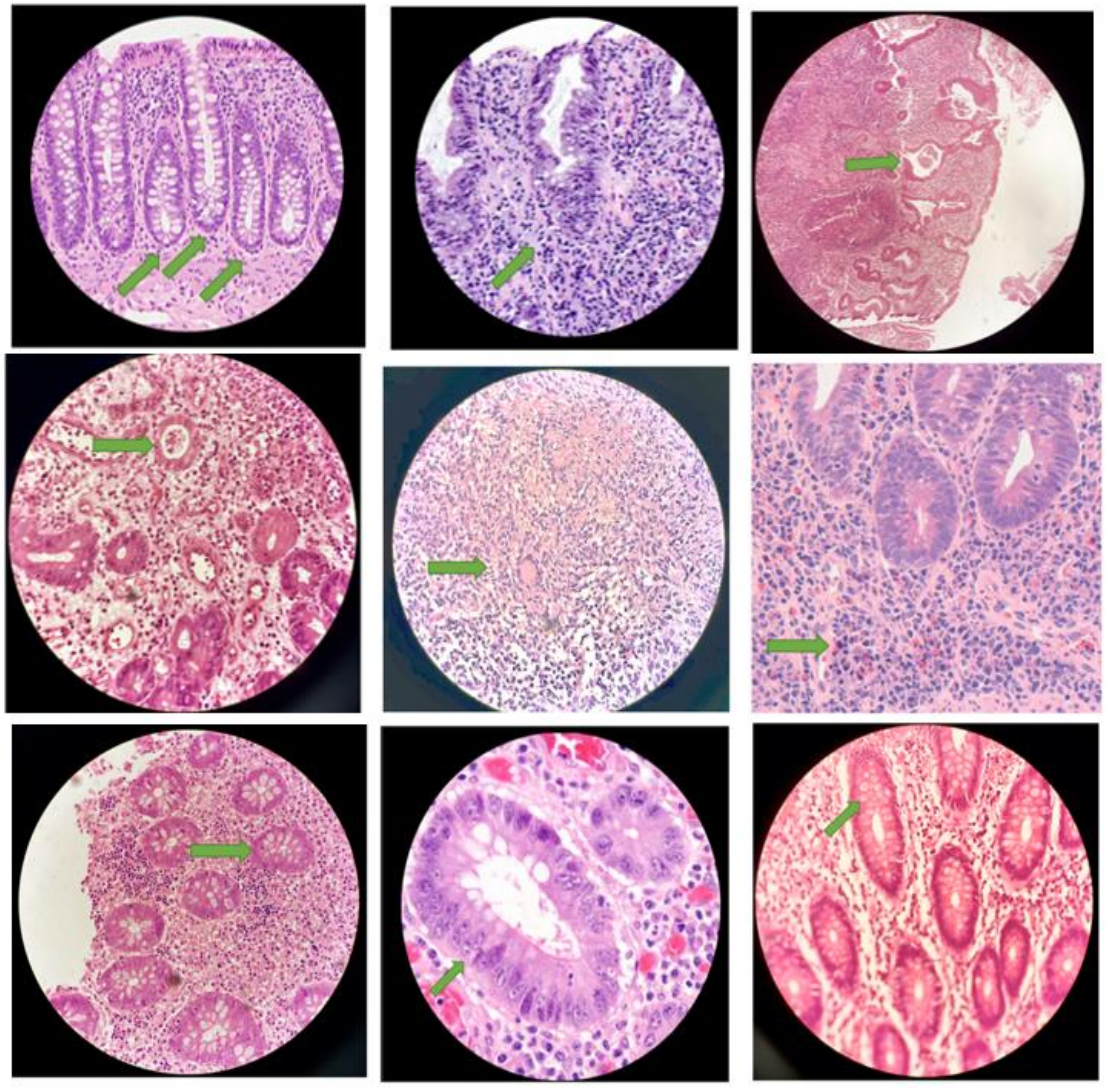

Figure 1: H&E Stained Section at 400X Showing Normal Colonic Mucosa with Test Tube Pattern of Gland.
Figure 2: H&E stained section at 400X showing moderate architecture Distortion with Dense Inflammation in Lamina Propria.
Figure 3: H&E Section at 100X Show Cystic Dilation of Crypts with Cryptitis & Dense Inflammation in Lamina Propria.
Figure 4: H&E Stained Section at 400X Showing Crypt Abscess.
Figure 5: H&E Section at 100X Showing Granulomas.
Figure 6: H&E Section Showing 400X showing Basal plasmacytosis.
Figure 7: H&E Section at 400X Showing Cryptitis.
Figure 8: H&E Section at 100X Showing Depletion of Goblet Cells.
Figure 9: H&E Section at 100X Showing Normal Distribution of Goblet Cells.

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