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MUCIN HISTOCHEMISTRY PATTERN IN INFLAMMATORY AND NEOPLASTIC (BENIGN & MALIGNANT) GASTROINTESTINAL LESIONS

Pathology

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ABSTRACT

Introduction: The inflammatory and neoplastic lesions form a major proportion of gastrointestinal tract pathologies. Present study tries to demonstrate the type of mucin in inflammatory & neoplastic lesions of gastrointestinal tract and to find out whether its demonstration can assist in the diagnosis & classification of these diseases. **Objective:** To demonstrate the mucin histochemistry pattern in inflammatory & neoplastic gastrointestinal lesions. **Methodology:** This study was conducted in Department of Pathology in a tertiary care centre. The paraffin embedded tissue blocks were cut into 5 micron thickness section & stained with H&E followed by special staining; ie- histochemical stain for mucin like alcian blue pH 2.5- PAS to differentiate neutral & acid mucin, alcian blue pH 1.0-PAS to demonstrate sulphomucin. **Results:** There is a significant difference in pattern of mucin among persons with gastrointestinal lesions compared to normal individuals. Majority of the inflammatory, benign, malignant & pre-neoplastic lesions in GIT demonstrated, both acidic & neutral mucin with acidic predominance. **Conclusion:** A detailed study of the mucins with appropriate combination of special stains help us in assessing the nature of the lesion (inflammatory/neoplastic) and also the degree of severity of the lesion.

KEYWORDS

Inflammatory & neoplastic gastrointestinal lesions, mucin histochemistry

INTRODUCTION

The gastrointestinal tract (GIT) is a hollow tube extending from oral cavity to the anus that consists of anatomically distinct segments including esophagus, stomach, small intestine, colon, rectum & anus(1).The inflammatory and neoplastic lesions form a major proportion of GIT pathologies. Chronic GI inflammation is diverse in aetiology, pathogenesis and manifestations (3). Mucins or mucoglycoproteins are a family of polydisperse molecules designed to carry out multiple tasks at mucosal surface of GIT (4). The epithelium of human gastrointestinal mucosa produces different types of mucin. They perform significant functions like selective impermeability to HCl & bile salts, anti-bacterial effects, lubricating luminal contents, regulate epithelial dehydration, prevent tissue edema, anti-metaststic & immunological phenomenon(5). Histochemically mucins are classified into neutral mucin & acidic mucin, the latter again grouped into sulphomucin and sialomucin. Mucin histochemistry can effectively determine the presence & types of mucin (6).

Determining the type of mucin may be helpful in evaluating pathologic changes in a tissue. Many previous studies showed that there are alterations in chemical structure of mucin in diseased gastrointestinal mucosa when compared with normal mucosa (7) (8) (9) (10) (11).

The present study aims to demonstrate the type of mucin in inflammatory & neoplastic lesions of gastrointestinal tract and to find out whether its demonstration can assist in the diagnosis & classification of these diseases.

OBJECTIVE

To demonstrate the mucin histochemistry pattern in inflammatory & neoplastic gastrointestinal lesions.

METHODLOLOGY

This study was conducted in Department of Pathology in a tertiary care centre in the specimens diagnosed as GI neoplasms or inflammatory disease. The paraffin embedded tissue blocks were cut into 5 micron thickness section & stained with H&E followed by special staining; ie- histochemical stain for mucin like alcian blue pH 2.5-PAS to differentiate neutral & acid mucin, alcian blue pH 1.0-PAS to demonstrate sulphomucin. The slides were analysed under light microscope & histopathological diagnosis, various morphological changes including type of mucin were recorded. Few tissues of GI specimens received in pathology department that are found normal by histopathological examination, were also stained as above to study the mucin in normal mucosa. All collected data were entered in Microsoft Excel & analysed by appropriate statistical software.

RESULTS

During the study period of one year, a total of 150 specimens of GI lesions were studied. The majority of cases (46%) were from 40-59 age group, followed by 60-79 age group. The incidence of GI lesions were more common in males with male: female ratio- 1.4:1. Most of the cases were from colon (54%), followed by stomach and appendix.

Among 150 cases studied, 83 cases were inflammatory while 63 cases were neoplastic & 5 were pre-neoplastic. Among males, 61.8% were inflammatory lesions while in females 49.2% were found to be neoplastic.

In stomach, small intestine and in appendix majority were inflammatory lesions. In colon, major proportion of cases were neoplastic.

Majority of the samples studied were adenocarcinoma NOS(30%), followed by ulcerative colitis(15.3%) & chronic gastritis.

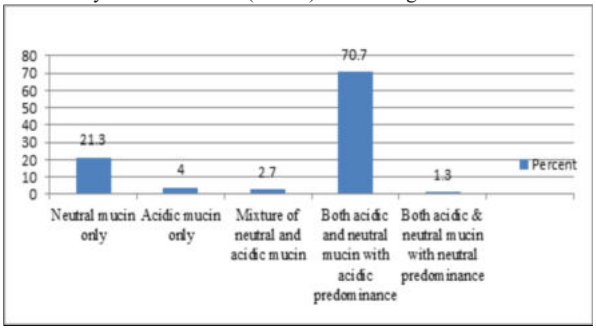

Chart1: Mucin Histochemistry Pattern In Total GI Lesion

The mucin histochemistry patterns observed in various GI lesions were:

1. Neutral mucin only
2. Acidic mucin only
3. Mixture of neutral and acidic mucin(both in equal quantities)
4. Both acidic and neutral mucin with acidic predominance
5. Both acidic and neutral mucin with neutral predominance

70.7% cases had both acidic and neutral mucin with acidic predominance. It is noted that the majority of cases 78.7% demonstrated sulphomucin. All the cases which had acidic mucin were positive for sulphomucin.

Among 113 cases which had both acidic & neutral mucin, most of the cases, 94.7% demonstrated predominance of acidic mucin.

It is noted that there is a significant difference in pattern of mucin among persons with GI lesions compared to normal individuals.(χ^2 63.491, p value <0.001)

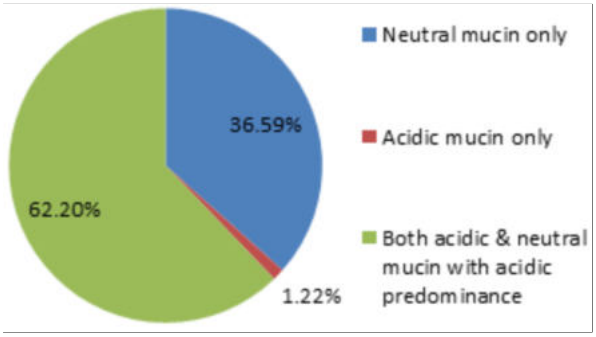

Chart 2: Mucin Pattern In Inflammatory Lesions Of GIT

Among the benign lesions, majority demonstrated both neutral & acidic mucin with acidic predominance. Rest was positive for neutral mucin only. Most of the pre-neoplastic lesions demonstrated both neutral & acidic mucin with acidic predominance.

86 % of the malignant GI lesions demonstrated both acidic & neutral mucin with acidic predominance.

Barrett's esophagus demonstrated only acidic mucin. All cases of chronic gastritis demonstrated only neutral mucin. Most of the gastric adenocarcinoma cases had both acidic and neutral mucin with acidic predominance. Gastric mucinous adenocarcinoma showed a mixture of both neutral and acidic mucin.

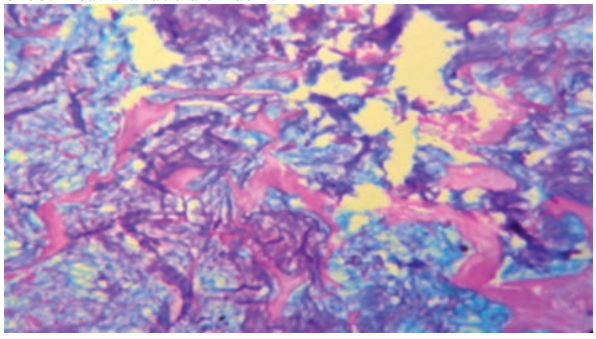

Figure1: Alcian Blue pH1-PAS stain in mucinous adenocarcinoma stomach demonstrating mixture of neutral & sulphomucin, 100X

In colon adenocarcinoma NOS, mucinous carcinoma, tubular adenoma with dysplasia, ulcerative colitis, crohn's disease and tuberculosis cases demonstrated both acidic and neutral mucin with acidic predominance. In appendix, all the inflammatory lesions demonstrated both acidic & neutral mucin with acidic predominance. Mucinous adenocarcinoma appendix demonstrated mixture of neutral & acidic mucin.

DISCUSSION

Present study demonstrated acidic mucin in Barrett's esophagus which was comparable with Wani AS et al.(12). Chronic gastritis cases were positive for neutral mucin only which correlated with Wani AS et al.(12).However our results were in contrast to that of Prathima et al which demonstrated a mixture of acidic & neutral mucin in gastritis(8). Our study demonstrated both acidic & neutral mucin in adenocarcinoma of stomach which was comparable with Wani AS et al. (12) & Awad E et al.(11).

In the present study, mucinous adenocarcinoma stomach demonstrated mixture of neutral & acidic mucin in contrast to the study by Uma R which demonstrated only acidic mucin(13). In this study, it is noted that ulcerative colitis demonstrated both acidic & neutral mucin with acidic predominance similar to that seen in Wani AS et al. (12). Present study showed only acidic mucin in crohn's cases in contrast to that of Isabel Filipe (14) which demonstrated acidic mucin with small amount of neutral mucin. Present study revealed both acidic & neutral mucin in adenomatous polyp colon which is comparable with Wani AS et al. (12). Also moderate to marked decrease in the mucin quantity is noted in the areas of dysplasia. All the cases of adenomatous polyp were positive for sulphomucin.

All the cases of adenocarcinoma NOS colon demonstrated both acidic & neutral mucin with acidic predominance, which correlated with that of Awad E et al. (11) and Wani AS et al. (12). In the present study mucinous adenocarcinoma showed mixture of both acidic & neutral mucin which is similar to that noted in the study of Ionila M et al. (16)

CONCLUSION

The pattern of secretion & the nature of the mucin vary with different types of lesions in different parts of GIT. Detailed study of the mucin with appropriate combination of special stains helps in assessing the nature of the lesion (inflammatory/neoplastic) and also the degree of severity of the lesion. The study of mucin pattern may be of value as an ancillary technique of study along with IHC. Since these studies are easier to be done & cost effective, they can be routinely done in the study of GIT lesions.

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