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Goblet Cell Sialomucin, Sulphomucin and O-acylated Sialomucin Content in Ulcerative Colitis

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SUMMARY

This study was carried out to investigate the pattern of goblet cell sialomucin, sulphomucin and O-acylated sialomucin in ulcerative colitis. Endoscopic biopsy material was obtained from 15 cases of ulcerative colitis, and stained with High iron diamine / alcian blue and periodic acid borohydrate saponification PAS technique. The mucin profile was correlated with degree of dysplasia. Three (27.27 %) out of 11 cases without dysplasia and one (25 *%)* out of 3 cases with dysplasia showed increased sialomucin content. The content, of O-acylated sialomucin was normal in 66.66%and reduced in 33.33% of the cases. The reduction in the O-acylated sialomucin was seen in 75 % of the dysplastic lesions and in 18.18 % of the cases with no evidence of dysplasia. It can be concluded that composition of mucin is changed in ulcerative colitis. An increase in sialomucin and reduction in O-acylated sialomucin content was seen in some of the cases, the later change was associated more frequently with dysplasia.

INTRODUCTION

Goblet cells in normal colorectal epithelium contain a mixture of neutral mucins, acidic sialomucins and acidic sulphomucins[1,2]. The sialomucins are of two types depending upon the presence of N and O-acylated sialic acids. The normal colonic mucosa contains predominantly O–acylated sialomucin[3].

Composition of mucin is changed in ulcerative colitis. An increase in sialomucin is reported to occur in ulcerative colitis, which is related both with inflammation and dysplasia[4,5]. It has been stated that diffuse changes in epithelial mucins may help to identify colitic patients who are at increased risk of developing colorectal malignancy. This finding was regarded as a more sensitive indicator of cancer than dysplasia and as useful adjunct to routine hematoxylin and eosin staining[4].

Purpose of this study was to investigate the pattern of sialomucin, sulphomucin and O-acylated sialomucin in ulcerative colitis and to find any association between altered pattern of mucin and dysplasia.

MATERIALS AND METHODS

A total of 15 cases of ulcerative colitis were included in the study from department of histopathology of the Sheikh Zayed Hospital Lahore. Biopsies were obtained endoscopically at the department of gastroentrology, routinely fixed in 10% formaline, routinely processed embedded in paraffin wax and stained with H & E.

The detection of different types of mucins was done with the following staining techniques.

1. **High iron diamine Alcian Blue technique (HID/AB):**
   This stain was used for the differentiation of sialomucin and sulphomucins. By this method sialomucins are stained blue and sulphomucins are stained black in normal colonic mucosa. A predominance of sulphomucins is regarded as normal mucin pattern and and excess (50% or more) of sialomucin is seen[3]. To assess the mucin at least 200 goblet cells were counted randomly from different high power fields, where necessary.

2 **Periodate Borohydrate Saponification PAS (PB/KOH/PAS) Technique:**

This stain was used for the demonstration of 0-acylated sialomucin in the goblet cells, which are stained red. The normal colonic mucosal goblet cell gives a reasonably clear red colour with this method. The staining intensities were graded subjectively under low power from negative (o) to intense (3+)[3]. Grading of staining intensity along with it's interpretation is outlined below:

Staining Intensity	Interpretation.
3+~Intense staining.	Normal content of O-acylated Sialomucin.
2+=Moderately strong	Slightly reduced O-acylated sialomucin.
+/0=Week to negative	Markedly reduced to complete staining loss of O-acylated sialomucin.

In parallel with the above method positive nd negative controls from normal biopsies were lso set-up.

RESULTS

Out of 15 cases in the study 6 were males and were females with age range (18-77) years with a ean of 39 years. Five patents had associated flammatory polyps.

Four (26.66 %) of the 15 cases showed creased sialomucin, out of these, three had no vidence of dysplasia. Only one showed moderate egree of dysplasia. While rest of the cases showed rmal pattern of sulphomucin predominance Table 1). Regarding the O-acylated sialomucin ntent, out of the 11 cases with no evidence of ysplasia 9 (81.81%) showed normal content.

One biopsy (9.09%) showed slightly reduced ontent and 1 (9.09%) showed markedly reduced O-cylated sialomucin One of two cases with mild ysplasia showed slight reduction in O-acylated ialomucins, the other showed normal pattern of 0 - cylated sialomucins. Both cases with moderate egree of dysplasia showed markedly reduced o-cylated sialomucins (Table 2).

DISCUSSION

The results of mucin histochemistry in our cases of ulcerative colitis correlate with other studies. Increase in sialomucin was seen in three cases even without dysplasia. Similar reports of increased sialomucin in the absence of the dysplasia in ulcerative colitis have been reported by other workers[4,5,6]. Out of dysplastic lesions in the present study one case with moderate dysplasia showed evidence of increased sialomucin secretion. The predominance of sialomucin in ulcerative colitis with associated dysplasia has been documented by other workers[7]. They have studied patients with extensive colitis and dysplastic changes, and 83% of their cases showed an increased sialomucin. Fozard and Dixon[8] are of the view that sialomucin predominance may be significantly associated with cancer and dysplasia in ulcerative colitis. Their findings are based on colonoscopic samples from cancer and non-cancer ulcerative colitis cases and they support a role for mucin histochemistry in assessing cancer risk. However, some other workers do not agree and they document that routine HID/AB staining does not aid the recognition of dysplasia in ulcerative colitis[9].

Regarding the degree of O-acylated sialomucin in patients with ulcerative colitis, 75% and 18.18% of the cases with and without dysplasia respectively showed some degree of loss of O-acylated sialomucins. The result correlates with other workers[5], who showed that the sialic acid content of the goblet cells was changed in patients with ulcerative colitis, with reduction or loss of O-acylated sialomucin, and this change was particularly marked in patients who were at increased risk of cancer. The results in this study are further supported by other workers[10,11], who also report loss of side change O-acetyl substitute of sialic acid in ulcerative colitis. Alien et al.[9] have also reported diminution in O-acylated variants of sialomucin in ulcerative colitis showing dysplastic changes.

The reduced O-acylated sialomucin in the lesion without dysplasia could be due to goblet cell mucus heterogeneity as reported by other workers[10]. They have attributed loss of O-acylated sialomucin in ulcerative colitis to the goblet cell mucus

Table 1: Sialomucin and sulphomucin in ulcerative colitis and its relation to dysplaisa.

Type of mucin	Degree of dysplasia							
	Negative		Mild		Moderate		Severe	
	No.	%	No.	%	No.	%	No.	%
Predominant sialomucin	3	27.27	-	-	1	50	-	-
Predominant sulphomucin	8	72.72	2	100	1	50	-	-
Total	11	100	2	100	2	100	-	-

Table 2: O-acylated sialomucin in ulcerative colitis and its relation to dysplasia

Grade of staining and intensity	Degree of dysplasia							
	Negative		Mild		Moderate		Severe	
	No.	%	No.	%	No.	%	No.	%
3+	9	81.81	1	50	-	-	-	-
2+	1	9.09	1	50	-	-	-	-
+/0	1	9.09	-	-	2	100	-	-
Total	11	100	2	100	2	100	-	-

heterogeneity in normal population. They have conducted a study on apparently normal mucosa from Crohn's disease, diverticular disease and irritable bowel syndrome and found loss of o-acylation in 8% of their cases. It can be concluded that compositions of mucin is changed in ulcerative colitis. An increase in sialomucin and reduction in O-acylated sialomucin content was seen in some of the cases, the later change was associated more frequently with dysplasia.

REFERENCES

1. Listinskyv CM, Riddle RH. Patterns of mucin secretion in neoplastic diseases of the colon Hum pathon 1991: 15; 136-44.
2. Filipe MI. Gastrointestinal tract. In: Samuel S, ed. Spicer.cd.Histochemistry in pathologic diagnosis New York. Mareel Dedder 1987; 354-87.
3. Greves P, Eilipe MI, Abbas S, Ormerod MG. Sialomucin and carcinoembryonin antigen in the evulaution of colorectal cancer-Histopathology. 1984; 8: 825-8.
4. Williams GT. Transitional mucosa of the large intestine. (Commentary). Histopathology 1985; 9: 1237-43.
5. Filipe MI. The histochemistry of intestinal mucins. Changes in disease. In: Whitehead R. ed. Gastrointestinal and esophageal pathology. New York: Churchill Livingston, 1989: 65-89.
6. Pranzin G, Grigioni WF, Dina R, Scarpa A, Zamboni G. Mucin secretion and morphological changes of the mucosa in non-neoplastic lesions of the colon. Histopathology 1983; 7: 707-18.
7. Babib NA, Dawson PM, Wood CB. A study of histochemical changes in mucus from patients with ulcerative colitis, Crohn's disease and diverticular disease of the colon. Dis Colon Rectum 1986; 29: 15–7.
8. Fozard JBJ, and Dixon MF. Colonoscopic surveillance in ulcerative colitis ~Dysplasia through looking glass. Gut 1989; 30: 285-92.
9. Allen DC, Colony NS, Bigart JD. High iron diamine Alcian blue mucin profiles in Benign. Premaliganat and malignant

colorectal disease. Histopathology 1988; 13: 399-411.
10. Jass JR,. England JK. Value of mucin histochemistry in follow up surveillance of patients with long standing ulcerative colitis. J Clin Pathol 1986; 39: 393-9.
11. Rhodes JM. Colonic mucus and mucosal qlycoproteins: the key to colitis and cancer. Gut 1989; 30: 1660 – 66.

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