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Original Research Paper

ROLE OF EOSINOPHILIC INFILTRATION IN JUVENILE GASTROINTESTINAL POLYPS

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ABSTRACT

Background: Gastrointestinal polyps are common findings in child subjects, with juvenile polyps being the most common type seen in nearly 90% of the subjects. The incidence of juvenile polyposis syndrome is 1 in 100,000-160,000. Mucosal eosinophilia is highly significant in juvenile polyps. It is vital to have detailed knowledge of these disorders to ensure appropriate follow-up and management.

Aim: The present study aimed to assess the distribution and histology of intestinal polyps and evaluate the significance of stromal eosinophilia in the pathogenesis of juvenile polyps.

Methods: The present study assessed 84 child subjects with gastrointestinal polyps. The location, number, and size of the polyps were assessed in all subjects. Also, the association of size/age and stromal eosinophilia was assessed in subjects with juvenile polyps. The data gathered were analyzed statistically.

Results: The results of the present study showed that Peutz Jeghers, inflammatory, multiple juvenile, and solitary juvenile polyps were seen in 6 subjects, 6 subjects, four subjects, and 68 study subjects respectively. The most common site of the polyp was rectum and the mean age of the study subjects was 6.5 years. A positive correlation was seen in eosinophilic infiltration to the size of the polyp and an inverse correlation with the age of juvenile polyps.

Conclusions: The present study concludes that the majority of the gastrointestinal polyps seen in the child subjects are solitary juvenile polyps. Significant eosinophilic infiltration of gastrointestinal polyps might depict the possible role of allergy in the etiopathogenesis of juvenile polyps.

Keywords: Eosinophilic infiltration, gastrointestinal polyps, juvenile polyps, pediatric polyps, child subjects.

INTRODUCTION

The term polyp is derived from the Greek word depicting polypus meaning many feet. A polyp is any growth or excrescence which is seen protruding above the mucous membrane. The majority of the polyps seen in the child subjects are generally solitary juvenile polyps. The exact etiology and pathogenesis of the gastrointestinal polyps in the child subjects are not known clearly.[1]

Existing literature data has reported an increase in the incidence of stromal eosinophilia in subjects with juvenile polyps. Also, the existing literature data is scarce concerning the assessment of the role of eosinophilic infiltration in child subjects with juvenile gastrointestinal polyps.[2,3] Considering the presence of eosinophils in subjects having juvenile polyps, the present study aimed to assess the possible role of eosinophilic infiltration in the etiopathogenesis of gastrointestinal juvenile polyps. The study also assessed different types of polypoidal lesions in subjects of pediatric age.

MATERIALS AND METHODS

The present clinical assessment study was aimed to assess the possible role of eosinophilic infiltration in the etiopathogenesis of gastrointestinal juvenile polyps. The study also assessed different types of polypoidal lesions in subjects of pediatric age. The study was done at Department of Pathology, Shri Balaji Institute of Medical Science, Mowa, Raipur, Chhattisgarh after the clearance was given by the concerned Institutional Ethical committee. The study subjects were from the Department of Pathology of the Institute. Verbal and written informed consent were taken from all the subjects before study participation.

The study assessed 84 subjects from both genders with confirmed clinical diagnoses of gastrointestinal polyps. The study assessed both bowel resection and polypectomy specimens. In all the included participants, the location of the polyps, the number of the polyps, the mode of presentation, and demographic data were assessed. Histopathological specimens and samples were processed routinely and stained using Eosin and Hematoxylin staining.

The polyps studied were classified based on the size of the polyps in different categories as less than one cm, between one and two cm, and more than two cm. Significant eosinophilic infiltration in the lamina propria of the polyp was defined as the presence of more than 20 eosinophils per high-power field.

The data gathered were analyzed statistically using SPSS (Statistical Package for the Social Sciences) software version 24.0 (IBM Corp., Armonk. NY, USA) for assessment of descriptive measures, Student t-test, ANOVA (analysis of variance), and Chi-square test. The results were expressed as mean and standard deviation and frequency and percentages. The p-value of <0.05 was considered statistically significant. Correlation in each parameter concentration and DAS28 were assessed using Pearson's correlation.

RESULTS

The present clinical assessment study was aimed to assess the possible role of eosinophilic infiltration in the etiopathogenesis of gastrointestinal juvenile polyps. The study also assessed different types of polypoidal lesions in subjects of pediatric age. The present study assessed 84 child subjects with gastrointestinal polyps. In all the subjects, the location, number, and size of the polyps were assessed. Among the 84 subjects assessed in the study, there were 45.24% (n=38) female and 54.76% (n=46) male subjects in the study. The age range was 2-12 years with a mean age of 6.5 years. The presentation mode was mass per rectum in rectal polyps, painless, and intermittent rectal polyps. More proximally present polyps presented with anemia, chronic rectal bleeding, and abdominal pain. Four subjects presented with intussusception leading to intestinal obstruction.

The study results showed that in subjects with eosinophilic infiltration of <20/HPF, six subjects had rectal polyps, six subjects had jejunal polyps, eight subjects had colonic polyps, and four subjects had ileal

polyps respectively. The polyps in the study were classified based on their histology. Eosinophilic infiltration of <20/HPF was seen in 6, 6, 4, and 8 subjects with inflammatory polyps, Peutz Jeghers polyp, juvenile polyposis coli, and solitary juvenile polyps respectively. Eosinophilic infiltration of >20/HPF was seen in 0, 0, 0, and 60 subjects with inflammatory polyps, Peutz Jeghers polyp, juvenile polyposis coli, and solitary juvenile polyps respectively (Table 1).

It was seen that in 80.9% (n=68) of subjects, solitary juvenile polyps were seen. Also, there were polypoidal grey-white masses in the range of 0.5-1.5cm. The histopathological assessment showed the presence of various cystically dilated glands in an edematous and inflamed lamina propria having inflammatory infiltrate comprising of histiocytes, plasma cells, eosinophils, lymphocytes, and neutrophils. Multiple juvenile polyposis was seen in 4.8% (n=4) subjects. Polyps number was in the range of 10-15 and were seen distributed in the colon. Similar histopathological features to solitary juvenile polyps were seen. The study showed 7.1% (n=6) subjects having Peutz Jegher's polyps that were located in the ileum and jejunum in the range of 3-5. These lesions were pedunculated and cauliflower-like. Histopathology showed that polyps have smooth muscles in an arborizing arrangement covered with mucosal lining.

Inflammatory polyps were seen in 7.1% (n=6) subjects. Histopathology showed extensive granulation tissue and inflammatory infiltrates. Among 60 subjects that had juvenile polyps with four juvenile polyposis and 68 solitary juvenile polyps, 60 subjects had significant eosinophilic polyp infiltration. No eosinophilic infiltration was seen in multiple juvenile polyposis. No subject with inflammatory and Peutz Jeghers polyps depicted significant eosinophilic infiltration.

Concerning the correlation of juvenile polyp size to eosinophilic infiltration, 68 subjects aged 2-12 years having juvenile polyps were assessed for juvenile polyp size to eosinophilic infiltration correlation, and it was seen that eosinophilic infiltration <20/HPF was seen in 12 cases with 0, 2, and 10 cases of <1, 1-2, and >2cm respectively, whereas, eosinophilic infiltration >20/HPF was seen in 60 subjects with 8, 38, and 14 cases of <1, 1-2, and >2cm tumor size respectively. Among a total of 72 subjects, tumor size of cases of <1, 1-2, and >2cm respectively was seen in 8, 40, and 24 study subjects (Table 2).

On assessing the correlation of eosinophilic infiltration with age in study subjects, eosinophilic infiltration <20/HPF was seen in 0, 0, 2, 4, 6, and 12 subjects in the age range of 2-4, 4-6, 6-8, 8-10, and 10-12 years respectively. Among 60 subjects with eosinophilic infiltration >20/HPF was seen in 12, 16, 16, 12, 4, and 60 subjects in the age range of 2-4, 4-6, 6-8, 8-10, and 10-12 years respectively (Table 3). An inverse correlation was seen in the eosinophilic index and increasing age with p=0.04. Also, a positive relation was seen in the eosinophilic index and polyp size with p=0.02.

DISCUSSION

The results of the present study showed that in subjects with eosinophilic infiltration of <20/HPF, six subjects had rectal polyps, six subjects had jejunal polyps, eight subjects had colonic polyps, and four subjects had ileal polyps respectively. The polyps in the study were classified based on their histology. Eosinophilic infiltration of <20/HPF was seen in 6, 6, 4, and 8 subjects with inflammatory polyps, Peutz Jeghers polyp, juvenile polyposis coli, and solitary juvenile polyps respectively. Eosinophilic infiltration of >20/HPF was seen in 0, 0, 0, and 60 subjects with inflammatory polyps, Peutz Jeghers polyp, juvenile polyposis coli, and solitary juvenile polyps respectively. These data were comparable to the previous

studies of Fox VL et al[4] in 2010 and Rosty C et al[5] in 2013 where polyp distribution in study subjects similar to the present study was reported by the authors in their studies.

In 80.9% (n=68) subjects, solitary juvenile polyps were seen. Also, there were polypoidal grey-white masses in the range of 0.5-1.5cm. The histopathological assessment showed the presence of various cystically dilated glands in an edematous and inflamed lamina propria having inflammatory infiltrate comprising of histiocytes, plasma cells, eosinophils, lymphocytes, and neutrophils. Multiple juvenile polyposis was seen in 4.8% (n=4) subjects. Polyps number was in the range of 10-15 and were seen distributed in the colon. Similar histopathological features to solitary juvenile polyps were seen. The study showed 7.1% (n=6) subjects having Peutz Jegher's polyps that were located in the ileum and jejunum in the range of 3-5. These lesions were pedunculated and cauliflower-like. Histopathology showed that polyps have smooth muscles in an arborizing arrangement covered with mucosal lining. These findings were in agreement with the results of Rahat N[6] in 2005 and Lee BG et al[7] in 2012 where histopathological characteristics in subjects with GI polyps reported by the authors correlated with the results of the present study.

It was seen that inflammatory polyps were present in 7.1% (n=6) of subjects. Histopathology showed extensive granulation tissue and inflammatory infiltrates. Among 60 subjects that had juvenile polyps with four juvenile polyposis and 68 solitary juvenile polyps, 60 subjects had significant eosinophilic polyp infiltration. No eosinophilic infiltration was seen in multiple juvenile polyposis. No subject with inflammatory and Peutz Jeghers polyps depicted significant eosinophilic infiltration. These results were in line with the findings of Gupta S et al[8] in 2001 and Gurung P et al[9] in 2014 where results similar to the present study were reported by authors in their studies in pediatric subjects with intestinal polyps.

For the correlation of juvenile polyp size to eosinophilic infiltration, 68 subjects aged 2-12 years having juvenile polyps were assessed for juvenile polyp size to eosinophilic infiltration correlation, and it was seen that eosinophilic infiltration <20/HPF was seen in 12 cases with 0, 2, and 10 cases of <1, 1-2, and >2cm respectively, whereas, eosinophilic infiltration >20/HPF was seen in 60 subjects with 8, 38, and 14 cases of <1, 1-2, and >2cm tumor size respectively. Among a total of 72 subjects, tumor size of cases of <1, 1-2, and >2cm respectively was seen in 8, 40, and 24 study subjects. These findings correlated with the previous studies of Corredor J et al[10] in 2001 and Durno C[11] in 2007 where authors in their studies reported a positive correlation in eosinophilic infiltration to the size of the polyp as seen in the present study.

Concerning the assessment of the correlation of eosinophilic infiltration with age in study subjects, eosinophilic infiltration <20/HPF was seen in 0, 0, 2, 4, 6, and 12 subjects in the age range of 2-4, 4-6, 6-8, 8-10, and 10-12 years respectively. Among 60 subjects with eosinophilic infiltration >20/HPF was seen in 12, 16, 16, 12, 4, and 60 subjects in the age range of 2-4, 4-6, 6-8, 8-10, and 10-12 years respectively (Table 3). An inverse correlation was seen in the eosinophilic index and increasing age with p=0.04. Also, a positive relation was seen in the eosinophilic index and polyp size with p=0.02. These results were in line with the findings of Zheng E et al[12] in 2015 and Attard TM et al[13] in 2004 where similar to the present study, the authors also reported an inverse correlation with the age in juvenile polyps.

CONCLUSIONS

The present study, within its limitations, concludes that the majority of the gastrointestinal polyps seen in the child subjects are solitary juvenile polyps. Significant eosinophilic infiltration of gastrointestinal polyps might depict the possible role of allergy in the etiopathogenesis of juvenile polyps. However, the study had the limitation of being conducted at a single center, in the same geographical region, and with a limited number of subjects. Environmental and local factors can complicate and affect the presence of gastrointestinal polyps in child subjects. Hence, multi-center studies including subjects from varying geographical backgrounds in the future might help in further exploring the issue.

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Polyps type	Inflammatory polyps	Peutz-Jeghers polyp	Juvenile polyposis coli	Solitary juvenile polyps
Eosinophilic infiltration <20/HPF	6	6	4	8
Eosinophilic infiltration >20/HPF	0	0	0	60

Table 1: Classification of polyps based on the histology

Polyps type	Total	<1cm	1-2 cm	>2cm
Eosinophilic infiltration <20/HPF	12	0	2	10
Eosinophilic infiltration >20/HPF	60	8	38	14
Total	72	8	40	24

Table 2: correlation of juvenile polyp size to eosinophilic infiltration

Age groups	2-4	4-6	6-8	8-10	10-12	Total
Eosinophilic infiltration <20/HPF	0	0	2	4	6	12
Eosinophilic infiltration >20/HPF	12	16	16	12	4	60
Total	12	16	18	16	10	72

Table 3: Correlation to eosinophilic infiltration with age in study subjects