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Original Article

Epidemiological Findings of Colon Biopsies in Children with Gastrointestinal Symptoms: A Cross-Sectional Study in the West of Iran

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ABSTRACT

Background:
Despite the increasing prevalence of inflammatory gastrointestinal (GI) diseases in children, accurate data on the prevalence of colitis and its histopathological findings in Iran, particularly in the West, are lacking. The present study aimed to address this gap by analyzing epidemiological, clinical, and histopathological data from colon tissue biopsy samples in children.

Materials and Methods:
This descriptive, cross-sectional study was conducted on 600 pathology slides from colon biopsies of patients referred to Dr. Mohammad Kermanshahi Hospital, Kermanshah, Iran, from 2016 to 2021, who presented with GI symptoms and were diagnosed by a pediatric gastroenterologist. The samples were examined and diagnosed histologically by the pathologist.

Results:
Allergic colitis accounted for the highest frequency (77.5%) among colitis cases under 6 months. Colitis was slightly more prevalent in boys than in girls (55.3%). The highest frequency of colitis was in the 5-12-year age group (40.5%), and patients under 1 year had the lowest frequency (9.16%). The most reported symptom was rectorrhagia (71.83%), and the most common colonoscopy finding was increased vascular pattern and mucosal nodularity (43.1%).

Conclusion:
When approaching children with GI symptoms, especially rectorrhagia, allergic colitis should be at the top of the list, which is prevalent under 6 months and decreases with age.

Keywords: Histopathology, Colonoscopy, Pediatric, Colitis, Rectorrhagia

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INTRODUCTION

Gastrointestinal diseases in children are among the most common reasons for referral to healthcare facilities. The literal meaning of colitis is inflammation of the colon (large intestine), and it encompasses a variety of diseases. The general symptoms of colitis vary with age and severity. For example, children with ulcerative colitis experience a more severe and extensive disease than adults (1). These symptoms generally include abdominal pain (in older children who can express their complaints and problems), restlessness in younger children, poor weight gain, food intolerance, chronic or bloody diarrhea, the presence of a mass in the rectum, and other associated symptoms. Many of these symptoms are common to different types of colitis and overlap with those of other gastrointestinal diseases (2, 3).

Diagnosing and treating chronic and debilitating gastrointestinal diseases in children require specific knowledge and experience (4). One of the diagnostic aids is performing a colonoscopy and taking various samples of the colonic mucosa (2). Annually, many children are referred to pediatric subspecialty centers for various reasons and undergo diagnostic colonoscopies. However, the exact role of colonoscopy in children has not yet been determined (5). In some studies, gastrointestinal bleeding has been reported to be the most common reason for colonoscopy (6, 7).

Despite the increase in cases of inflammatory bowel disease in children in recent years, the exact statistics of inflammatory bowel disease and other types of colitis in our country, especially in the western region, remain unclear. In this study, we decided to take a step towards improving this situation by conducting an epidemiological and histopathological analysis of colon biopsy samples from children.

MATERIALS AND METHODS:

This descriptive, cross-sectional study was conducted after approval from the Research Committee of Kermanshah University of Medical Sciences, using colon tissue samples obtained from colonoscopy and biopsy procedures from November 2022 to May 2023 at Dr. Mohammad Kermanshahi Children's Hospital in Kermanshah Province, Iran.

This study used convenience sampling. The inclusion criteria were all children under 18 years of age who were referred to Dr. Mohammad Kermanshahi Hospital with one or more complaints of chronic diarrhea, bloody stool, abdominal pain, and rectal mass from 2016 to 2021, and after a colonoscopy and biopsy of the colon mucosa, a definitive diagnosis of the disease was made based on pathology findings. Samples without colonoscopy reports or with incomplete information were excluded from the study.

The files of all children hospitalized with a final diagnosis of one of the colitis subtypes were collected. Demographic characteristics (age, sex, file number, and pathology slide number) and clinical findings were obtained from the hospital information system (HIS) of Dr. Mohammad Kermanshahi Hospital. The colonoscopy reports performed by the pediatric gastroenterologist were categorized into one of five: (1) Normal mucosa, (2) local erythema, (3) increased vascular pattern, (4) increased vascular pattern and mucosal nodularity, (5) ulcers with mucosal fragility and contact bleeding.

After reviewing the slides by the pathologist and confirming the diagnosis, the biopsy specimens were categorized into one of the following types: Allergic colitis (AC), non-specific colitis (NSC), infectious colitis (IC), pseudomembranous colitis (PC), Crohn's colitis (CC), and ulcerative colitis (UC).

For data analysis, SPSS software version 22 was used. Frequency and percentage tables were used for age, sex, various clinical manifestations, and pathology and colonoscopy findings of the patients.

Patient records were kept confidential, and results were published anonymously. This study's samples were pathology slides, and no interventions were performed on the patients.

RESULTS

Of the 600 pathological specimens, 332 (55.3%) were from male patients, and the rest were from female patients. Allergic colitis was the most common subtype in both male patients (76.12%) and female patients (78.61%). AC, CC, and NSC were more prevalent in boys (78.61%, 1.2%, and 52%, respectively), and UC and IC were more common in girls (5.22% and 3.36%, respectively). Children aged from 5 to 12 years had the highest frequency (40.5%), and the most prevalent colitis in this age group was allergic colitis (70.78%). It was also the most frequent in children younger than 6 months (92.86%). Children aged 6 to 12 months were the minority (4.5%). The prevalence of all colitis subtypes decreased after 12 (Tables 1 and 2).

The most frequent clinical manifestation was rectorrhagia (71.83%) and chronic diarrhea (12.5%). Rectorrhagia was the most frequent complaint in AC (77.72%). Rectal mass was the least reported complaint (3.5%, Table 3).

The most prevalent colonoscopic findings were increased vascular pattern and mucosal nodularity (43.1%), mainly seen in AC (88%). Normal mucosa and local erythema were the least likely to be seen in colonoscopy, consisting of 1% and 0.66%, respectively (Table 4).

Table 1. Sex distribution

	Female N (%)	Male N (%)
Allergic colitis	204 (76.12)	261 (78.61)
Crohn's colitis	2 (0.75)	4 (1.2)
Infectious colitis	9 (3.36)	7 (2.1)
Non-specific colitis	39 (14.55)	52 (15.66)
Pseudomembranous colitis	0	1 (0.3)
Ulcerative colitis	14 (5.22)	7 (2.1)
Total	**268 (44.7)**	**332 (55.3)**

Table 2. Age distribution

	Age					
	Under 6 months N (%)*	6-12 months N (%)	1-2 years N (%)	2-5 years N (%)	5-12 years N (%)	Over 12 years N (%)
Allergic colitis	26 (92.86)	24 (8.89)	60 (88.24)	153 (84.53)	172 (70.78)	30 (56.6)
Crohn's colitis	0	0	0	0	5 (2.05)	1 (1.89)
Infectious colitis	0	0	2 (2.94)	2 (1.1)	8 (3.29)	3 (5.66)
Non-specific colitis	2 (7.14)	2 (7.14)	6 (8.82)	24 (13.26)	45 (18.51)	12 (22.64)
Pseudomembranous colitis	0	0	0	0	1 (0.41)	0
Ulcerative colitis	0	0	0	2 (1.1)	12 (4.93)	7 (13.21)
Total#	**28 (4.66)**	**27 (4.5)**	**68 (11.33)**	**181 (30.16)**	**243 (40.5)**	**53 (8.83)**

*Percent of each age group, #Percent of colitis subtypes

Table 3. Clinical manifestations

	Clinical manifestation				
	Abdominal pain N (%)*	Rectorrhagia N (%)	Chronic diarrhea N (%)	Rectal mass N (%)	Total N (%)
Allergic colitis	54 (73.97)	335 (77.72)	58 (77.33)	18 (85.71)	465 (77.5)
Crohn's colitis	1 (1.37)	4 (0.93)	1 (1.33)	0	6 (1)
Infectious colitis	0	15 (3.48)	1 (1.33)	0	16 (2.67)
Non-specific colitis	16 (21.92)	58 (13.45)	14 (18.67)	3 (14.29)	91 (15.17)
Pseudomembranous colitis	0	0	1 (1.33)	0	1 (0.17)
Ulcerative colitis	2 (2.74)	19 (4.4)	0	0	21 (3.5)
Total#	**73 (12.16)**	**431 (71.83)**	**75 (12.5)**	**21 (3.5)**	**600**

*Percent of each clinical manifestation, #Percent of colitis subtypes

Table 4. Colonoscopic findings

	Colonoscopic findings					
	Normal mucosa N (%)*	**Local erythema N (%)**	**Increased vascular pattern N (%)**	**Increased vascular pattern and mucosal nodularity N (%)**	**Ulcers with mucosal friability and contact bleeding N (%)**	**Total**
Allergic colitis	4 (66.67)	1 (25)	161 (79.7)	228 (88)	71 (55.04)	**465 (77.5)**
Crohn's colitis	0	0	0	1 (0.39)	5 (3.88)	**6 (1)**
Infectious colitis	0	1 (25)	4 (1.98)	0	11 (8.53)	**16 (2.67)**
Nonspecific colitis	2 (33.33)	2 (50)	36 (17.82)	27 (10.42)	24 (18.6)	**91 (15.17)**
Pseudomembranous colitis	0	0	0	0	1 (0.78)	**1 (0.17)**
Ulcerative colitis	0	0	1 (0.5)	3 (1.15)	17 (13.18)	**21 (3.5)**
Total#	**6 (1)**	**4 (0.66)**	**202 (33.6)**	**259 (43.1)**	**129 (21.5)**	**600 (100)**

*Percent of each colonoscopy finding, #Percent of colitis subtypes

DISCUSSION

In the present study, allergic colitis had the highest frequency (77.5%), the most common type of colitis in children under 6 months. AC is a common cause of gastrointestinal bleeding in children aged 1 to 6 months (8-10) and is more common in boys (9, 11, 12), similar to our study.

Akin to our study, the prevalence of AC decreases with age. By the age of 1 to 2 years, most infants with AC tolerate the allergen that provokes milk protein (10, 12). Given the high prevalence of allergic colitis, it seems diet plays a vital role in developing AC. Furthermore, in this study, infectious colitis was less prevalent in children under 1 year old. The possible reason for this could be the viral and often self-limiting gastrointestinal infections, which are less likely to require a colonoscopy to establish the diagnosis.

It is estimated that up to 10–25% of all diagnosed inflammatory bowel diseases occur in individuals aged 20 years or earlier (13). In our study, the highest prevalence of CC and UC was observed in the 5–12-year age group (2.05% and 4.93%, respectively). Some studies have shown that the highest prevalence of pediatric inflammatory bowel disease (IBD) occurs between the ages of 10 and 17 (13). In some studies, UC was more prevalent than CC among individuals aged 3–5 years (14, 15), similar to our findings. However, unlike our study, CC accounted for 60% of IBD in older children (6–12 years); this trend was also maintained in the 12 and older age group (14). In other studies, the incidence of CC was higher than that of UC in almost all regions (16, 17).

In the present study, CC was more common in boys, and UC was more common in girls. Some studies have reported male predominance in CC prevalence and incidence compared with females, with the opposite trend for UC (18-20). In another study, girls had a lower risk for CC at ages 10-14 years; however, this rate increased thereafter (21). By contrast, in some studies, the incidence of UC was not significantly different between boys and girls (21, 22).

The most frequently reported symptom was rectorrhagia (71.83%), which was most prevalent in AC (77.72%). Bloody stool with or without diarrhea has been observed as the most common manifestation of AC (10, 23). It has been introduced as a risk factor for the development of food-protein-induced allergic proctocolitis (12).

In the present study, the most common colonoscopy finding was increased vascular pattern and mucosal nodularity (43.1%), most commonly reported in AC. This was followed by an increased vascular pattern, which was most prevalent and was found similarly in other studies (24-26).

The most common finding in CC and UC was ulcers with mucosal friability and contact bleeding, consistent with similar studies (27-29). The most common complaint reported in CC and UC was bloody stool, also reported in other studies (27, 30). In another study, abdominal pain and chronic diarrhea were common symptoms in CC, while bloody diarrhea and rectal bleeding were common symptoms in UC (31).

Limitations

Only symptomatic children were included in this study, making it difficult to estimate the true prevalence of colitis, including symptomatic and asymptomatic cases. Also, the prevalence of colitis in different communities can

vary depending on genetic background, diet, and endemic gastrointestinal infections.

Due to challenges in proper colon preparation before colonoscopy in children and the possibility of insufficient sampling, the final diagnosis of the patients might be affected. Also, the arbitrary use of antibiotics by the patients and/or prescription of experimental antibiotics can affect the prevalence of infectious and pseudomembranous colitis, which was not assessed in this study. Worthy of mention, this study does not address patient follow-up or the relationship between clinical manifestations and age.

This study's sample comprises only a portion of the population; therefore, it is suggested that studies with larger sample sizes be conducted in other geographical and cultural regions of the country. Systematic studies and meta-analyses are recommended in this regard.

CONCLUSION

According to the present study's findings, considering patients' age is essential in the approach to chronic pediatric gastrointestinal diseases. Allergic colitis, with increased vascular pattern and mucosal nodularity on colonoscopy, was the most common histopathological finding in colon samples and the most common type of colitis in children under 6 months of age. Given the clinical manifestations, the results of the present study could serve as a guide for clinicians in pediatric gastrointestinal conditions and differential diagnoses.

Declarations and Statements

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CONFLICT OF INTEREST:

The authors declare no conflict of interest related to this work

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AVAILABILITY OF DATA

The datasets used during the present study are available from the corresponding author upon reasonable request.

ETHICAL CONSIDERATIONS:

This article is a part of the thesis titled "Epidemiological and histopathological findings of colitis types in children referred to Dr Mohammad Kermanshahi Hospital from 2016 to 2021" for the degree of General Medicine at the Faculty of Medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran. The ethical approval code is IR.KUMS.MED.REC.1402.176.

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