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Analysis of colorectal polyp in pediatric patients: A retrospective study from a tertiary center

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Abstract

The most common cause of rectal bleeding in childhood is colonic polyps. Approximately 90% of colorectal polyps observed in pediatric patients are solitary juvenile polyps, typically located in the rectosigmoid region. Twenty-four pathological specimens submitted to the Pathology Department of the Ankara Pediatric Hematology and Oncology Education and Research Hospital and Ankara Bilkent City Hospital were retrospectively analyzed. Of the 24 cases, 10 (41.7%) were females and 14 (58.3%) were males. The mean age at diagnosis was 9.1 years. Histopathological examination revealed juvenile polyps in 14 cases, tubular adenomas in 9 cases, and a single case of a prolapse-related inflammatory polyp. Juvenile polyps are the most prevalent type of colonic polyp in children and adolescents. Other gastrointestinal polyps, such as those associated with hamartomas and adenomatous polyposis syndromes, are less frequently encountered. However, adenomatous polyposis syndromes carry a high-risk of malignant transformation. Therefore, systematic screening and regular follow-up are essential for pediatric patient's diagnostic with these lesions.

Keywords: Colorectal polyps, juvenil polyp, tubular adenoma, pediatrics

Introduction

Gastrointestinal polyps are mucosal masses that protrude into the intestinal lumen [1,2]. They are less common in children than in adults. Clinically, pediatric patients usually asymptomatic [3]. However pediatric patients may present with painless rectal bleeding, anemia, abdominal pain, intestinal obstruction, and rectal prolapse [3,4]. Histopathological classification of pediatric polyps includes inflammatory polyps, hamartomatous polyps and epithelial polyps [5,6]. Juvenile polyps re the most common cause of rectal bleeding in children [7]. Approximately 90% of all colorectal polyps in pediatric patients are in the rectosigmoid region [7]. The term juvenile refers to the histological subtype, not the patient's age.

Adenomas, by contrast, are intraepithelial neoplasms characterized by dysplastic epithelial proliferation [8,9]. Most polyps identified in childhood are considered benign and without malignant potential [5].

The aim of this study was to document the histopathological types of gastrointestinal polypectomy specimens from a pediatric patient group diagnosed at our center and to review colonic polyps observed in the context of the relevant literature.

Material and Methods

Approval for this retrospective cohort study was granted by the Research Ethics Committee of Ankara Bilkent City Hospital (No: TABED 1/1560/2025, Date: 30 July 2025). Written informed consent was obtained from parents of children who participated in this study.

Twenty-four cases referred to the pathology departments of Ankara Children's Health and Diseases Hematology-Oncology Training and Research Hospital and Ankara Bilkent City Hospital between 2005 and 2025 were retrospectively reviewed. The cases were evaluated by gender, age, family history, symptoms, lesion location, lesion diameter, and histopathological polyp type. Clinical data was obtained from the instutional electronic medical record system.

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Data obtained in the study was analyzed statistically using Microsoft Excel software. Depending on the characteristics of the variables, percentages, mean values were used in the statistical evaluations.

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Results

Of the 24 cases, 41.7% were female (n=10) and 58.3% were male (n=14). The age of patients at the diagnosis ranging 1 to 17 and mean age was 9.1 years. Demographic distribution of cases summarized in Table 1.

Table 1. Demographic distribution of cases

Variables	Number of patients
Gender	
Male	14 (58.3%)
Female	10 (41.6%)
Location	
İsolated rectum	12 (50%)
Rectum+ other colonic segments	9 (37.5%)
Other locations	3 (12.5%, 1 ascending colon, 2 descending colon and sigmoid colon)
Polyp types	
Juvenil polyp	14 (58.3%)
Tubular adenoma	9 (37.5%)
Inflammatory polyp	1 (4.1%)
Clinical presentation	
Rectal bleeding	12 (50%)
Fap history	9 (37.5%)
Anemia	2 (8.3%)
Spontaneous sloughing of a colonic tissue	1 (4.1%)

Rectal bleeding seen 41.6% (n=10) of cases presented with rectal bleeding, 41.6%(n=10) with familial adenomatous polyposis coli (FAP), 4.1% (n=1) with iron deficiency anemia, 8.3% (n=2) with abdominal pain, and 4.1% (n=1) with a history of aborted colon. Polyps were identified during colonoscopic examination.

Half of the cases (n=12) had a solitary polyp in the rectum, 37.5% (n=9) had multiple polyps involving both the rectum and other colonic segments, and 8.3% (n=2) patients had solitary polyps in the descending colon and sigmoid colon, 4.1%(n=1) patient had a solitary polyp in the ascending colon. The size of the lesions ranged from 0.1 cm to 3 cm.

Histopathological analysis revealed 58.3% (n=14) juvenile polyps, 37.5% (n=9) tubular adenomas, and 4.1% (n=1) prolapse-associated inflammatory polyp (Figure 1, Figure 2 and Figure 3). A positive family history of adenomatous polyposis was reported in 88.8% (n=8) of cases with tubular adenomas.

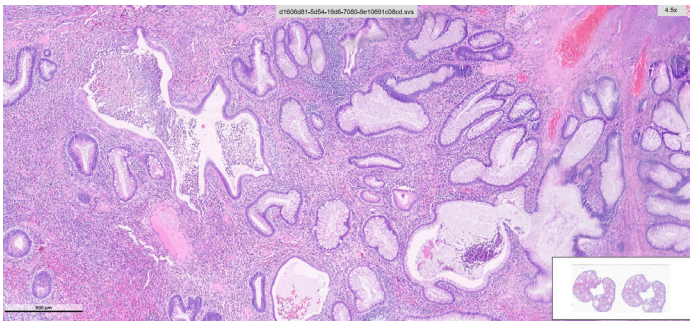

Figure 1. Juvenile polyp. H&E section. Edematous lamina propria with inflammatory cells and cystically dilated glands lined by cuboidal epithelium

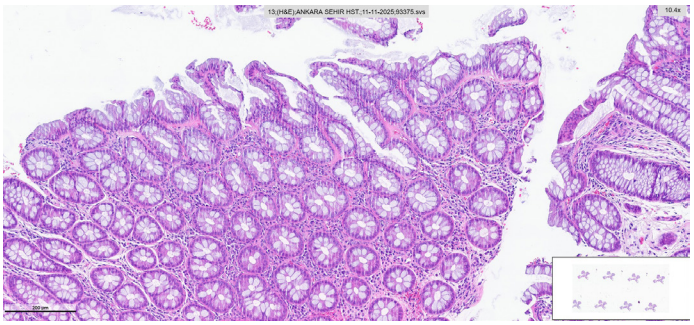

Figure 2. Hyperplastic polyp. H&E section. Serrated architecture with a sawtooth appearance. Epithelium showed mild nuclear enlargement, stratification and hyperchromasia

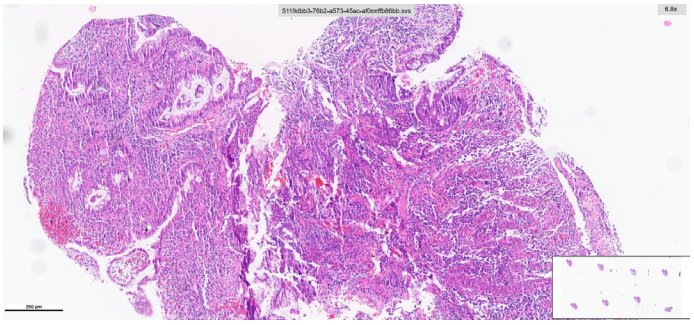

Figure 3. Inflammatory polyp. H&E section. Polypoid lesion lined with normal colonic mucosa and expanded lamina propria with extensive inflammation and crypt abscesses

And, 4.1% (n=1) of case with a family history of Familial Adenomatous Polyposis (FAP) multiple juvenile polyps were observed in rectum and other colonic segments. Among patients followed up due to a history of FAP, hyperplastic polyps were found in the descending colon in 4.1% (n=1) of cases and inflammatory polyps in the sigmoid colon in 4.1%(n=1) of cases

Finally, 4.1% (n=1) of patient who presented with rectal bleeding and had no family history of FAP, colonoscopy demostrated a tubular adenoma in the rectum.

Discussion

Most colonic polyps in the pediatric age group are asymptomatic. However, the most common clinical findings of coloniz polyps in children are rectal bleeding and anemia [10]. Silbetmintz et al. reported that polyps were detected in 41.6% of children

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presenting with lower gastrointestinal bleeding [11].

Approximately 70% were solitary juvenile polyps, 26% multiple juvenile polyps, and 4% adenomatous polyps [12]. In our study,consistent with the literature, juvenile polyps were observed in 58.3% (n=14) of cases, making them the most common histological subtype.

Hamartomatous polyps are classified into four distinct forms: solitary juvenile polyps, infantile juvenile polyposis syndrome (JPS), juvenile polyposis coli, and generalized JPS. The sporadic form, seen in 2% of the pediatric pateints population, is the most common type [13]. Autosomal dominant JPS is associated with mutations in the SMAD4/DPC4 and BMPR1A genes, somponent of the TGF-B signaling pathway, and carries risk for adenoma and adenocarcinoma [12,13]. Juvenile polyps are usually located in the rectosigmoid region [14]. Histologically, they are composed of cystically dilated crypts with a mixed inflammatory infiltrate consisting of plasma cells, lymphocytes, and neutrophils, in the lamina propria. The surface may appear edematous and congested [1,15]. In our study, among the juvenile polyps, 57.1% (n=8) of them were detected in the rectum, 35.7% (n=5) were detected in the rectum and other colonic segments and one case was located in the ascending colon. In the majority of cases, consistent with the literature, polyps are seen in the rectum.

Other syndromic or non-syndromic polyps include Peutz-Jeghers, Cowden, and Cronkhite-Canada syndromes, adenomas (tubular, villous, and tubulovillous), and familial adenomatous polyposis (FAP) [16].

Peutz-Jeghers syndrome is an autosomal dominant condition marked by mucocutaneous pigmentation and multiple hamartomatous polyps with a risk for both intestinal and extraintestinal malignancies [15,17]. STK11/LKB1 tumor suppressor gene mutations are present in 60% of familial and 50% of sporadic cases [6]. Histologically, polyps display tree-like smooth muscle extensions from muscularis mucosae and a hyperplastic apithelial surface with normal cullar lamina porpria [6]. There were no syndromic cases in our study.

Cowden syndrome, also autosomal dominant, involves hamartomas derived from all three germ layers and is associated with PTEN gene mutations. It predisposes to malignancies of the thyroid, breast, endometrium, colon, and kidney [18].

Cronkhite-Canada syndrome is a non-hereditary condition characterized by hamartomatous polyps and ectodermal anomalies such as nail dystrophy, alopccia, and skin hyperpigmentation [19]. There were no syndromic cases in our study.

Adenomas are intraepithelial neoplasms exhibiting epithelial dysplasia [20]. They are classified in to tubular, villous, and tubulovillous types. Malignancy risk is associated with polyp diameter, villous architecture, and degree of epithelial dysplasia. The adenoma-carcinoma sequence follows the APC/β-catenin pathway. Early APC gene mutations (on 5q21), followed by K-RAS, p53, and 18q deletions, drive carcinogenesis [21,22].

FAP is caused by autosomal dominant mutations in the APC gene [23], Variants iclude FAP, Gardner, Turcot syndrome, attenuated FAP, and MUTYH-associated polyposis. In classic FAP, more than 100 adenomatous polyps are present in the colon. The majority of these are tubular adenomas [24]. In our study, 37.5% (n=9) of cases had tubular adenoma, with 88.8% (n=8) having a known family history and were followed up. Additionally, 4.1% (n=1) of patients who presented with rectal bleeding and had no family history of FAP, colonoscopy demostrated a tubular adenoma in the rectum. Moreover, 4.1%(n=1) of cases with a family history of FAP, multiple juvenile polyps were observed in rectum and other colonic segments

Gardner syndrome includes colonic polyps, desmoid tumors, osteomas, and epidermal cysts. Turcot syndrome combines polyps with central nervous system tumors such as medulloblastoma or glioblastoma. MUTYH-associated polyposis presents similarly to attenuated FAP but involves biallelic mutation in the MutY homologous gene without APC gene mutation [12]. There were no syndromic cases in our study.

Serrate polyps are classified as hyperplastic, conventional and sessile serrate adenomas. Hyperplastic polyps are lesions measuring 1-5 mm and located in the distal colon. Hyperplastic polyps categorized as microvesicular, goblet cell rich, or mucin-poor [22]. Sessile serrated lesions are linked with microsatellite instability and exhibit features such as crypt dilatation, L- and T- shaped bases, and horizontal growth [22,24]. In our study, most cases with familial polyposis presented with multiple tubular adenomas; 4.1% (n=1) of that cases involves a solitary hyperplastic polyp in the transverse colon and 4.1% (n=1) of them had an inflammatory polyp.

Familial cases generally localize to the left colon [5,24]. Consistently, 95.8% (n=23) of polyps in our cohort were left-sided; 8.3% of them were found in different location in colon without rectum involvement and 4.1% of them was found only in the ascending colon. Thus rectosigmoidoscopy alone may not be sufficient in rectal bleeding cases and pediatric polyp evaluation.

Conclusion

In conclusion, most colonic polyps in children are benign. However, adenomatous polyposis syndromes pose a significant malignancy risk, particularly in the context of generic predisposition. In our study, it was determined that rectosigmoidoscopy alone may be insufficient, juvenile polyps may be seen in patients followed with FAP, and tubular adenoma with dysplasia and a risk of malignancy is not seen only in FAP patients. Therefore, genetic counseling, lon-term clonoscopic surveillance, and family screening are crucial components of management in affected pediatric patients.

This stıdy has several limitations. First, the retrospective design may have led to incomplete clinical data collection and potential bias. Second, the relatively small sample size limits the generalizability of the findings. Third, genetic analysis was

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not performed for all patients, which restricted our ability to fully characterize the hereditary basis of polyposis syndromes. Future studies with larger, multicenter, and prospectively designed cohorts are needed to validate and expand our findings. Comprehensive genetic analyses are strongly recommended to clarify hereditary predispositions, especially in cases of multiple or recurrent polyps.

Ethical Approval
Approved by the Research Ethics Committee of Ankara Bilkent City Hospital (No: TABED 1/1560/2025, Date: 30 July 2025).

Patient Consent
Written informed consent was obtained from parents of children who participated in this study.

Conflict of Interest
The authors declare no conflict of interest.

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