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Original Article *Özgün Araştırma*

MECKEL'S DIVERTICULUM IN CHILDREN: A SINGLE-CENTER EXPERIENCE

Çocuklarda Meckel Divertikülleri: Tek Merkez Deneyimi

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ABSTRACT

Objective: We aimed to investigate the epidemiological and characteristic features of patients with Meckel's diverticulum (MD) treated in our clinic and share our experiences.

Material and Methods: Records of patients were reviewed retrospectively. Demographic and clinical data, the treatments modalities, appearance and location of MD and results of histopathological examination were investigated. Patients were compared according to gender and whether they were symptomatic. Statistical analysis evaluated with SPSS version 21. P<0.05 was considered significant.

Results: A total of 59 patients (14 female, 45 male) were included in the study. There was no difference between genders in terms of age, length-of-hospital stay and location MD (p=0.60, p=0.072 and p=0.765, respectively). Abdominal pain was the most common reason for admission in both genders. There were 45 patients in the symptomatic group and 14 patients in the incidental group. MD in the symptomatic group was located more proximal (p=0.041) but there was no difference between the groups in terms of other parameters. The scintigraphy was positive in eight of nine patients, while it was negative in one. The most common ectopic tissue detected in patients was gastric mucosa (70%). Forty-seven patients were operated on with open surgical technique. Appearance of MD was normal in 23 patients (39.0%), and the diverticulitis was seen in 17 (28.8%). In five patients who were diagnosed incidentally during appendectomy, MD was not resected because they were asymptomatic. Diverticulectomy was performed in 34 patients (57.6%), while anastomosis was performed with segmental-ileal-resection in others. None of patients died.

Conclusion: Most patients present with symptoms resulting from complications of MD. Since these complications cause acute abdomen, MD should be kept in mind in the differential diagnosis of children presenting with abdominal pain. In addition, it should be known that MD can be seen in children older than the classical age-range described in literature.

***Keywords**: Meckel diverticulum, children, diverticulectomy, ectopic tissue*

ÖZ

Amaç: Meckel divertikülü (MD) gastrointestinal kanalın en sık görülen konjenital anomalisidir. Çalışmamızın amacı MD hastalarımızın epidemiyolojik ve karakteristik özelliklerini araştırmak ve konuyla ilgili tecrübelerimizi paylaşmaktır.

Gereç ve Yöntemler: MD hastalarının dosyaları retrospektif olarak incelendi. Hastaların demografik ve klinik verileri, uygulanan tedaviler, divertikülün görünümü, lokasyonu ve histopatolojik inceleme sonuçları araştırıldı. Hastalar önce cinsiyetlerine sonra semptomatik olup olmadığına göre gruplandırılarak karşılaştırıldı. İstatistiksel analizler SPSS version 21 ile yapıldı. P<0,05 anlamlı olarak kabul edildi.

Bulgular: Çalışmaya 14 kız ve 45 erkek olmak üzere (F/M=1/3) 59 hasta dahil edildi. Cinsiyetler arasında yaş, hastanede kalma süreleri ve divertikülün lokasyonu açılarından fark bulunmadı (sırasıyla p=0.60, p=0.072 ve p=0.765). Her iki cinsiyette de en sık hastaneye başvuru nedeni karın ağrısı idi. Semptomatik hasta grubunda 45, insidental hasta grubunda 14 hasta vardı. Semptomatik hasta grubundakilerin divertikülleri daha proksimal yerleşimli olup (p=0.041) diğer parametreler açısından gruplar arasında fark bulunmadı. Sintigrafisi yapılan dokuz hastanın sekizinde test pozitif sonuçlanırken bir hastada negatif olarak sonuçlandı. Tüm hastalarda en sık tespit edilen ektopik doku gastrik doku (%70) idi. Hastaların 47'si açık cerrahi teknik ile opere edildi. Yirmi üç hastada (%39.0) divertikülün görünümü normal, 17 hastada (%28.8) ise makroskopik olarak divertikülit görünümü vardı. Apendektomi yapılırken insidental olarak tanı konulan beş hasta asemptomatik oldukları için divertiküllerine müdahale edilmedi. Otuz dört hastada (%57.6) divertikülektomi yapılırken diğer hastalarda segmental ileal rezeksiyon ile anastomoz yapıldı. Hastalardan hayatını kaybeden olmadı.

Sonuç: MD hastalarının çoğu, hastalığın komplikasyonları sonucu meydana gelen semptomlarla başvurur. Bu komplikasyonlar akut batın tablosuna neden oldukları için karın ağrısı şikayetiyle başvuran çocuklarda ayırıcı tanıda MD akılda tutulmalıdır. Ayrıca literatürde tariflenen klasik yaş aralığından daha büyük çocuklarda da MD görülebileceği bilinmelidir.

***Anahtar Kelimeler**: Meckel divertikülü, çocuklar, divertikülektomi, ektopik doku*

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INTRODUCTION

Meckel's diverticulum (MD), an omphalomesenteric duct remnant, is the most common congenital anomaly of the gastrointestinal tract (1). Its prevalence is between 2 and 4%. Mostly asymptomatic, MD becomes complicated and symptomatic in 2% of patients (2). The most common symptoms in children are bleeding (30-56%), intestinal obstruction, and inflammation of the diverticulum (3). In addition, it may present with clinical presentations such as intussusception, perforation, and incarceration into the inguinal hernia (Littre's hernia).

Meckel's diverticulum is a true diverticulum because it includes all layers of the intestinal wall. It is also known as two's disease because the rule of two's is used in diagnosis. According to the "rule of two's," MD involves two types of heterotopic mucosa, usually located 2 feet from the ileocecal valve, 2 inches long, about 2 cm in diameter, and it is generally diagnosed before age 2, seen twice in men, and its incidence is around 2% (2).

Although less common, it can be located in malignant structures, such as carcinoid tumors, especially in adults (4). Although it is typically end-free, it is connected to the umbilicus by a fibrous band in 26% of cases (5).

Diagnosis is performed via clinical and imaging methods. Complicated cases (obstruction, perforation, invagination, and bleeding) are usually diagnosed during operation. In other cases, ultrasonography, computed tomography, and Technetium-99m pertechnetate scintigraphy are used for diagnosis (3). Treatment is the surgical excision of the diverticulum (6).

Our study aims to investigate the epidemiological and characteristic features of MD patients treated in our clinic and share our experiences.

MATERIALS AND METHODS

The electronic and physical medical records of patients diagnosed with MD in our clinic between 01.01.2013 and 31.12.2020 were retrospectively reviewed. The study was approved by the local ethics committee (Ankara City Hospital Clinical Research Ethics Committee, date: 07/04/2021; issue number: E2-21-360).

Demographic data include age, gender, admission complaints, preoperative diagnosis, length of hospital stays, treatment modalities, surgical methods, the intraoperative appearance of MD, location of the diverticulum, histopathological examination results, and mortality rates were investigated.

First, the patients were divided into two groups according to gender, and we investigated whether there was a difference between the groups. Then, they were divided into symptomatic and asymptomatic (incidental) groups. Differences between groups were analyzed. Patients who applied with the complaints such as abdominal pain, vomiting, rectal bleeding, obstruction, invagination, diverticulitis, and perforation, which are the symptoms that develop due to complications of MD, and those diagnosed intraoperatively as MD was classified as "symptomatic," while patients who were operated on for another reason and intraoperatively diagnosed as MD were categorized as "incidental." Also, patients with abdominal pain and vomiting associated with MD were classified as symptomatic, and patients with these symptoms due to acute appendicitis or another cause were classified as incidental.

Surgery was performed in either an open or laparoscopic fashion. In patients who were operated on laparoscopically, the intestinal segment with MD was taken out via the umbilical port entrance hole, extended after diagnosis. Subsequently, diverticulectomy or resection-anastomosis was performed extracorporeally. Finally, the intestinal segments were placed back into the abdomen. The location of the diverticulum was determined by measuring the centimeters proximal from the ileocecal valve.

Statistical analysis was performed with the Statistical Package for the Social Sciences (SPSS) software Version 21 (SPSS Inc., Chicago, IL, USA). The age of

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the patients, the length of hospital stay, and the location of the diverticulum were expressed as mean ±SD (Min-Max) in the form of numerical variables. Whether these variables were normally distributed was investigated with Kolmogorov-Smirnov or Shapiro-Wilk tests, which are normality tests. Differences between groups were investigated using a Student's t-test for those variables with a normal distribution (age and locations of diverticulum) and a Mann-Whitney U-test for those without one (length of hospital stay). Differences between groups for categorical variables, such as gender, presentation complaints, preoperative diagnosis, treatment methods, surgical methods, the intraoperative appearance of the diverticulum, and histopathological examination results, were investigated via cross-tabulation with Pearson Chi-Square or Fisher's Exact test. Cells with "zero" sample numbers were combined for cross-tabulation and analyzed. P <0.05 was considered significant for all variables.

RESULTS

Demographic Data of Patients: Between the defined dates, 59 patients were diagnosed as MD and treated. Of these patients, 14 (23.8%) were female, and 45 (76.2%) were male. The ratio of girls to boys was approximately 1/3. The mean age of the patients was 8.2 years. The mean length of hospital stay was 7.1 days, and the mean distance of the diverticulum to the ileocecal valve was 55.2 cm. There was no difference between the two genders regarding age, length of hospital stay, and MD location (p=0.60, p=0.072, and p=0.765, respectively). The most common reason for admission to the hospital was abdominal pain, with or without vomiting. A total of 45 patients (76.3%) presented with abdominal pain, 17 of them (28.8%) with only abdominal pain and 28 (47.5%) with vomiting. There was no difference between the two genders regarding complaints upon admission to the hospital (p=0.792) (Table 1).

It was observed that, in 51 patients (86.4%), the ends of the diverticula were free, and in seven patients (11.9%), they were attached to the umbilicus by a fibrous band at the ends. In one patient, the segment in which the diverticulum was included was the existing defect in the meso of the diverticulum herniated. There was obstruction due to an incarcerated internal hernia. However, the tip of the diverticulum was free. There was no difference between the two genders in terms of the presence of a fibrous band at the tip of the diverticulum (p=0.666) (Table 1).

The diverticula of five patients diagnosed incidentally during appendectomy and asymptomatic were not operated on. Most commonly, diverticulectomy was performed in patients who underwent surgical intervention (n = 34, 57.6%). The epidemiological data for the patients are shown in Table 1.

Clinical Presentation and Preoperative Diagnosis: While 45 (76.3%) of the patients presented with MD-related symptoms (symptomatic group), 14 patients (23.7%) were diagnosed incidentally (incidental group) during operations performed for other reasons, mostly appendectomies; there was only a difference in the location of the diverticulum between the two groups (p=0.041). Symptomatic MDs were located more proximal to the ileocecal valve (59.1 cm versus 45.0 cm). There was no statistically significant difference in gender, age, length of hospital stay, admission complaints, and histopathological results for the diverticulum (p=1.000, p=0.940, p=0.640, p=0.836, and p=0.467, respectively). There was no difference between girls and boys regarding preoperative diagnosis (p=0.355) (Table 1). The statistical analysis of patients with symptomatic and incidental diagnoses is shown in Table 2. Patients diagnosed with Meckel's diverticulum preoperatively.

Only ten (16.9%) patients were operated upon with a preliminary diagnosis of MD. The other patients (83.1%) were diagnosed while being operated upon with a different pre-diagnosis. The most common preliminary diagnosis was acute appendicitis (n=28, 47.5%), followed by intussusception (n=14, 23.7%).

Table 1: Demographic characteristics of the patients and comparison of the values of females and males

Variables	**Female (n=14) (%)**	**Male (n=45) (%)**	**p**	**Total (n=59) (%)**
Age (years), Mean±SD (min-max)	8.8±4.0 (1.0-16.8)	8.0±5.0 (0.01-17.0)	0.60 *	8.2±4.8 (0.01-17.0)
Length of stay at hospital (days), Mean±SD (min-max)	6.6±5.5 (3.0-25.0)	7.3±3.6 (2.0-20.0)	0.072 *	7.1±4.0 (2.0-25.0)
Location of diverticulum (cm), Mean±SD (min-max) µ	55.8±23.4 (20-110)	55.0± 21.6 (20-100)	0.765 *	55.2±21.8(20-110)
Submission complaints, n (%)§				
Abdominal pain	3 (21.4)	14 (31.1)	0.792**	17 (28.8)
Abdominal pain with vomiting	7 (50.0)	21 (46.7)		28 (47.5)
Rectal hemorrhage	4 (28.6)	8 (17.8)		12 (20.3)
Apurulent discharge from the belly	0	1 (2.2)		1 (1.7)
During omphalocele repair	0	1 (2.2)		1 (1.7)
Preoperative diagnosis, n (%)§				
Meckel diverticulum	3 (21.4)	7 (15.6)	0.355**	10 (16.9)
Acute appendicitis	9 (64.3)	19 (42.2)		28 (47.5)
Intussusception	1 (7.1)	13 (28.9)		14 (23.7
Obstruction (Ileus or volvulus)	1 (7.1)	4 (8.9)		5 (8.5)
Omphalocele	0	1 (2.2)		1 (1.7)
Urachal remnant	0	1 (2.2)		1 (1.7)
Surgical technique, n (%)				
Open surgery	10 (71.5)	37 (82.3)	0.501**	47 (79.6)
Laparoscopic	3 (21.4)	6 (13.3)		9 (15.3)
Laparoscopic converted to open	1 (7.1)	2 (4.4)		3 (5.1)
Intraoperative appearance of diverticulum, n (%)§				
Normal	5 (35.7)	18 (40.0)	0.459**	23 (39.0)
Diverticulitis	5 (35.7)	12 (26.7)		17 (28.8)
As a leading point of intussusception	1 (7.1)	10 (22.2)		11 (18.6)
Perforated	1 (7.1)	3 (6.7)		4 (6.8)
With torsion + volvulus causing obstruct.	2 (14.4)	1 (2.2)		3 (5.1)
With omphalomesenteric duct remnant	0	1 (2.2)		1 (1.7)
Tip of the diverticulum, n (%)§				
Free	13 (92.9)	38 (84.4)	0.666**	51 (86.4)
With fibrous cord attached to umbilicus	1 (7.1)	6 (13.4)		7 (11.9)
Internal hernia	0	1 (2.2)		1 (1.7)
Surgical technique, n (%)§				
Unresected (asympt. incidentally diagn.)	0	5 (11.1)	0.889***	5 (8.5)
Diverticulectomy	9 (64.3)	25 (55.6)		34 (57.6)
Segmental ileal resection with anastomosis	5 (35.7)	15 (33.3)		20 (33.9)
Histopathologically identified ectopic tissue, n (%)§				
No ectopic tissue	6 (42.9)	21 (46.7)	0.808**	27 (45.7)
Gastric	7 (50.0)	15 (33.3)		22 (37.3)
Pancreatic	0	1 (2.2)		1 (1.7)
Gastric and pancreatic	1 (7.1)	2 (4.4)		3 (5.1)
Burkitt lymphoma	0	1 (2.2)		1 (1.7)
Unresected (No report)	0	5 (11.1)		5 (8.5)

* Mann Whitney U test used. ** Fischer exact test used. *** Pearson Chi-Square test used
§ The cells have a value of zero was combined with similar cells for crosstabulation,
µ Only 50 patients (female=12 and male=38) whose locations were known were evaluated.

Table 2: Statistical analysis of symptomatic and asymptomatic patients

	Symptomatic n=45 (%)	**Incidental** n=14 (%)	**P**
Gender			
Female	11 (24.4)	3 (21.4)	1.000*
Male	34 (75.6)	11 (78.6)	
Age, Mean±SD(Min-Max)	8.2±4.7 (0.27-17.0)	8.1±5.0 (0.01-16.0)	0.940**
Length of stay at hospital (Days), Mean±SD (min-max)	7.3±4.2(3.0-25.0)	6.4±3.4(2.0-13.0)	0.640***
Location of diverticulum (cm), Mean±SD (min-max)[μ]	59.1±22.8 (20-110)	45.0±15.2 (20-70)	0.041***
Submission complaints[§]			
Abdominal pain	10 (22.2)	7 (50.0)	
Abdominal pain with vomiting	22 (48.9)	6 (42.9)	
Rectal hemorrhage	12 (26.7)	0	0.836*
A purulent discharge from the belly	1 (2.2)	0	
During omphalocele repair	0	1 (7.1)	
Histopathologically identified ectopic tissue[# §]			
None ectopic tissue	21 (46.7)	6 (54.5)	
Gastric	19 (42.2)	5 (45.5)	
Pancreatic	1 (2.2)	0	0.467*
Gastric and pancreatic	3 (6.7)	0	
Burkitt lymphoma	1 (2.2)	0	

* Fischer exact test, ** Student T test, *** Mann-Whitney U test used,
[μ] The data of 37 cases from the symptomatic group and 13 cases from the incidental group were evaluated.
[§] The cells have a value of zero was combined with similar cells for crosstabulation,
[#] Five asymptomatic cases in the Incidental group that were not resected were excluded.

While the most common reason for admission among patients diagnosed with preoperative MD was abdominal pain (alone or with vomiting) only three patients (30%) presented with a complaint of rectal bleeding. Scintigraphy was performed in nine cases (90%). Eight of these (80%) tested positive, while one patient was negative.

Gastric tissue (70%) was the most frequently detected ectopic tissue histopathologically in patients diagnosed with preoperative MD. Detailed information on the patients diagnosed with preoperative MD is given in Table 3.

Patients Diagnosed with Preoperative Intussusception: Fourteen patients (23.7%) were hospitalized with a preliminary diagnosis of intussusception based on ultrasound images and physical examination findings. However, intraoperatively, three of them did not have intussusception. Two of them had diverticulitis. One of them had a normal MD but perforated appendicitis. MD was a leading point that caused intussusception in eleven patients (18.6%). The mean age of these patients was greater than the age of those with idiopathic intussusception [mean=9.3±(0.68–16.0)]. In six (54.6%) patients, an attempt was made by ultrasound-guided rectal administration of isotonic saline. However, none of these efforts succeeded. No intervention was performed in the other five patients. Intussuscepton was ileoileal in five patients (45.4%). The most common ectopic tissue detected in these patients was stomach

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tissue. Detailed information on the MD cases with intussusception is shown in Table 4.

Table 3: Analysis of patients (n=10) preoperatively diagnosed as Meckel's diverticulum

Variables	Results
Age (years), Mean±SD (min-max)	8.3±5.0 (0.7-16.8)
Gender, n (%)	
Female	3 (30)
Male	7 (70)
Submission complaints, n (%)	
Abdominal pain	3 (30.0)
Abdominal pain with vomiting	4 (40.0)
Rectal hemorrhage	3 (30.0)
Tip of the diverticulum, n (%)	
Free	9 (90)
With fibrous cord attached to umbilicus	1(10)
Surgical technique, n (%)	
Diverticulectomy	2 (20.0)
Segmental ileal resection + anastomosis	8 (80.0)
Histopathologically identified ectopic tissue, n (%)	
Without ectopic tissue	2 (20.0)
Gastric	7 (70.0)
Gastric and pancreatic	1 (10.0)
Scintigraphy, n (%)	
None	1 (10.0)
Positive	8 (80.0)
Negative	1 (10.0)

Perioperative Data: Forty-seven (79.6%) patients were operated upon with an open surgical technique. The appearance of the diverticulum was normal in 23 (39.0%) patients. Macroscopic diverticulitis was seen in 17 patients (28.8%). A diagnosis of MD was made incidentally during the repair of the defect in a newborn diagnosed with omphalocele. This patient underwent a diverticulectomy. Gastric ectopia was found based on histopathological examination.

Table 4: Analysis of patients (n = 11) preoperatively diagnosed as intussusception

Variables	Result
Age (Years), Mean±SD (Min-Max)	9.3± (0.68-16.0)
Gender, n (%)	
Male	9 (81.8)
Female	2 (18.2)
Location of intussusception n (%)	
Ileoileal	5 (45.4)
Ileocecal	3 (27.3)
Ileocolic	3 (27.3)
Ultrasound guided reduction with saline, n (%)	
None	5 (45.4)
Done but unsuccessful	6 (54.6)
Surgical technique, n (%)	
Diverticulectomy	8 (72.7)
Segmental ileal resection + anastomosis	3 (27.3)
Histopathologically identified ectopic tissue, n (%)	
No ectopic tissue	6 (54.6)
Gastric	4 (36.3)
Gastric and pancreatic	1 (9.1)

A 6-year-old male patient presented with the umbilical discharge was operated upon with a presumptive diagnosis of the urachal remnant. However, an omphalomesenteric duct opening with MD was observed during the operation. The diverticulum was excised. Histopathological examination revealed normal small bowel mucosa. In five patients diagnosed with MD incidentally during appendectomy, the diverticula were not resected, because they were asymptomatic. Diverticulectomy was performed in 34 patients (57.6%), while anastomosis with segmental ileal resection was performed in the other patients. The detailed perioperative information regarding the patients is given in Table 1. None of the patients treated for MD died.

Histopathological Findings: Histopathological examination was performed in all patients (n=54, 91.5%), except for five patients who did not undergo

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resection. Therefore, various ectopic tissues were detected in 50% (27/54) of the remaining patients after the five cases detected as incidental but not touched and not known to have ectopic tissue were removed. On the other hand, in 27 patients (50%), normal small bowel mucosa was detected, and no ectopic tissue was found. The most common ectopic tissue (n=22, 37.3%) was stomach tissue. Burkitt lymphoma was detected in one patient, and treatment was begun. There was no difference between the two genders regarding histopathological findings (p=0.808) (Table 1).

DISCUSSION

Typically, MDs are asymptomatic, and only 4–6% are symptomatic (7). Their symptoms occur as a result of complications of the diverticulum and can be confused with the symptoms of many diseases (7). For this reason, they are difficult to diagnose preoperatively and usually diagnosed intraoperatively in patients who have been operated upon with a pre-diagnosis of acute appendicitis and a similarly acute abdominal issue (8). Our results show that most of our patients presented with acute abdominal findings in the literature. Only ten patients (16.9%) were preoperatively diagnosed with MD. Therefore, MD should be considered in the differential diagnosis of patients presenting with acute abdominal issues.

The "rule of 2" for MD is described in the literature. Accordingly, the diagnosis of MD is most often made around the age of 2 years (2). However, the mean age of our patients was found to be 8.2 years, which stands in contrast to the data from the literature. Francis et al. reported the mean age of their patients to be 6.0 years in their study involving 208 patients (9). Similarly, Irvine et al. found the mean age of their patients to be 4.82 years (10). Huang et al. found the mean age of 100 pediatric MD patients to be 5.32 years (11). Similarly, many studies report the age at diagnosis for pediatric MD patients to be higher than two years (5,8). Therefore, we think this literature information should be re-evaluated with extensive meta-analyses.

Consistent with the literature, MD was more common in males in our series (F/M = 1/3). In the literature, it has been reported that MD is more common in males (12). In terms of the location of the diverticulum, our data were compatible with the literature.

The most common reason for our patients to apply for admission to the hospital was abdominal pain, either alone or with vomiting. The second most common reason for admission was rectal bleeding. The most common prediagnosis in patients presenting with abdominal pain was acute appendicitis. This was followed by intussusception.

While surgical excision is unquestionably recommended in treating symptomatic MDs, there are different approaches to managing incidentally diagnosed asymptomatic MDs (13). Some authors suggest excision in cases with incidental findings in adult patients, while others indicate that MD should not be operated on. While some authors suggest excision in cases with identified risk factors, they suggest follow-up in other cases (13). Park et al. recommend resection in cases in which one of the four factors is present in adult patients. These factors were the patient's young age (<50 years), gender (male), length of the diverticulum (<2 cm), and presence of ectopic tissue findings (4). Robijn et al. recommend that male gender, age (<45 years), a length of more than 2 cm, and the presence of a fibrous band at the tip of the diverticulum be considered risk factors (14). The patient's young age was seen as a risk factor for developing complications in all studies. Mackey et al. found that 70% of the patients who developed complications were younger than 40 years (15). Leijonmarck et al. suggest that the probability of developing complications decreases with age. The incidence of complications is 3.7% at the age of 16, which reduces to 2% at the age of 30 and decreases to almost 0% in the elderly (16). Ludkte et al. reported that the most common complications in children were seen

before <2 years (17). For this reason, resection is recommended in children (18). Cullen et al. recommend the resection of all incidentally detected MDs (6). In our patients, resection was performed in cases detected incidentally, but resection was not performed in five patients diagnosed incidentally during an appendectomy. In these cases, because the appendix was mainly perforated and the abdomen was inflamed, resection with appendectomy was not considered safe, so the diverticula were not resected to avoid complications. However, the MD was surgically resected in the remaining patients who were diagnosed incidentally.

It has been reported that the length of the diverticulum is an essential factor in the development of complications in adults and that the probability of developing complications is higher in MDs longer than 2 cm (4,14). However, in children, the size of the diverticulum increases with age. Therefore, diverticulum lengths are not considered in children (14). We did not measure diverticulum lengths in our patients. Most MDs have ectopic epithelial tissue. The currently accepted theory is that these heterotropic tissues originate from pluripotent cells formerly located in the omphalomesenteric duct (19). It has also been suggested that improper molecular signaling throughout the GI tract, along with the loss of the sonic hedgehog gene, may be responsible for the development of ectopic pancreatic tissue (20). The presence of ectopic tissue causes complications highly (4,19). The most common ectopic tissue in MD is gastric tissue (19). Consistent with the literature, the most common tissue in our cases was gastric tissue.

The complications of MD should be kept in mind in the differential diagnosis of children presenting with abdominal pain because they are among the clinical causes of acute abdominal issues. It should be known that MD can also be seen in children older than the classical age range defined in the literature.

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