Research Article

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Evaluation of children with dysfagia

Disfajisi olan çocukların değerlendirilmesi

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Abstract

Purpose: Difficulty in swallowing; It is a symptom that occurs as a result of mechanical inhibition of the transfer of ingested food from the mouth to the stomach. It can be due to acute and chronic diseases. It is presented because of the limited number of studies comparing the characteristics of both types of oropharyngeal and esophageal dysphagia in healthy and chronically ill children in the pediatric population.

Materials and methods: 201 pediatric patients admitted with dysphagia between May 2019 and November 2020 were included. They were grouped according to the types of dysphagia.

Results: Group 1 consisted of 80 pediatric patients with oropharyngeal dysphagia, while Group 2 consisted of 121 pediatric patients with esophageal dysphagia. 51.7% of the patients were female, mean age was 9.4 years. While all patients in Group 2 had solid food dysphagia, Group 1 had 27% liquid and 53% solid-liquid dysphagia. Percutaneous endoscopic gastrostomy tube for 50 pediatric patients who could not be fed safely; a nasogastric feeding tube was placed in 4 children. Esophagogastroduodenoscopy was performed in 72.6% of the patients, and esophageal pathology was detected in 55.4%.

Conclusions: Although the incidence of dysphagia is high in children with chronic diseases, it should not be forgotten that it can also be seen in healthy children and may be associated with treatable.

Keywords: Child, dysphagia, gastroenterology, swallowing.

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Öz

Amaç: Yutma güçlüğü; alınan gıdanın ağızdan mideye transferinin mekanik olarak engellenmesi sonucu oluşan semptomdur. Akut ve kronik hastalıklara bağlı olabilir. Pediatrik popülasyonda sağlıklı ve kronik hastalığı olan çocuklarda, orofarengeal ve özofageal her iki tip disfajiyi kapsayan, özelliklerini karşılaştıran çalışma sayısı az olması nedeniyle sunulmuştur.

Gereç ve yöntem: Mayıs 2019 ve Kasım 2020 arasında disfaji şikayeti ile başvuran 201 çocuk hasta dahil edildi. Disfaji tiplerine göre gruplandırıldı.

Bulgular: Grup 1 orofarengeal disfaji olan 80 çocuk hastadan oluşurken Grup 2 özofageal disfaji olan 121 çocuk hastadan oluşmaktaydı. Hastaların %51,7 kız, ortalama yaş 9,4 yıldı. Grup 2'de tüm hastalarda katı gıda disfajisi varken, Grup 1'de %27 sıvı %53 katı-sıvı disfaji vardı. Güvenli oral beslenemeyen 50 çocuk hastaya perkütan endoskopik gastrostomi tüpü; 4 çocuk hastaya nazogastrik beslenme tüpü yerleştirildi. Hastaların %72,6 özofagogastroduodenoskopi yapıldı, %55,4'ünde özefagus patolojisi saptandı.

Sonuç: Disfajinin kronik hastalığı olan çocuklarda görülme sıklığı yüksek olsa da sağlıklı çocuklarda da görülebileceği ve tedavi edilebilir hastalıklarla ilişkili olabileceği unutulmamalıdır.

Anahtar kelimeler: Çocuk, disfaji, gastroenteroloji, yutma.

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Introduction

Swallowing is a complex function made possible by the coordinated work of the oral cavity, pharynx, larynx and esophagus. For safe swallowing, the oral cavity, pharynx muscles, cranial nerves, upper and lower esophageal sphincter, esophageal muscles and stomach must work in coordination. Dysphagia, which means difficulty in swallowing, is a symptom that occurs as a result of mechanical inhibition of the transfer of ingested food from the mouth to the stomach, decreased strength of the muscles that provide the swallowing movement, or deterioration of coordination [1].

There are 3 stages of swallowing; oral, pharyngeal and esophageal. Oral stage; is the transfer of food to the pharynx by chewing and breaking it into small pieces. The pharyngeal stage is involuntary. Food is safely passed into the esophagus in less than a second. In the esophageal stage; the bite is transmitted to the stomach by primary and secondary peristaltic movements of the esophagus. All three components of swallowing in infants are reflex and involuntary, and the oral stage becomes controlled over time [2]. Transfer dysphagia occurs in the oropharyngeal stage and results from neurological, myopathic and metabolic causes. Nontransfer dysphagia, on the other hand, is often caused by intrinsic diseases of the esophagus, mechanical or motility disorders in the esophageal stage [3]. Dysphagia in children can be seen at any age, and it can adversely affect growth and development, most commonly with feeding and/or respiratory problems. It is necessary to define and manage appropriately in a multidisciplinary manner. There are few studies comparing the characteristics of both types of oropharyngeal and esophageal dysphagia in the pediatric population. Therefore, we aimed to present the common causes, types, clinical features, laboratory, imaging techniques and results of dysphagia in patients with neuromuscular, neurometabolic, allergic or syndromic abnormalities and healthy children, together with the current literature.

Material and methods

201 pediatric patients who applied to the Pediatric Gastroenterology outpatient clinic of Health Sciences University Adana City Training and Research Hospital between May 2019 and November 2020 with the complaint of dysphagia were included. They were grouped according to the types of dysphagia. Group 1 consisted of 80 patients with oropharyngeal dysphagia and group 2 consisted of 121 patients with esophageal dysphagia. Age, gender, type, characteristics and duration of dysphagia, respiratory system and gastrointestinal system complaints, accompanying allergic, neurological, metabolic diseases, height and weight percentiles were evaluated. To detect the presence of iron deficiency anemia, hemogram, serum iron, iron binding capacity, ferritin; Vitamin B12 levels and folic acid levels for vitamin deficiency, thyroid function tests, total Ig E for allergic diseases, and food and respiratory tract-specific antigen test results were examined retrospectively. Esophagography was performed to detect anatomical abnormalities. Multiple biopsies were taken by esophagogastroduodenoscopy. Since there is no study in the literature that includes both oropharyngeal and esophageal type dysphagia in the pediatric age group, all data were evaluated in the light of the current literature. The study was approved by the scientific research ethics committee of our university.

The parametric descriptive statistics of the numerical data in the study group were calculated as the mean, standard deviation, and the median (min-max) of the non-parametric ones, and categorical data were given as percent (%). Chi-square test was used for comparison between groups. The limit of significance was accepted as $p<0.05$.

Results

Two hundred and one pediatric patients were included in the study, 51.7% of them were women and the mean age was 9.4 years. The rate of dysphagia in pediatric patients was 40% for oropharyngeal and 60% for esophageal. The characteristics of the patients are presented in Table 1. Eighty percent (64 patients) of 80 patients with oropharyngeal dysphagia were followed by pediatric neurology and metabolism clinics. Those with hemoglobin and hematocrit levels below 2 age-appropriate standard deviations in the complete blood count were defined as iron deficiency anemia. Those with vitamin B12 levels below 200 pg/ml were defined as vitamin B12 deficiency. Of 121 patients with esophageal dysphagia, 55.4% had esophageal pathology. There was

no neurometabolic disease in the esophageal dysphagia group. Esophageal symptoms such as nausea, vomiting and pyrosis were 91% in the esophageal dysphagia group. Of the 85 patients with respiratory system symptoms such as cough, hoarseness, cyanosis while feeding, wheezing, and frequent lung infection, 74% were children with neurometabolic disease in the oropharyngeal dysphagia group. Fourteen percent of those with dysphagia were accompanied by odynophagia. When pediatric patients with odynophagia are examined; Reflux esophagitis was detected in 8 pediatric patients, a history of drinking corrosive substances in 6 pediatric patients, foreign body ingestion in 3 pediatric patients, ulcers in 3 pediatric patients, candida esophagitis in 2 pediatric patients, and eosinophilic esophagitis in 2 pediatric patients. When the growth of the patients was evaluated, the weight was below the 3rd percentile in 33% of 201 patients. The percentiles of cases with acute dysphagia, which developed especially after ingestion of foreign bodies and ingestion of corrosive substances, were normal. Nutritional support was provided by placing a percutaneous endoscopic gastrostomy tube in 50 pediatric patients who could not be fed safely due to chronic dysphagia, and a nasogastric feeding tube was placed in 4 pediatric patients. In the esophageal dysphagia group, patients with a weight below the 3rd percentile had esophageal taste and ulcers due to different reasons. Pathology was detected in 30 of 160 patients who underwent contrast-enhanced esophagography. Esophageal stricture was found in 12 of 18 pediatric patients with esophageal pathology, gastroesophageal reflux stage two in 5, and hiatal hernia in 1 patient. Esophageal symptoms such as nausea, vomiting and pyrosis were 91% in the esophageal dysphagia group. Respiratory system symptoms such as cough, hoarseness, cyanosis when feeding, wheezing and frequent lung infections were present in 85 patients. Of these, 74% were children with neurometabolic disease in the oropharyngeal dysphagia group. The accompanying complaints according to the type of dysphagia are presented in Figure 1. 14% of those with swallowing difficulties were accompanied by odynophagia. Eight patients with odynophagia had reflux esophagitis, 6 patients had corrosive substance ingestion, 3 patients had foreign body, 3 patients had ulcers due to stenosis due to achalasia, 2 patients had candida esophagitis, 2 patients had eosinophilic esophagitis. High resolution monometry was performed in 3 pediatric patients who could adapt to manometry, which was thought to be achalasia due to esophageal stenosis, and a diagnosis of type 2 achalasia was made. Peroral endoscopic myoromy was performed in 3 patients diagnosed with type 2 achalasia. Dilation was performed on young patients with cricopharyngeal achalasia and other stenoses such as Shatzki ring. Esophagogastroduodenoscopy was performed under anesthesia in 72.6% of 201 patients with dysphagia. The diagnoses of the patients according to the groups are shown in Table 2; concomitant diseases are presented in Table 3.

Table 1. Characteristics of the patients

	All patients	**Group 1 (Oropharyngeal)**	**Group 2 Esophageal)**
Number of patients (n)	201	80	121
Gender (M / F)	97/104	44/36	53/68
Age (months)	112	66	144
Type of dysphagia			
Solid	107	14	93
Liquid	30	27	3
Solid+Liquid	64	42	22
Dysphagia Duration (months)	11.3	13.8	9.4
Extraesophageal Symptoms	85	63	22
Esophageal Symptoms	183	76	107
Allergic Disease	24	0	27
Neurometabolic Disease	64	64	0
Weight <3 p	67	48	19

Table 2. Diagnosis of patients by groups

Oropharyngeal Dysphagia (n:80)		Esophageal Dysphagia (n:121)	
64	Neurometabolic Disease	31	Reflux esophagitis
4	Cleft Palate	13	Heterotopic gastric mucosa
2	Crichopharyngeal Achalasia	13	Gastroesophageal reflux
2	Shatszki Rings	13	Vitamin B12 deficiency
2	Esophageal Ulcer	13	Vitamin B12 deficiency+ Iron deficiency
2	Globus hysterical	7	Eosinophilic esophagitis
1	Bicuspid Aorta	6	Pulmunary Winson Syndrome
1	Reflux esophagitis	6	Ccorrosive substances
1	Iron deficiency anemia	5	Gastritis
1	B12 vitamin deficiency	3	Foreign body ingestion
		3	Type 2 Achalasia
		2	Candida esophagitis
		1	Scleroderma
		1	Congenital Heart Disease
		1	Esophageal polyp
		1	Hypothyroidism
		1	Pyloric stenosis

Table 3. Concomitant diseases

Neurometabolic Genetic Diseases Associated with Oropharyngeal Dysphagia (n)	Concomitant Diseases in Esophageal Dysphagia (n)
Down Syndrome (2)	Scleroderma
Syndromic Patient (2)	Familial Mediterranean Fever
Nieman Pcik Type B (1)	Celiac Disease (1)
Cerebral palsy+ Epilepsy (34)	Crohn’s Disease (2)
Pontocerebellar hypoplasia type10 (1)	
West Syndrome (5)	
Sandorff Syndrome (3)	
MSUD	
Cri de Cat Syndrome	
Neurometabolic (3)	
SMA (3)	
Canavan Syndrome	
Propionic Acidemia	
Jaberi elahi syndrome	
Trisomy 18	
Glutaric Acid type	
Gikohen Warehouse type 1b	
Bochledek Syndrome	

Discussion

Dysphagia is seen in every age group for very different reasons. Oropharyngeal and esophageal distinction should be made accurately and quickly, and life-threatening conditions should be controlled and treated. Children with neurometabolic or neuromuscular disorders and chronic gastrointestinal disease are at higher risk of dysphagia than healthy children. Swallowing problems can prevent development by preventing adequate energy and nutrient intake. In necessary patients, feeding should be done with a gastrostomy tube.

In a study by Bhattacharyya [4], in the United States, the annual incidence of pediatric swallowing problems was found to be 0.9%. In different studies, swallowing disorders are seen at a rate of 20-40% in healthy children, while the rate increases to 80% in children with neuromuscular, neurometabolic disease, traumatic brain injury or airway malformations [5-7]. Of the 201 children in our study, 55.2% (111 patients) were healthy and 44.7% (90 patients) had neuromuscular, neurometabolic, genetic, allergic and rheumatological diseases. When past studies on children with oropharyngeal and esophageal swallowing difficulties are examined; Svystun et al. study [8] 54% male, 46% female (128 patients), Lefton Greif et al. study [9] 68.5% male 32.5% female (19 patients), Sheikh et al. study [10] 69.3% were male and 30.7% were female (13 patients). Differently, our study consisted of 51.7% female patients. The number of female patients in the esophageal dysphagia group was 68 and 36 in the oropharyngeal dysphagia group. Female gender was 1.8 times higher in the esophageal dysphagia group. History of eating and swallowing, motor and language developmental stages, medical history in a child presenting with dysphagia; especially respiratory system history, presence of gastroesophageal reflux disease, medications used, history of surgery, presence of allergy, communication of the feeder, nutritional environment should be questioned in detail, body weight and weight gain should be recorded [6, 11]. In our study, the number of patients in group 1 consisting of oropharyngeal dysphagia patients was 80, and group 2 consisting of esophageal dysphagia patients was 121. In group 1; 80%, 64 patients, were followed by pediatric neurology and pediatric metabolism clinics, and their neuromotor development was slower than their age. Due to the structure of oropharyngeal dysphagia, liquid foods cannot be advanced to the esophagus despite chewing and repeated swallowing [12].

Laryngeal penetration occurs when food enters the laryngeal vestibule. Aspiration occurs when the food fall below the level of the vocal cords. Asphyxiation occurs when a bolus physically blocks the airway and can be life-threatening [13]. Cough, drooling, increased secretion, regurgitation, apnea, unexplained respiratoryproblems, and vomiting may ocur [14]. Consistent with the study of Steele and Cichero [12], especially in our oropharyngeal group there was dysphagia to liquid foods. Eighty percent of the patients in this group were children who could not take solid food due to chewing and swallowing problems and were fed only liquid or blenderized foods. In our study, Lefton Greif et al. [14] similar to the studies, laryngeal penetration and aspiration findings such as choking, coughing attacks, increased secretion, drooling, regurgitation, cyanosis while feeding, and frequent respiratory tract infections were present in 79% of our patients, but they could not be demonstrated by swallowing tests. In our study, it was performed in only 3 patients, since the swallowing center was not located in our city in pediatric patients with oropharyngeal dysphagia. It was one of the shortcomings of our study, it shows the need for studies with more VFYC and FEES.

In esophageal dysphagia; during the passage of food into the esophagus, the upper esophageal sphincter cannot relax. There may be coughing, throat clearing, pyrosis, burping, vomiting, abdominal pain, and unexplained weight loss [7]. The rate of solid food dysphagia was 86.7% in the esophageal dysphagia group. Esophageal symptoms such as vomiting, abdominal pain and pyrosis were accompanying 9% of 121 patients. In group 2, 23% of the patients who developed ulcers in the esophagus as a result of ingestion of corrosive substances, foreign body ingestion, candida esophagitis and type 2 achalasia stricture were accompanied by odynophagia.

When the growth of the patients was evaluated, in 201 patients, the weight was 33.3% below the 3rd percentile and 10% was in the 3-10th percentile. In the literature, Svystun et al. [8] 9%, Sheikh et al. [10] 10%; Lefton Greif et al. [9] 10% found growth retardation due to malnutrition. Weight percentiles were found to be significantly lower in patients with oropharyngeal dysphagia. It was thought that the nutritional problems related to the primary disease were related to the long-term duration. Height percentiles of the patients were also found below the 3% percentile. On the other hand, height and weight percentiles were normal in patients with swallowing complaints after acute ischemic events such as traffic accident, falling and drowning. Patients with a weight below the 3rd percentile who could not be fed safely due to dysphagia were fed with a percutaneous endoscopic gastrostomy tube. Examining the studies, Sheikh et al. [10] placed a gastrostomy tube at a rate of 30.8% and Svystun et al. [8] at a rate of 12.6%. In our study, percutaneous endoscopic gastrostomy tube was placed in 24.8% of the patients, and feeding was provided safely by inserting a nasogastric feeding tube in 4 pediatric patients.

The most commonly used swallowing evaluation methods in the analysis of oral, pharyngealand esophageal phases in the evaluation of pediatric feeding and swallowing disorders; videofluoroscopic swallowing study (VFYC) and fiberoptic endoscopic swallowing study (FEES) [15]. In the literature, there are many pediatric nutrition and swallowing assessment tools developed for use in certain age ranges. VFYC and FEES developed by Benfer et al. [16] are both accepted as the gold standard in diagnosis when applied and interpreted by experienced clinicians. However, the lack of sufficient and experienced personnel to implement and interpret it, and the patient's inability to cooperate at a level to fulfill simple eating-swallowing instructions reduces its use [7]. In our study, only 3 patients underwent videofluoroscopic swallowing study, and they were trained because of thedifficult accessibility in our city. Oropharyngeal dysphagia is more common in neuromuscular and neurometabolic diseases because neuromuscular communication is not intact. My center is in the region where the rate of consanguineous marriage is common, this type of swallowing problem is common, but there is no center that evaluates swallowing. It again emphasizes the inadequacy of the necessary devices and the number of researchers and centers with appropriate knowledge and experience for the assessment of swallowing.

In iron deficiency and vitamin B12 deficiency, cytokine expression is impaired, oxidative enzymes are decreased, white matter myelination is impaired, webs are formed in the pharyngeal muscles as a result of atrophy and myopathy. Neurogenic difficulty in swallowing, nausea, and vomiting develop [17, 18]. Plummer-Vinson syndrome (PVS); a clinical condition characterized by dysphagia, upper esophageal web, and iron deficiency anemia [19]. Webs, a rare cause of upper cervical dysphagia, are seen in 5-15% of patients with dysphagia [20]. The webs may be multiple, and if the lumen is narrower than 2 cm, dysphagia is observed, so most of them are asymptomatic [21]. The diagnosis is clinically made with intermittent dysphagia to solid foods associated with chronic iron deficiency anemia, and esophageal webs are observed only in 10% of patients radiologically and endoscopically. For the diagnosis of PVS, esophageal web is not always necessary in a patient with iron deficiency, but dysphagia must be present. The first stage of treatment is the correction of iron deficiency and vitamin B12 deficiency. Although webs persist after iron therapy in non-obstructive PVS patients, esophageal motility returns to normal, resulting in significant improvement in dysphagia [21]. In our study, 201 pediatric patients with dysphagia were found to have 3% iron deficiency anemia, 6.5% vitamin B12 deficiency, 6% iron deficiency and vitamin B12 deficiency. All of the patients were in the esophagealdysphagia group and had no accompanying pathologies. In our study, similar to the Godino and Wong [20] study, no web was detected radiologically or endoscopically. Unlike the study of Novacek [22]. The rate of female patients was 71.5%, which was approximately three times higher than that of men. A different theory in its development is that it develops after an immunological process that triggers the formation of autoantibodies against the esophagus [21]. The reason why the rate of female patients was 3 times higher in our study suggested that it may be due to autoimmune etiopathogenesis. In our study,

other autoimmune diseases were not evaluated in patients diagnosed with PVS, leading to more comprehensive and larger studies to test these possibilities.

Another cause of dysphagia is muscular or mucosal rings in the lower part of the esophagus that narrow the lumen. Schatzki [23] ring is the most common type, its incidence is 0.2-15% in the literature; in children, it is 0.2%. Etiopathogenesis includes fibrotic changes in the distal esophagus due to acid reflux, Barrett's esophagus, and eosinophilic esophagitis [24]. Although patients are mostly asymptomatic, episodic dysphagia and food retention, especially against solid foods, occur. Diagnosis is made by barium radiography or upper endoscopy [25]. In our study, Schatzki [23] ring was detected with a rate of 1.5%, patients had difficulty in swallowing against solid foods, vomiting and pain when passing food in the distal esophagus. The stenosis of the distal esophagus was also detected in the esophagogastroscopy in barium X-ray. In two patients, biopsies were taken and dilatation was performed in the treatment in patients who could not progress to the stomach due to stenosis. Although Schatzki [23] ring is very rare in children, it should definitely be considered because it is an important treatable cause of dysphagia.

Dysphagia; can be oropharyngeal or esophageal after corrosive substance ingestion. Solid and powdery ones stick to the mouth, pharynx and larynx and cause oropharyngeal dysphagia, while those with liquid consistency due to esophageal damage; cause esophageal dysphagia [26, 27]. In the study of Kutlu et al. [28] 48% of children who underwent endoscopy after ingestion of corrosive substances were stage 1, 20% stage 2, 5.7% stage 3 esophagitis, in the study of Previtera et al. [29] 28% stage 1, 9.2% stage 2, 4.8% stage 3 esophagitis, only 2.5% esophageal stenosis was detected. In our study, the rate of dysphagia due to corrosive substance intake was 3%, while 50% of the patients were women, the mean age was 84 months. Similar to the study of Moulin et al. [27], all patients had complaints of esophageal dysphagia and odynophagia was accompanied by vomiting. In esophagogastroduodenoscopy, stage 3 esophagitis with esophageal stenosis in 50% of patients, stage 1 in 33%, and stage 2 esophagitis in 17% were detected. It was thought that the high rate of stenosis and esophagitis patients was due to the low number of patients and the fact that the patients came after taking corrosive substances for a long time and had severe feeding and swallowing problems.

Achalasia; develops due to primary motility disorders of the esophagus and is rarely seen in children. According to the region where the dysfunction originates; It is defined as cricopharyngeal achalasia above and thoracic achalasia distally [30]. Cricopharyngeal achalasia is a relaxation problem due to spasm in the cricopharyngeal muscle during swallowing, ganglion cell loss is absent in this type. It can occur for many reasons. Partial relaxations, premature contractions, or failures in upper sphinter relaxation cause dysphagia. In the esophageal passage graphy taken for diagnostic purposes, narrowing in the esophagus passage is detected at the level of the cricopharyngeal muscle [31]. In our study, cricopharyngeal achalasia was found in only 2 patients, and both patients were children with neurological disease, which is consistent with the literature. Patients with narrowing of the esophageal passage at the level of the cricopharyngeal muscle in the esophageal passage X-ray were referred to pediatric surgery for treatment.

Thoracic achalasia is a motility disease of the esophagus that occurs as a result of high resting pressure in the lower esophageal sphincter (LES) and insufficient relaxation of the LES during swallowing. The etiopathogenesis is not clear. The most common reason for admission is the difficulty in swallowing against solids and liquids, which has been increasing for several years. Regurgitation of undigested food, nocturnal cough due to microaspiration, recurrent pneumonia, chest pain, retrosternal burning and weight loss can be observed [32]. Domingeus et al. [33] detected progressive substernal dysphagia with solid and liquid foods, and Zhang et al. [34] and Hussain et al. [35] reported dysphagia as the most common symptom in pediatric patients with achalasia. In our study, 1.5% of the patients were diagnosed with achalasia. In accordance with the literature, all patients had esophageal dysphagia against solids and liquids, which increased over time for about a year. It was accompanied by retrostenal burning, vomiting, and weight loss. In the esophageal passage X-ray, which is the

first diagnostic test, a narrowing in the shape of a bird's beak at the extreme megaesophagus and esophagocardiac junction is diagnostic. Esophagogastroduodenoscopy may reveal enlargement of the esophagus, esophagitis due to food residues in the esophageal lumen, and ulcers. High-resolution impedance manometry is the gold standard diagnostic method, enabling its typing [36]. Zhang et al. [34] detecting goush-beak appearance in patients, performed esophagogastroduodendoscopy in 61.5% of the patients, and the diagnosis was confirmed by manometry. In our study, esophageal radiography was performed in 3 patients with distal achalasia, and distal stenosis, bird's beak appearance and megaesophagus were detected in accordance with the literature. Esophagogastroduodenoscopy revealed stenosis hyperemia and ulcer covered with white membrane in the distal esophagus. The diagnosis of type 2 achalasia was confirmed by high resolution monometry.

Inlet patch was first described by Schmidt in 1805. It is a heterotopic gastric mucosa located in the proximal esophagus as a result of a problem in the transformation of the esophageal mucosa from columnar epithelium to squamous epithelium or healing of the esophageal epithelium due to infection, trauma, and regurgitation [37]. It can be separated by sharp borders, varying in size from 2-3 mm to 4-5 cm, on the posterior or lateral wall, in single or multiple pieces [38]. In our study, 71% of 201 pediatric patients with dysphagia were treated with esophagogastroduodenoscopy and 13 children 1 to 3 HGM with diameters ranging from 10 mm to 25 mm were detected in the patient, located in the upper esophagus. Its frequency in pediatrics is 1.4-6%, and the frequency in our study was found to be 6.4% in line with the literature. Inlet patch is usually asymptomaticand dysphagia is seen in 15-39% of cases [39]. Other complaints are sore throat due to laryngopharyngeal reflux, globus sensation, retrosternal burning, regurgitation, chest pain, and symptoms due to acid production and colonization of Helicobacter pylori. In our study, the main complaint of all patients with HGM was dysphagia, which was against solids and liquids. Abdominal pain, vomiting, bad breath and stomach pain accompanied by the feeling of being stuck were other complaints. Although it is rarely seen in pediatric patients presenting with dysphagia, HGM should be remembered, therefore, it should be performed by experienced endoscopists, and it should be passed slowly and carefully when entering the upper esophagus with the endoscope.

Eosinophilic esophagitis (EoE); As a result of eosinophilic inflammation in the esophagus, it causes esophageal dysfunction and dysphagia [40]. Its frequency varies between 1% and 37% [41]. Cheung et al. [42] 88%; Desai et al. [43] 54.8% detected EoE. In our study, the rate of patients diagnosed with EoE was 3.4%, with more than 20 eosinophils, basal cell hyperplasia, and eosinophilic micro-abscesses detected only in esophageal biopsy samples in the histopathological examination. There are different clinical findings in eosinophilic esophagitis. Food refusal, vomiting, restlessness, and developmental delay are seen in young children. In older children, dysphagia against solid foods, food insertion, chest pain, pyrosis, abdominal pain, vomiting, chewing a lot, keeping food in the mouth are detected most frequently. In our study, 4 patients had esophageal dysphagia to solids and liquids, and 3 patients to liquids only. Gastrointestinal complaints such as abdominal pain, vomiting and pyrosis were accompanied by 57%. Upper gastrointestinal endoscopy should be performed for EoE in allergy patients with dysphagia. In the endoscopy, red lines, white exudates, hyperemic fragile mucosa, ringing are detected in the esophagus [44]. Liacouras et al. [40] and Prasad et al. [45] studies, one out of three patients with histological EoE was found to be normal by endoscopy. In our study, ring formation, white dot lesions and grooves in the esophagus were detected in 57.1 %. Hyperemic fragile mucosa was seen in 71%. Esophageal mucosa was normal in 28.5%. As in the studies of Liacouras et al. [40] and Prasad et al. [45], although the endoscopic appearance is normal, it supports the necessity of taking multiple biopsies for histopathological examination.

In conclusion, a comprehensive evaluation should be performed in children with dysphagia. Under the leadership of pediatric gastroenterologists, pediatric neurology, child metabolism, otolaryngology, swallowing-speech therapists should work in cooperation.

This study is retrospective. It would be useful to perform swallowing tests in patients

with difficulty swallowing. However, test can be performed on a limited basis due to the difficulty of performing tests in the pediatric age group and the small number of experienced specialists who will perform and interpret them. It could be performed on a limited number of patients in our study.

We believe that our series will contribute to the literature by being one of the few studies in the literature that includes both types of dysphagia in childhood, conducted in a single center with 201 patients. It will shed light on a well-designed study with prospective limitations.

Conflict of interest: No conflict of interest was declared by the authors.

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