Investigation of The Presence of *Blastocystis* Spp. in Pediatric Patients Admitted To Our Hospital With The Diagnosis of Gastroenteritis

Gastroenterit Tanısı İle Hastanemize Başvuran Pediatrik Hastalarda *Blastocystis* Spp. Varlığının Araştırılması

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Objective: The aim of this study was to investigate the prevalence of Blastocystis spp. in pediatric patients who have gastrointestinal complaints.

Materials and Methods: The parasitology data of pediatric patients who were sent to Selcuk University Medical Faculty Hospital Medical Microbiology Laboratory with the request of "stool parasite test" between October 2017 - October 2019 in Konya were retrospectively analyzed. The stool samples investigated for parasites by direct microscopic examination (iodine saline) and stool concentration methods.

Results:
Parasitic positivity was found in 739 (6,48%) out of 11393 stool specimens of pediatric patients. *Blastocystis* spp. was found in 233 (31.5%) of the positive samples. Of the pediatric patients who were positive for *Blastocystis* spp., 109 (46.7%) were male, 124 (53.2%) were female and 94.4% were polyclinics and 5.6% were service patients. In 66 cases (28.3%) only *Blastocystis* spp., in 165 (70.8%) *Blastocystis* spp. and *Entamoeba* spp., in one of the samples *Blastocystis* spp. and *Dientamoeba fragilis* (0.4%) and in one *Blastocystis* spp., *Entamoeba* spp. and *Dientamoeba fragilis* (0.4%) together was determined.
Conclusion: It was concluded that *Blastocystis* spp. and *Entamoeba* spp. were the most common parasitic agents and it was found that the patients infected with these parasites were mostly found in patients admitted to the Pediatric Emergency Department (48%). *Blastocystis* infections show different clinical picture in each patient. Some of the *Blastocystis* subtypes are thought to be pathogenic and some are non-pathogenic and therefore, new scientific studies are needed to determine the relationship between parasite and pathogenicity.

Keywords: *Blastocystis, gastroenteritis, pediatric patients*

Amaç:
Bu çalışmanın amacı gastrointestinal şikayetleri olan pediatrik hastalarda *Blastocystis* spp. prevalansını araştırmaktır.
Yöntem ve Gereç: Konya ilinde Ekim 2017 - Ekim 2019 tarihleri arasında Selçuk Üniversitesi Tıp Fakültesi Hastanesi, Tıbbi Mikrobiyoloji Laboratuvarına "gaita parazit tetkiki" istemi ile gönderilmiş olan çocuk hastalarının hastane laboratuvar işletim sistemindeki parazitoloji verileri retrospektif olarak incelenmiştir. Dışkı örnekleri parazitler için doğrudan mikroskobik inceleme (iyot salin) ve dışkı konsantrasyonu yöntemleriyle incelenmiştir

Bulgular:
Çocuk hastalara ait 11393 gaita örneğinden 739'ünde (%6,48) parazit pozitifliği saptanmıştır. Pozitif örneklerin 233'ünde (%31,5) *Blastocystis* spp. bulunmuştur. *Blastocystis* spp. pozitif pediatrik hastalarından 109'u (%46,7) erkek, 124'ü (%53,2) kız ve %94,4'ü poliklinik, %5,6'sı servis hastası olmuştur. *Blastocystis* spp. bulunan olguların 66'sında (%28,3) sadece *Blastocystis* spp., 165'inde (%70,8) *Blastocystis* spp. ile beraber *Entamoeba* spp., örneklerin

birinde *Blastocystis* spp. ile *Dientamoeba fragilis* (%0,4) ve birinde ise *Blastocystis* spp., *Entamoeba* spp. ve *Dientamoeba fragilis* (%0,4) birlikte saptanmıştır.

Sonuç:
Sonuçlarımıza göre, gastroenterit yakınması olan çocuklarda en sık rastlanan parazit etkenlerinin *Blastocystis* spp. ve *Entamoeba* spp. olduğu ve bu parazitlerle enfekte olguların daha çok Çocuk Acil kliniğine (%48) başvuran hastalarda saptandığı görülmüştür. *Blastocystis* enfeksiyonları Türkiyede önemli sağlık problemleri arasında devam etmektedir. Bu enfeksiyonlar semptomatik ve asemptomatik olarak her hastada farklı klinik tablo göstermektedir. *Blastocystis* alt tiplerinin bazılarının patojen, bazılarının ise non-patojen olduğu düşünülmektedir ve bu yüzden parazitin patojenitesi ile ilişkisini ortaya koymak için yeni bilimsel çalışmalara ihtiyaç vardır.

Anahtar Kelimeler*: Blastocystis, gastroenterit, çocuk hastalar*

Introduction:
Intestinal parasites may cause asymptomatic infections or present with clinical complaints such as abdominal pain, flatulence, nausea and vomiting, loss of appetite, weight loss and diarrhea. *Blastocystis* spp. *Giardia intestinalis*, *Cryptosporidium* spp. And *Entamoeba histolytica* are the most common protozoan parasites that causes gastroenteritis in children (1).
Blastocystis has a global distribution and has been reported to be the most common intestinal protozoan in human stool specimens in many studies (2). Fecal-oral transmission can occur either directly or by consuming food and drinks contaminated with feces (3). Disease caused by this parasite was named as Blastocystosis and it was found that the most common complaints were abdominal pain (39.3%), itching (36.1%) and diarrhea (3.3%) (4). There is a view that different serotypes may be pathogenic at different levels (5). Although, a large number of molecular techniques have been developed in order to identify subtypes (STs), a standard methodology has not yet been established. Human *Blastocystis* isolates are limited to STs 1–9 (6).
The aim of this study was to evaluate the distribution of *Blastocystis* spp. in pediatric patients who have gastrointestinal complaints in our hospital.

Materials and Methods:
A total of 11393 pediatric patients who were admitted to the Medical Microbiology Laboratory of Selcuk University Medical Faculty Hospital between October 2017 and October 2019 and asked for parasitic examination by the clinicians were evaluated retrospectively. The data obtained as a result of direct microscopic examination (iodine-saline) and LJ-200 Stool Analyzer device methods were evaluated together with the patients' **clinical information.**

Results:
Parasitic positivity was found in 739 (6,48%) out of 11393 stool specimens of pediatric patients who were examined in the last two years. *Blastocystis* spp. was found in 233 (31.5%) of the positive samples (Table 1).
Blastocystis spp. and *Entamoeba* spp. were detected together in 165 samples. The rate of cases infected with *Blastocystis* spp. alone was 66. Of the pediatric patients who were positive for *Blastocystis* spp., 109 (46.7%) were male, 124 (53.2%) were female and 94.4% were polyclinics and 5.6% were service patients. In one of the samples *Blastocystis* spp. and *Dientamoeba fragilis* (0.4%) and in one of them *Blastocystis* spp., *Entamoeba* spp. and *Dientamoeba fragilis* (0.4%) were determined together.

Blastocystis spp. positive specimens were mostly found in patients admitted to the Pediatric Emergency Department (48%),Outpatient Clinic for Child Health and Diseases (27,9) and Pediatric Gastroenterology, Hepatology and Nutrition Polyclinic (16,3) (Table 2).

Discussion:

According to our results, between 2017-2019 in children with gastroenteritis It was concluded that *Blastocystis* spp. and *Entamoeba* spp. were the most common parasitic agents and it was found that the patients infected with these parasites were mostly found in patients admitted to the Pediatric Emergency Department (48%). Clinical symptoms attributed to *Blastocystis hominis* include acute or chronic diarrhea, bloating, flatulence, abdominal cramps, and fatigue İn a study, more than 75% of the patients with GIS and dermatological complaints had medium to dense parasite densities in their stool samples respectively. This suggests a positive correlation between parasite density and GIS and dermatologic symptomatology (7).

Genetic diversity revisions have led to the identification of 17 subtypes (STs) within the *Blastocystis* genus, and 9 (ST1 to ST9) have been reported in humans with varying prevalence (8). İn another study, out of the 138 patients who had functional abdominal pain and *Blastocystis* , 37 patients did not receive any treatment (26.8%), while 101 received it and were treated with different antimicrobial agents (73.2%); regarding the improvement of symptoms, a statistically significant difference ($p<0.001$) was observed (9).

Conclusion:

Since the members of the genus revealed a large genetic diversity, several molecular modalities of subtyping methods have been developed. Although the pathogenic role of *Blastocystis* spp. in humans is still controversial, it is supposed to the presence of this parasite is associated with disorders gastrointestinal symptoms. Therefore, new scientific studies are needed to determine the relationship between parasite and pathogenicity.

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Table-1.Distribution of *Blastocystis* spp. Positivity according to patients ages

Age grup	n (%)
0-6	87 (37.3)
6-12	51 (21.9)
12-18	95 (40.8
Total	233 (100)

Table-2. Rates of *Blastocystis* spp. infected cases sent by polyclinics and services.

Polyclinics and Services	N (%)
Pediatric Emergency Outpatient Clinic	112 (48)
Pediatric Health and Diseases Polyclinic and Service	65 (27.9)
Pediatric Gastroenterology, Hepatology and Nutrition Polyclinic and Service	38 (16.3)
Pediatric Infectious Diseases Polyclinic and Service	4 (1.7)
Pediatric Oncology Polyclinic and Service	2 (0.8)
Pediatric Nephrology Polyclinic and Service	2 (0.8)
Pediatric Cardiology Polyclinic	1 (0.4)
Pediatric Intensive Care Unit	1 (0.4)
Pediatric Allergy and Immunology Polyclinic	1 (0.4)
Pediatric Neurology Polyclinic	1 (0.4)
Pediatric Surgery Polyclinic	1 (0.4)
Anesthesiology and Reanimation Polyclinic	1 (0.4)
Total	233 (100)