DOI: 10.14744/ejmi.2018.97268
EJMI 2018;2(4):224–226

Research Article

Urinary Tract Infections in Pediatric Patients with Celiac Disease

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Abstract

Objectives: The aim of the study was to determine the prevalence of urinary tract infections in children with celiac disease (CD).
Methods: 120 patients with CD aged from 1 year to 16 years (mean 6.65±4.61), and 45 age and sex matched healthy children were screened for urinary tract infections by urinalysis and urine culture.
Results: Only 5 patients had urinary tract infection in whom urine culture was positive for Escherichia coli (E.coli) whereas no urinary tract infection was detected in healthy children. Also no urinary abnormalities in urinalysis were obtained from study participants.
Conclusion: No significant difference was observed in prevalence of urinary tract infections between pediatric patients with CD and healthy children.
Keywords: Celiac disease, children, urinalysis, urinary tract infections
Cite This Article: *Kalyoncu D, Urganci N. Urinary tract infections in pediatric patients with celiac disease. ejmi. 2018; 2(4): 224-226*

Celiac disease (CD) is an immune-mediated disease triggered by the ingestion of gluten that develops in genetically predisposed patients and is also associated with other autoimmune diseases affectingtheendocrine, neurological, cutaneous, and reproductive systems.

A small number of studies report an association between CD and renal diseases.[1–7] The aim of the present study was to determine the prevalence of urinary tract infections (UTIs) and urinary abnormalities in children with CD and compare the results of urinalysis in children with CD with that inhealthy children.

Methods

A total of 120 childrendiagnosedwith CD and followed up with between 1999 and 2016 at the Division of Pediatric Gastroenterology of Sisli Etfal Training and Research Hospital (Istanbul, Turkey) were evaluated prospectively and compared with 45 healthy controls who were recruited from the hospital's well-child outpatient clinic.

The diagnosis of CD was based onthe ESPGHAN criteria.[8] All patients with CD andallcontrols were screened for urinalysis and urine culture. Bacterial growth of >100.000 CFU/mL in urine obtained by one midstream urine sample was considered a positive urine culture.[9, 10]

Informed consents were obtained from all of the patients' parents before the procedures. The study was approved bythe hospital's ethics committee.

Statistical Analysis

Statistical analyses were performed using SPSS 11.0 software (SPSS Inc., Chicago, IL, U.S.A.). Results were expressed as means±SD for quantitative variables and proportions for categorical variables. The analysis was conducted using a Fisher's exact test, a chi-square test, and ANOVA to analyze qualitative variables. P values of<0.05 were considered statistically significant.

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Submitted Date: February 15, 2018 **Accepted Date:** March 10, 2018 **Available Online Date:** November 29, 2018

Results

The age of the patients ranged from 1 year to16 years (mean 6.65±4.61), and the male to female ratio was 0.69. There were no serologic or clinical signs of another autoimmune disease in the CDpatients except in two patients with type 1 diabetes mellitus. No patients or controls had histories of previous UTIs or urinary system–related symptoms. The characteristics of the patients and controls are shown in Table 1.

Only five patients with CD who were uncompliant with a gluten-free diet (GFD) had UTIs. Urine cultures werepositive for Escherichia coli (E.coli) in all of these patients with positive nitrite tests. However, radiological examinations revealed no renal abnormalities in these patients,andnone of them had diabetes. The differencesbetween the patients with UTIs and without were not significant in terms of age or gender (p>0.05). No UTIs or abnormalities in urinalysis were detected inthehealthy children.

Discussion

Most previous studies have reported that rates of renal diseases such as nephritis, IgA nephropathy, and renal stones are higher in individuals with CD.[1–7] The possible mechanisms for renal involvement in CD are the activated mucosal immune system due to the increased numbers of intra-epithelial T-cells in the mucosa, increased gut permeability, increased levels of CD auto-antibodies, exposure to nephrotoxic substances, and high nitric oxide production, which is also a pro-inflammatory mediator in renal disease.[1, 7, 11–16]

The increased incidence of UTIs in patients with CD has been attributed to an associated disturbance of urinary tract motility, bladder dysfunction, changes in the bacterial flora in the gut predisposing the urinary tractto contamination, a decrease in the immunological defense against infections, or altered immunity.[2, 3]

Saalman et al.[2] reported that UTIs in children with CD were associated with untreated and active CD, but urinalysis at diagnosis of CD revealed UTIs or urinary abnormalitiesin none of our patients. Five patients with UTIs were uncompliant with GFD and had active disease.

Conclusion

No significant difference was observed in the prevalence of UTIs between pediatric patients with CD and healthy children. Larger, well-designed studies are needed to clarify the renal involvement and risk of UTIs in children with CD and if routine monitoring by urinalysis is indeed necessary.

Disclosures

Ethics Committee Approval: The study was approved by the Local Ethics Committee.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Table 1. Characteristics of the patients with celiac disease and healthy controls

	Patients (n=120)	Controls (n=45)	P
Age, y, mean±SD	6.65±4.61	6.3±3.41	
Male/Female	0.69 (49/71)	0.66 (18/27)	
Duration of disease, y, mean±SD	9.25±3.6		
Clinical presentation, n (%)			
Typical	74 (61.6)		
Atypical	46 (38.3)		
Compliance with GFD, n (%)			
Compliant	63 (52.5)		
Noncompliant	57 (47.5)		
Urinalysis			
Urine specific gravity (n=1003-1030)	1012±5.45	1013±3.7	0.25
pH, median (n=5-7)	5	5	1.00
Glucose (positive/negative)	0/120	0/45	1.00
Nitrite (positive/negative)	5/120	0/45	0.32
Protein (positive/negative)	0/120	0/45	1.00
WBCs >5 per HPF	5/120	0/45	0.32
RBCs >5 per HPF	0/120	0/45	1.00
Urine culture (positive/negative)	5/120	0/45	0.32

WBCs: White blood cells; RBCs: Red blood cells; HPF: High power field; p<0.05 is statistically significant.

Authorship contributions: Concept – N.U.; Design – D.K.; Supervision – N.U., D.K.; Materials – N.U.; Data collection &/or processing – N.U.; Analysis and/or interpretation – N.U., D.K.; Literature search – D.K.; Writing – D.K.; Critical review – N.U.

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