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ASSOCIATION BETWEEN URINARY TRACT INFECTION AND CHRONIC CONSTIPATION IN CHILDREN UNDER FIVE YEARS OLD

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ABSTRACT

Background

The bacterial infection in children is urinary tract infection (UTI) delay diagnosis and treatment lead to hypertension, kidney scar, and chronic renal failure. This study aimed to make the prevalence of UTIs in constipated children under 5 years old.

Methods

This cross-sectional study was done for 74 children less than 5 years old with chronic functional constipation at Hivi Pediatric Teaching Hospital in Duhok Iraq. In this study children with congenital anomaly, immunocompromised, cerebral palsy and unconscious patients were excluded.

Results

The study showed the risk of UTI was 54.1%and the prevalence of UTI was significantly higher in females compared to males (62.96% vs. 30.00; P=0.0115), in patients with Dysuria (76.92% vs. 41.67%, P=0.0002), and frequency of urination (82.14% vs. 36.96%, P=0.0002). No association was found between UTI and age, fever, and abdominal pain.

Conclusion

Results of our study showed that chronic constipation have a significant impact on UTI, and children with chronic constipation have a higher risk of occurrence of UTI.

KEYWORDS: Chronic constipation, urinary tract infection

INTRODUCTION

Constipation is defined as less than twice-weekly bowel motions. Chronic constipation requires two or more of the following symptoms for at least three months, according to the definition: Excessive straining during bowel movements, hardness in stool consistency, and a general feeling of being inadequate excretion after a bowel movement and defecation of fewer than two times per week.(Ataee, Eftekhari et al. 2020).

Constipation has been linked to urinary tract diseases in pediatrics, such as infection, urinary incontinence, vesicoureteral reflux, and urinary tract blockage, according to many types researches

The pathology that behind these observations is still unknown.(Averbeck and Madersbacher 2011).

Lower Urinary Tract Symptoms (LUTS) and constipation can occur simultaneously in a variety of patients, such as children, women, and the elderly, and in neuropathic patients. Because the urine bladder and the rectum are connected, embryological genesis with autonomic and somatic similarities in innervations, and dysfunction in one can have an impact on the other, such as mechanical impediment. The bladder is unable to retain and release its contents on its own. If the child is constipated and has a big amount of stool in the rectum or bowel LUTS and defecation issues may be present (Averbeck and Madersbacher 2011).

Any voiding dysfunction such as the inability of the bladder to empty or urinary incontinence can be correlated in a high number of children with a high constipation. Constipation is a frequent disease in children that is remained underdiagnosed and poorly managed. The enlarged rectum strain on the bladder wall produces urine blockage due to the constipation and impairment in the bladder detrusor muscle .(Sampaio, Sousa et al. 2016).

Constipation was found to be prevalent in 8% of children with UTI, and recurrent UTI was found to be prevalent in 67.8% of children with constipation, according to several studies. There was a link discovered between recurring UTI, urinary Inconcontinence, vesicoureteric reflux (VUR) and Constipation(Ataee, Taleshi et al. 2020).

Regarding to the study in Iraq the prevalence of urinary tract infection(UTI) in 165 children with chronic constipation was 34.5%(Edan and Yahya 2022)

The most common area in children and infants for infection is urinary tract system which can cause long-term complications, thus early detection and adequate treatment is very important.one of the most common pediatric bacterial infection is urinary tract infection (Sampaio, Sousa et al. 2016). Up to the age of seven years about 2% of boys and 5% of girls has at least one attack of UTI (Habib 2012). Risk of UTI eightfold in uncircumcised boys is higher than circumcised boy(Mitiku, Amsalu et al. 2018).

Renal scarring, hypertension and chronic kidney failure are the complications due to long-term urinary tract infection(Mitiku, Amsalu et al. 2018) .

Incidence of urinary tract infection is different among the pediatric age groups peaking in infants, toddlers and adolescent females and uncircumcised infant have a higher risk(Shaikh, Morone et al. 2008).

This study aimed to explore the prevalence of urinary tract infection and its correlated factors in children under five years in Duhok city in Iraqi Kurdistan.

PATIENTS AND METHODS

This cross-sectional study was done from November 2021 to November 2022 in the medical and surgical outpatient clinic of Hivi pediatric teaching hospital Duhok, Iraq. The Sample size was calculated by the non-probability and convenient method. In this study children with congenital anomaly, immunocompromised, cerebral palsy and unconscious patients were excluded. After exclusion 74 patients less than 5 years old met Rome III criteria for chronic constipation. By data collection sheets data were collected. Before any antibiotic therapy urine samples aseptically were collected by sterile pediatric urine collection bag and midstream urine sample for urine culture-sensitivity and general urine examination.

Ethical consideration:

Ethical approval was obtained from the Directorate General of Health / Dohuk / Directorate General of Education / Dohuk. On the other hand, approval was obtained from the patient's parents and all the parents have the right to reject their children to participate in the study. All data were kept confidential

Statistical analyses

The general information of the children with chronic constipation was presented in mean, standard deviation(SD) or no (%). The prevalence of UTI among children with chronic sortation was determined in no and %. The prevalence of UTI in patients with chronic constipation with different characteristics were examined in an independent t-test and Pearson Chi-squared tests. The comparisons of constipation duration and bowel motion in patients with and without UTI were examined in an independent t-test. The significant level of difference was determined by a p-value of less than 0.05. The statistical calculations were performed in JMP Pro 14.3.0.

RESULTS

In our study the patient age was between 5 months and 5 years, with 45(72%) of them being females and the remaining 20 (27%) were male. We found in the current study that most of the patients were free from fever (81%), while more than half of them were present with abdominal pain (51%), with (32%) localized to flank pain area (region), in relation to urinary symptoms only (35%) of them had dysuria, with about (37%) increase frequency of micturition, as shone in table 1.

Table (1): General characteristics and history of children with chronic constipation

Characteristics (n=74)	**Frequency Distribution**	
	No (%)	**95% CI**
Age (Range: 5 months-5 years)	3.4 (1.2)	3.23.7
Gender		
Male	20 (27.03	18.23-38.09
Female	54 (72.97	61.91-81.77
Fever		
No	60 (81.08	70.71-88.38
Yes	14 (18.92	11.62-29.29
Abdominal pain		
No	36 (48.65	37.61-59.82
Yes	38 (51.35	40.18-62.39
Flank pain		
No	50 (67.57	56.27-77.14
Yes	24 (32.43	22.86-43.73
Dysuria		
No	48 (64.87	53.50-74.76
Yes	26 (35.14	25.24-46.50
Urination		
No	46 (62.16	50.77-72.35
Yes	28 (37.84	27.65-49.23

In table 2 shows the duration of constipation within 3 months to 3 years with a mean of (0.68) whereas the number of motion/week (1-3 times) were calculated to be mean (1.82) among studied samples. In this table we estimate that 54.1% (40) patients among total of 74 constipated individuals suffered from UTIs.

Table (2): Disease related information of patients with constipation

Characteristics (n=74)	**Frequency Distribution**	
	Mean	**SD**
Constipation Duration: Range: 3 months-3 years)	0.68	0.34
Bowel motion: Range: 1-3 times/week	1.82	0.75
	Number	**Percentage**
UTI		
No	34	45.9
Yes	40	54.1
All patients had a hard stool at the presentation to the hospital.		

The study showed that the prevalence of UTI was significantly higher in females compared to males (62.96% vs. 30.00; P=0.0115), in patients with Dysuria **(**76.92% vs. 41.67%, P=0.0002), and frequency of urination (82.14% vs. 36.96%, P=0.0002). No association was found between UTI and age, fever, abdominal pain (Flank pain)**(Table 3 and Fig 3). SS**

Table (3): Prevalence of UTI in patients with chronic constipation with different characteristics

Characteristics (n=74)	Study groups		P-value (two-sided)
	No UTI (n=34)	UTI (n=40)	
Age	3.5 (1.3)	3.4 (1.2)	0.5317[a]
Gender			**0.0115[b]**
Male	14 (70.00	6 (30.00	
Female	20 (37.04	34 (62.96	
Fever			0.1474[b]
No	30 (50.00	30 (50.00	
Yes	4 (28.57	10 (71.43	
Abdominal pain			0.1064[b]
No	20 (55.56	16 (44.44	
Yes	14 (36.84	24 (63.16	
By Flank pain			0.3125[b]
No	25 (50.00	25 (50.00	
Yes	9 (37.50	15 (62.50	
Dysuria			**0.0037[b]**
No	28 (58.33	20 (41.67	
Yes	6 (23.08	20 (76.92	
Urination			**0.0002[b]**
No	29 (63.04	17 (36.96	
Yes	5 (17.86	23 (82.14	

[a] An independent t-test and [b] Pearson Chi-squared tests were performed for statistical analyses.
The bold red numbers show the significant differences.

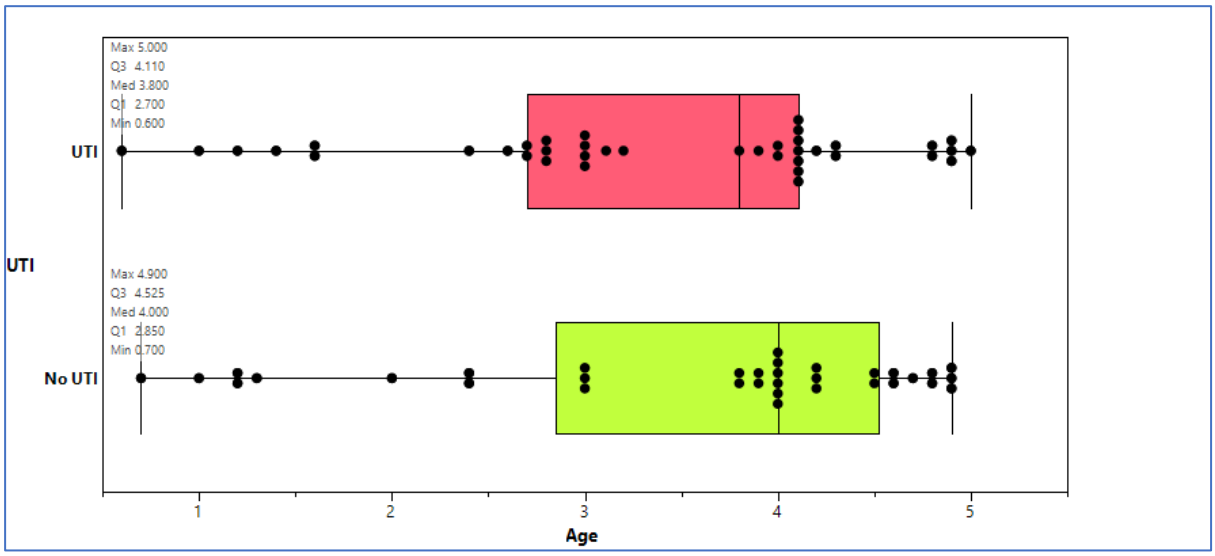


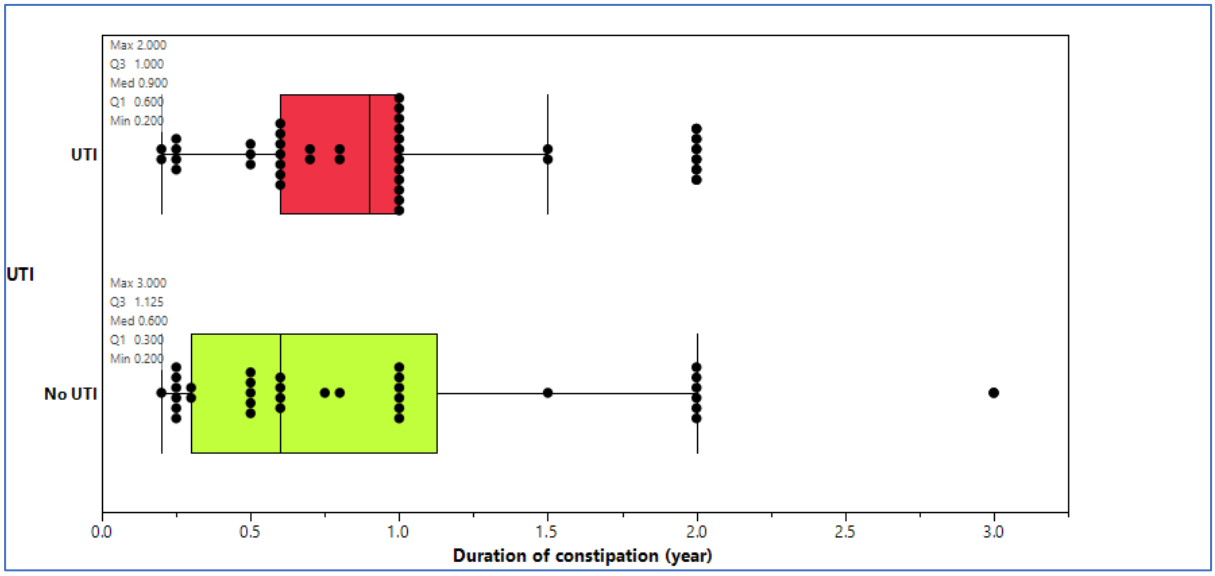
Fig. (1): Comparisons of age between the children with and without UTI

The study did not find an association between duration of constipation and occurrence of UTI (P-value= 0.3) while frequency of bowel motion/week found to be strongly correlated to UTI presented in our study (P-value= 0.0004). The study showed that the patients without UTI had significantly higher frequency of bowel motion compared to those without UTI; 2.15 vs. 1.55 times/week; P=0.0004 (Table 4 and Fig 2).

Table 4: Comparisons of constipation duration and bowel motion in patients with and without UTI

Characteristics (n=74)	Study groups		p-value (two-sided)
	No UTI (n=34)	UTI (n=40)	
Duration of constipation (year)	0.86 (0.63	0.74 (0.34	0.3404
Bowel motion (times/week)	2.15 (0.66)	1.55 (0.71)	**0.0004**

An independent t-test was performed for statistical analyses.



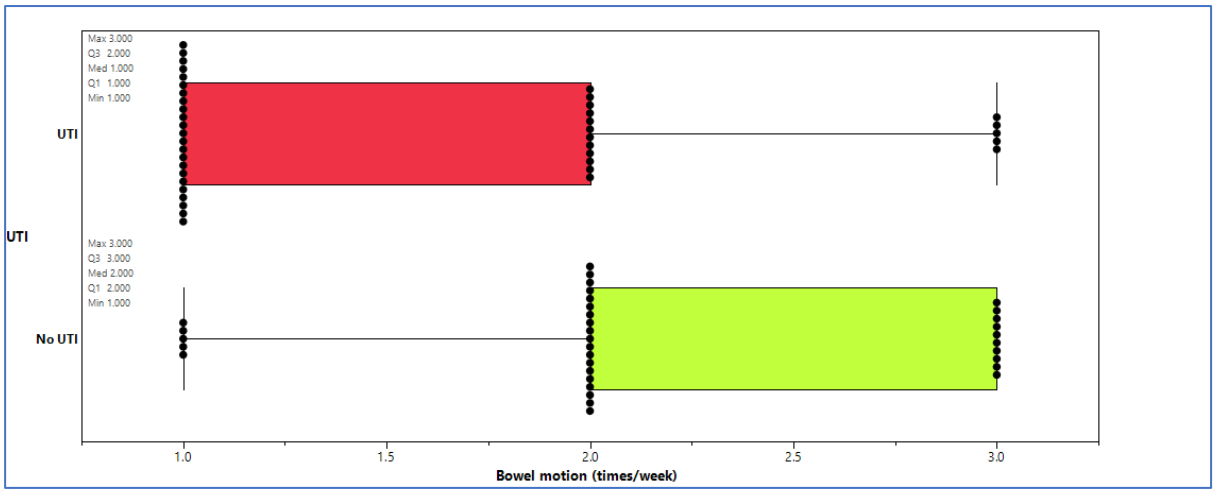


Fig. (2): Comparisons of constipation duration and bowel motion in patients with and without UTI

DISCUSSION

Chronic constipation whether functional or organic is one of the main issue now a day and it is regarded one and major risk factor of UTI (Whiting, Westwood et al. 2005)

Functional constipation is more common in pediatric age group and if remain un treated in will be responsible for many side and adverse sequels , in past there were a minute number of articles studying such sequel.

In general functional constipation carry a risk of increasing UTI 6.8 times more in comparison to non constipated child (Whiting, Westwood et al. 2005)

In the current study we try to make sense to the relation between constipation and urinary problems more specifically UTI.

So thoroughly we get different kind of results some was consistent with published articles and some not.

The findings of the current study are supported by a study published by hoque et al who found the same mentioning that prevalence of UTI is more in constipated child(Hoque, Islam et al. 2010).

Edan , make his work on 165 children with constipation found that the prevalence of UTI was 34.5% (Edan and Yahya 2022)

Inan M etbal and Halachmi S et al results were in agreement to our results(Halachmi and Farhat 2008, Inan, Tokuc et al. 2008)

Association between urinary tract infection and constipation was found in many other study (Ataee, Taleshi et al. 2020, Halder, Pervez et al. 2021)

The possible explanation behind why constipation may be a risk factor of UTI is that during functional constipation the child try to hold and control the sphincter and both urinary and anal sphincter are under one order control this will lead to increase residual urine in bladder and leading to stasis which make a good media for microbial over growth that's firstly(Kasırga, Akil et al. 2006) , secondly the chronic constipation may lead to encopresis which may lead to contaminated perineum and ascending infection beside to that chronic constipation lead to changing gastrointestinal flora and making UTI more sever and frequent(Hsiao, Wang et al. 2020)

While Reck burneo when he made his article and studying individuals(pediatric age group) with constipation and UTI , he found a significant correlation between both studied subject. (Reck-Burneo, Vilanova-Sanchez et al. 2018)

and the same finding were detected in study done in Iran by Dehghani SM et al (Dehghani, Basiratnia et al. 2013)

The our study showed that the prevalence of UTI was significantly higher in females compared to males (62.96% vs. 30.00; P=0.0115), this may be due to high percentage of female include in study and some other physiological factor adding to anatomical difference between both gender this was our observation which was disagreed with Reck-Burneo who found UTI is a consequences of constipation regardless of gender(Reck-Burneo, Vilanova-Sanchez et al. 2018)

. We found in current study that most of patients were free from fever (81%), while more than half of them were present with abdominal pain (51%), with (32%) localized to flank pain area (region), in relation to urinary symptoms only (35%) of them had dysuria, with about (37%) increase frequency of micturition, all the above mentioned data and observation were less or more in consistent and agreement with other published articles(Dehghani, Basiratnia et al. 2013, Reck-Burneo, Vilanova-Sanchez et al. 2018)

CONCLUSION

Results of our study showed that chronic constipation have a significant impact on UTI, and children with chronic constipation have a higher risk of occurrence of UTI.

RECOMMENDATION

We recommend to pediatrician that treatment and evaluation of patient with constipation and follow up of the condition will have a great impact on the treatment and prevention of UTI.

REFERENCES

Ataee, P., et al. (2020). "Association Between Duration of Constipation and Frequency of Urinary Tract Infection in Children." **11**: 104402.

Ataee, P., et al. (2020). "Association between duration of constipation and frequency of urinary tract infection in children." Journal of Comprehensive Pediatrics **11**(3).

Averbeck, M. A. and H. Madersbacher (2011). "Constipation and LUTS: how do they affect each other?" International braz j urol **37**(1): 16-28.

Dehghani, S. M., et al. (2013). "Urinary tract infection and enuresis in children with chronic functional constipation." Iran J Kidney Dis **7**(5): 363.

Edan, O. and F. Yahya (2022). "Socio-demographic characteristics and risk factors of functional constipation in children: A case-control study." Sri Lanka Journal of Child Health **51**(2): 227-234.

Habib, S. (2012). "Highlights for management of a child with a urinary tract infection." International Journal of Pediatrics **2012**.

Halachmi, S. and W. A. Farhat (2008). "The impact of constipation on the urinary tract system." International journal of adolescent medicine and health **20**(1): 17-22.

Halder, A. L., et al. (2021). "Chronic Constipation Enhances Urinary Tract Infection in Children: Experiences in a Tertiary Care Hospital Outpatient Department." Pediatric Oncall Journal **18**(2): 42-44.

Hoque, S. A., et al. (2010). "Impact of constipation in children on urinary tract infection (UTI)." Bangladesh Journal of Child Health **34**(1): 17-20.

Hsiao, Y.-C., et al. (2020). "Association between constipation and childhood nocturnal enuresis in Taiwan: a population-based matched case-control study." BMC pediatrics **20**(1): 1-6.

Inan, M., et al. (2008). "Personal characteristics of enuretic children: an epidemiological study from South-East Europe." Urologia internationalis **81**(1): 47-53.

Kasırga, E., et al. (2006). "Evaluation of voiding dysfunctions in children with chronic functional constipation." Turk J Pediatr **48**(4): 340-343.

Mitiku, E., et al. (2018). "Pediatric urinary tract infection as a cause of outpatient clinic visits in southern Ethiopia: a cross sectional study." Ethiopian journal of health sciences **28**(2): 187-196.

Reck-Burneo, C. A., et al. (2018). "A structured bowel management program for patients with severe functional constipation can help decrease emergency department visits, hospital admissions, and healthcare costs." Journal of Pediatric Surgery **53**(9): 1737-1741.

Sampaio, C., et al. (2016). "Constipation and lower urinary tract dysfunction in children and adolescents: a population-based study." Frontiers in pediatrics **4**: 101.

Shaikh, N., et al. (2008). "Prevalence of urinary tract infection in childhood: a meta-analysis." The Pediatric infectious disease journal **27**(4): 302-308.

Whiting, P., et al. (2005). "Rapid tests and urine sampling techniques for the diagnosis of urinary tract infection (UTI) in children under five years: a systematic review." BMC pediatrics **5**(1): 1-13.