J Compr Ped. 2017 August; 8(3):e62615. doi: 10.5812/compreped.62615.

Published online 2017 August 31. **Research Article**

Assessment of idiopathic Hypercalciuria in Girls kids with Infrequent Voiding (Underactive Bladder)

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Received 2016 November 26; **Accepted** 2017 July 30.

Abstract

Background: Hypercalciuria may be a sign of infrequent voiding; these symptoms may be treated if we get rid of hypercalciuria.
Objectives: This paper is intended to get to the prevalence of hypercalciuria in girls (kids) with infrequent voiding.
Methods: 80 patients with the index of infrequent voiding, who were admitted to Amir-Kabir hospital of Arak, and 80 children who were admitted without any particular disease just for a laboratory check were studied simultaneously. Urine sample (U/A-U/C), kidney, and bladder sonography was taken from both groups.
Results: The prevalence of hypercalciuria in the normal group was 9.64% and in the case group was 53.18% (P = 0.003). Based on the chi-square test, hypercalciuria distribution between the 2 groups is not homogeneous. Mean calcium to creatinine ratios were 0.17 $\pm$ 0.18 (mg/mg) and 3.9 $\pm$ 0.34 (mg/mg) for control and case groups, respectively and significant difference is observed between the 2 groups (P = 0.0001). Based on the logistic regression test, there is a significant relationship between both case and control groups and the occurrence of hypercalciuria with 6.3 times more than the control group observed in the case group.
Conclusions: Based on the high prevalence of hypercalciuria in the case group, examination and treatment of hypercalciuria in patients with infrequent voiding may be effective.

Keywords: Underactive Bladder, Hypercalciuria, Children

1. Background

What is a common disorder of micturition that is usually associated with UTIs? The answer is infrequent voiding (1). This disorder is behavioral and characterized by void only twice a day rather than the normal 4 - 7 times (2). In infrequent voiding, bacterial growth is common and can lead to recurrent UTIs (3, 4). Some of the children with an underactive bladder are constipated and some also have occasional episodes of incontinence. If the UTI accrues, antibacterial prophylaxis is needed and the encouragement of frequent voiding and complete emptying of the bladder is reestablished (5). Hypercalciuria is defined as more than 4 mg/kg calcium in 24-hour-urine or random calcium to creatinine ratio of more than 0.2 (6).

2. Objectives

Based on the fact that hypercalciuria may be a sign of an over active bladder, these symptoms may be treated if we get rid of hypercalciuria, if present in patients. This paper is intended to get to the prevalence of hypercalciuria in girls (kids0 with infrequent voiding.

3. Methods

In a cross-sectional study, the case group consisted of 80 girls above 5 years with infrequent voiding, while and the control group included 80 girls who only had cold symptoms without any urinary disease and with a normal clinical status. Both cases and controls were not investigated to any urodynamic investigations and none of them were on a free diet. Receiving adequate fluids was recommended to all families. Calcium and creatinine urinary amounts were measured. Patients with urinary infections were excluded and the calcium to creatinine ratio was considered as random calcium to creatinine ratio of more than 0.2 (6). Before this study took place, the procedure was explained to kids as well as their parents and the urine sampled for disease diagnosis were used with no additional cost imposed to the patients. The research was supported by the ethical committee of Arak University of Medical Sciences. Ethical subjects of this study included 1) the study supported the principles of the declaration of Helsinki and 2) informed consent was collected and they were free to abandon the study at any time. Data were analyzed by the SPSS 16 software. Idiopathic hypercalciuria in the 2 groups was assessed and analyzed by statistics including logistic regression, odd ratio (OR), and chi-square test. P value with a rate of less than 0.05 was considered significant level.

4. Results

The prevalence of hypercalciuria in the control group was 9.64% and 53.18% in the case group (P = 0.003). A total of 7 patients (9.64%) in the control group and 42 patients (53.18%) in the case group had hypercalciuria. Based on the chi-square test, hypercalciuria distribution between the 2 groups is not homogeneous (P = 0.001) (Table 1). Mean calcium to creatinine ratios were 0.17 ± 0.18 (mg/mg) and 3.9 ± 0.34 (mg/mg) for control and case groups, respectively. A significant difference is observed between the 2 groups (P = 0.0001). Based on logistic regression test, there is a significant relationship between both case and control groups and the occurrence of hypercalciuria with 6.3 times more than control group is observed in the case group.

Table 1. Assessment of Idiopathic Hypercalciuria in Girls Kids with Infrequent Voiding (Underactive Bladder) Referring to Amir Kabir Hospital[a]

	Normal	Abnormal	Total
Case	38 (47.5)	42 (53.18)	80 (100)
Control	73 (91.25)	7 (9.64)	80 (100)
Total	111 (69.37)	49 (30.62)	160 (100)

[a]Values are expressed as No.(%) unless otherwise indicated.

5. Discussion

A significant difference was observed in hypercalciuria between the case and control group in this study. No similar study was found since all other papers have discussed the relation between hypercalciuria and various voiding disorders, as a result no comparison might be done.

"Idiopathic hypercalciuria may have a significant role in cases of functional voiding disorders", this is the main result of the study done by Parekh et al. (7). In this study, results show an elevated calcium-to-creatinine ratio, which is the same as our study.

In 2011, Badeli showed that there is no significant statistical difference between the groups with respect to the Ca/Cr ratio mean. In addition, it is mentioned that urine Ca excretion is elevated in children with reflux (8); however, in our study, this criterion was not followed.

In the study of Yousefi et al., treating hypercalciuria was not helpful in preventing repeated UTIs and the author recommended more attention in eliminating confounding factors (9).

Furthermore, Yousefi, in another study, declared a therapeutic option in the treatment of recurrent abdominal pain in children with IH; that option was a single daily dose of HCT (10).

Yousefichaijan et al., found that based on the high prevalence of hypercalciuria in the case group, examination and treatment of hypercalciuria in patients with an over active bladder may be effective (11).

Civilibal (2014), in a case-control study, found that hypercalciuria is common in children with monosymptomatic NE (12); however, in our study, this criterion was not followed.

"Urinary calcium excretion was significantly disturbed", this is what Korzeniecka-Kozerska concluded in a study in 2015 (13).

In another study by Valavi et al., it was found that hypercalciuria has a significant association with nocturnal enuresis (NE) (14).

In the study of Kamperis et al., conclusions contradict several previous reports on a role of Ca in the pathogenesis of NE (15); although, the aim of our study was different.

5.1. Conclusion

The results of this study showed that there is a significant difference between case and control groups based on the presence of hypercalciuria and hypercalciuria is a cause of Underactive Bladder. Based on the high prevalence of hypercalciuria in these patients, examination and treatment of hypercalciuria in patients with infrequent voiding may be effective.

5.2. Limitations of the Study

The study was performed based on the laboratory assay and therefore the laboratory misdiagnosis can affect our study, however, its effect was on each case and control group.

Footnotes

Authors' Contribution: All authors contributed to the design of the research. Parsa Yousefichaijan, Parisa Poor Seyedreza, and Hassan Taherahmadi conducted the research. Bahman Sadeghi Sedeh and Hossein Malekee analyzed the data. Parisa Poor Seyedreza and Hassan Taherahmadi prepared the manuscript. All authors read, revised, and approved the final manuscript.

Conflict of Interests: The authors declared no competing interests.

Funding/Support: This work was performed in partial fulfillment of the requirements for medical doctors of Parisa Poor Seyedreza, which was financially supported by Arak University of Medical Sciences (Grant: Behsan-740).

Table 2. Mean and Standard Deviation of Hypercalciuria, Creatinine and Calcium to Creatinine Ratio in Girls with Infrequent Voiding (Underactive Bladder) Referring to Amir Kabir Hospital

	No.	Mean	SD	P Value
Calcium (mg/dl)				0.093
Control	80	11	13.98	
Case	80	13.78	17.84	
Creatinine (mg/dl)				0.087
Control	80	1.28	94.48	
Case	80	64.37	50.46	
Calcium/Creatinine (mg/mg)				0.003
Control	80	0.17	0.47	
Case	80	0.46	0.86	

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