



Comorbidity of headache and functional constipation in children: A cross-sectional survey

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ABSTRACT

Background/Aims: Constipation and headache are prevalent conditions among children worldwide. Previous studies have shown the relationship between upper gastrointestinal complaints and headache in children. However, the association with lower gastrointestinal complaints such as constipation has not been investigated until present. The aim of this study is to evaluate the relationship between headache and chronic functional constipation in children aged 4-12 years old.

Materials and Methods: This cross-sectional study has evaluated the prevalence of headache in 326 children in Shiraz, Iran 2012. All the subjects and their parents were interviewed based on a structured questionnaire for the diagnosis of constipation and headache. Children with constipation were selected from the Pediatric Gastroenterology Clinic Affiliated to the Shiraz University of Medical Sciences. The control group was selected from healthy children attending Shiraz schools. Diagnosis of headache and constipation were made based on the second Edition of The International Headache Classification (ICHD-2) and ROME III criteria, respectively.

Results: Headache prevalence among children with constipation was significantly higher (19.8%) than that of the control group (5.6%) [Odds ratio (OR) 4.192, $p < 0.001$], which was significant only in the non-migraine headache subtypes (15.1% vs 2.8%, OR 25, $p < 0.002$). Among the headache subtypes of different severity (mild, moderate, severe), only mild headache was significantly more prevalent in constipated children (14.9% vs. 1.4%, in the control group, respectively, $p < 0.001$).

Conclusion: This study revealed a strong correlation between headache and chronic functional constipation, which can result from the effect of these comorbid conditions with emotional stress, depression, and anxiety.

Keywords: Chronic functional constipation, headache, emotional stress, migraine, children, ROME III criteria

INTRODUCTION

Headaches are common in children (1-3). It has been reported that nearly 60% of children experience headaches over various periods of time (3). More than 90% of children report having a headache in their childhood (1). In a population-based study in Iran, the prevalence of migraine and tension type headache in school age children was 1.7% and 5.5%, respectively (4).

Headache is more prevalent in children with a positive family history of headaches and during the first 12 months after school attendance (5,6). Children who have headaches are more prone to develop multiple

medical problems, physical symptoms and psychiatric symptoms, such as anxiety, emotional stress and depression (5-7).

Constipation is also common among children, accounting for an estimated 3% to 5% of all visits to pediatricians and up to 25% of pediatric gastroenterologist visits (8).

Population based studies revealed a high prevalence of constipation, ranging from 0.3% to 28% (9,10). Constipation is also considered to associate with child and family anxiety, emotional disorders and depression (11).

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Received: 16.9.2013

Accepted: 18.6.2014

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Different studies have shown a positive association between headache and gastrointestinal (GI) problems. Upper and lower GI diseases such as acid peptic disease, gastroesophageal reflux disease, inflammatory bowel disease, and constipation were previously shown to have a significant correlation with headache in the adult population (12-17). On the other hand, in the pediatric population, only upper GI problems, such as acid peptic disease and abdominal pain, were shown to be related to headache (18-20). Abdominal migraine is a typical clinical feature of this association (21). However, it seems that the association of lower GI complaints, such as constipation, with headache has not been investigated previously. As both conditions have similar risk factors, accounting for emotional stress, anxiety and depression, it has been hypothesized that they may have an association in the pediatric population. The aim of this study is to investigate this association in a clinical based cross-sectional study.

MATERIALS AND METHODS

Study population

In this cross-sectional study, 326 children with constipation (case group) and without constipation (control group) were evaluated regarding the history, severity and type of headache. The study population were all children within the age range 4-12 years old, in 2012, Shiraz, Iran.

The case group consisted of 182 children with constipation, who were referred to the Pediatric Gastroenterology Clinic affiliated to the Shiraz University of Medical Sciences, Shiraz, Iran. Children older than 4 years old, with a diagnosis of constipation based on ROME III criteria, were included in the study whereas patients with other gastroenterological and neurological diseases, such as acid peptic disease, cirrhosis, seizure, cerebral palsy and brain tumor, were excluded. One hundred forty four children without constipation were selected by random sampling from the children attending a Shiraz elementary school, as the control group was not selected from the gastroenterology clinic due to the confirmed association between other gastroenterological complaints and headache in previous studies.

Data collection

All patients and their parents were interviewed based on a structured questionnaire for the diagnosis of constipation and headache. Demographic data, history of medication for constipation and family history of constipation and headache were also gathered.

The diagnosis of constipation was based on the history and physical examination items of the ROME III criteria (22) (≤ 2 defecations per week, history of excessive stool retention, history of painful/hard bowel movements, history of a large-diameter stool, ≥ 1 episode of fecal incontinence/week and presence of large fecal mass in the rectum).

The type (migraine and non-migraine headache) and severity of headache (mild, moderate, severe) were also determined based

on the 2nd Edition of The International Headache Classification (ICHD-2) criteria (23). Informed consent was obtained from parents of children who participated in this study.

Statistical analysis

Descriptive data were presented by tables and graphs. Analytic results were statistically analyzed with the Statistical Package for the Social Sciences (SPSS) software, version 18 (Chicago, IL, The USA), using Pearson Chi-square and t-test. The p values <0.05 were considered significant. We used logistic regression to compute the odds ratio of constipation based on sex, headache, type of headache and family history of constipation.

The study design was approved by the Ethics Committee of the Shiraz University of Medical Sciences, Shiraz, Iran.

RESULTS

Out of 326 children, 169 (51.8%) were male and 157 (48.2%) were female. Mean age in the case group (children with constipation) and control group were 9.64 ± 2.1 and 7.57 ± 1.5 years old ($p < 0.001$), respectively (ranging between 4-13 years old). Family history of headache was present in 12.6% vs. 7.7% in the case and control groups ($p < 0.126$), respectively.

A history of headache based on the ICHD-2 criteria was present among 19.8% of children in the case group, compared to 5.6% of children in the control group ($p < 0.001$). This accounts for a more significant prevalence of headache in the case group [Odds ratio (OR) 4.192, $p < 0.001$]. This significant difference was only present in the non-migraine headache subtypes (OR 25.500, $p < 0.002$) (Table 1). Among the severity of headache subtypes (mild, moderate, severe), only mild headache was significantly more prevalent in constipated children (14.9% vs. 1.4%, $p < 0.001$) (Table 2).

Children with both headache and constipation had a significantly higher rate of taking medication for constipation than children with constipation alone (77.8% vs 58.2%, $p = 0.03$). Only 20.75% of

Table 1. Distribution of sex and different type and severity of headache among case and control group

	Case (Children without constipation)	Control (Children with constipation)	p value
Sex			
Male	91 (50%)	78 (54%)	0.455
Female	91 (50%)	66 (46%)	
Headache			
Migraine	8 (4%)	7 (5%)	0.886
Non-Migraine	27 (15%)	1 (1%)	0.002
Severity			
Mild	27 (14.84%)	2 (1.39%)	<0.001
Moderate	6 (3.30%)	4 (2.78%)	0.75
Severe	2 (1.10%)	2 (1.39%)	0.61

children with comorbidity of headache and constipation had a history of headache attacks triggered by straining on defecation.

DISCUSSION

This study showed a significant association between constipation and headache, with a strong OR (4.192) in children ($p < 0.001$), which was more prominent in the non-migraine subtype headache group (OR 25.500, $p < 0.002$). This correlation has not been previously described in the pediatric population. However, the relationship between headache and upper GI problems, such as acid peptic disease and abdominal pain in the pediatric group, was previously described by multiple studies (18-20). Also, upper and lower GI conditions, such as acid peptic disease, gastro esophageal reflux disease, inflammatory bowel disease, and constipation have been shown to have a significant association with headache in the adult group (12).

The prevalence of headache in the normal population of children of this study (5.6%) was compatible with previous reports, in which the diagnosis of headache was based on the ICHD-2 criteria (24-26).

However, the distribution of migraine and non-migraine type headache in this study was different from previous evidence, which showed a higher prevalence of the non-migraine type compared to the migraine type headache among the pediatric population (24). The equivalence in frequencies of the two mentioned types of headache in the control group of this study may be secondary to the higher mean age of the children in this study. A superior prevalence of the non-migraine type of headache with increasing age in the pediatric population was also evidenced in previous studies (24). However, the small size of the control group of this study can also account for this difference. The significantly higher rate of medication administration for constipation in children with headache and constipation, compared to children with constipation alone (77.8% vs. 58.2%, $p < 0.001$) reveals the potential effect of headache on behavioral outcome of parents of pediatric patients with constipation.

Table 2. Odds ratio of constipation based on sex, headache, type of headache and family history of constipation

Variables		Odds ratio	95% Confidence interval for odds ratio		p value
			Lower	Upper	
Sex	Male	1	-	-	0.455
	Female	1.182	0.763	1.831	
Headache	No	1	-	-	<0.001
	Yes	4.192	1.882	9.337	
Type of headache	No	1	-	-	-
	Migraine	1.079	0.381	3.057	0.886
	Non migraine	25.500	3.418	190.246	0.002
Family history of constipation	Negative	1	-	-	<0.001
	Positive	23.307	9.117	59.584	

The mild intensity of headache in most children with constipation in this study - which may be neglected by physicians - prompts for the necessity for history data collection on headache in patients with constipation to be performed by pediatric gastroenterologists.

A strong family history of constipation in pediatric patients with functional constipation may be due to different factors, such as the genetic substrate, diet, physical activity, anxiety, emotional stress and depression (27).

The order of the prevalence of ROME III criteria in children with constipation in this study was compatible with the natural history of constipation, which starts with large-diameter stools (86%) and end whit soiling and fecal incontinence (26%).

The most important limitation of the present study was that the target population was clinical instead of population based. Also, the control group was not selected from the gastroenterology clinic due to the confirmed association between other gastroenterological complaints and headache in previous studies; the control group should be selected from healthy children with no known risk factor of headache (12). Another problem was the difference in the basic mean age between the two groups, which can make the difference in migraine and non-migraine type headache distribution (28).

Different factors can account for the association between constipation and headache in children. Emotional stress, anxiety and depression were shown to have an association with both headache and GI problems (29,30). Therefore, these factors can play a common etiological role between headache and constipation. Side effects of headache medications are also suggested as a cause of GI problems in patients with headache (12). It is well known that opioid analgesics may cause constipation and nausea, and various GI symptoms are common as side-effects of non-steroidal anti-inflammatory drugs (NSAIDs). Increased intracranial pressure, as a result of the Valsalva maneuver in patients with constipation is also suggested as the cause of headache in patients with constipation (31). Migraine with a GI origin is also described in previous studies (32). However, the causal direction of this association is not completely understood. Further studies can help determine this direction by evaluating the effect of treating constipation on the headache of patients with this co-morbidity. If positive effect of constipation treatment on headache is shown in future studies, the theory of headache with GI origin may be supported. However, more studies are needed for better understand the etiology of the association between headache and constipation.

This study revealed a strong relationship between headache and chronic functional constipation, which can result from the effect of these co-morbid diseases with emotional stress, depression, and anxiety.

Ethics Committee Approval: Ethics committee approval was received for this study from Medical Ethics Committee of Shiraz University of Medical Sciences.

Informed Consent Written informed consent was obtained from patients' parents who participated in this study.

Peer-review: Externally Peer reviewed.

Author contributions: Concept - M.H.; Design - S.I., SM.D., SM.H., M.H., ST.H.; Supervision - S.I., SM.D.; Resource - S.I., SM.D.; Materials - S.I., SM.D.; Data Collection&/or Processing - SM.H.; Analysis&/or Interpretation - M.H., ST.H.; Literature Search - SM.H.; Writing - M.H.; Critical Reviews - S.I., SM.D., SM.H., M.H., ST.H.

Acknowledgements: The authors would like to thank Dr. Nasrin Shokrpour at Center for the Development of Clinical Research of Nemazee Hospital, Dr. Asma Erjaee and Kowsar publication group for the editorial assistance. We would also like to thank Dr. Heydari for introducing the idea of the study from Traditional Persian Medicine.

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

Financial Disclosure: The authors declared that this study has received financial support from Shiraz University of Medical Sciences.

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