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Abdominal pain-related functional gastrointestinal disorders based on Rome III criteria in a pediatric gastroenterology clinic

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Abstract

Background: Functional gastrointestinal disorders (FGIDs) entail several distinct conditions that collectively account for a sizeable proportion of patients complaining of abdominal pain. Physicians' awareness is fundamental to avoid unnecessary evaluations and to alleviate stress-related problems. This study aimed to assess the relative frequencies of FGIDs and related categories in a selected Iranian population.

Methods: We conducted this cross-sectional study in a gastroenterology clinic of a tertiary care pediatric hospital in Iran. Children and adolescents between the age of 4 and 18 years referred to the clinic from October 2011 to February 2013 were enrolled if they were diagnosed with FGID according to the Rome III criteria. A structured questionnaire was used to collect data on demographic characteristics, pain location, duration and frequency, associated symptoms, and pertinent family history. We used descriptive analyses to show mean (±SD) and relative frequencies of categories of FGIDs.

Results: We diagnosed 183 (114 female) with FGIDs out of 1307 children and adolescents who were visited in the clinic. There was history of psychiatric disorders in 42 (22.9%) participants, and migraine headaches and gastrointestinal disorders were at least in one of the parents in 21 (11.5%) and 64 (34.9%) participants, respectively. We defined 84 (46%) patients under Irritable Bowel Syndrome (IBS) category, 38 (21%) under Abdominal Migraine, 26 (14%) under Functional Abdominal Pain, 21 (11%) under Functional Dyspepsia, and 7 (4%) under Functional Abdominal Pain Syndrome. Seven children (4%) had no defining feature for FGID categories and therefore labeled as unclassified.

Conclusion: FGID was a prevalent diagnosis among children and adolescents with abdominal pain. IBS was the largest category. Only a minority were unclassifiable under the Rome III criteria, indicating improved differentiation characteristics of Rome III criteria compared to the Rome II version.

Keywords: Abdominal pain, Functional gastrointestinal disorders (FGIDs), Rome criteria, Children, Iran.

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Introduction

Functional Gastrointestinal Disorder (FGID) is a frequent diagnosis in children and adolescents with chronic abdominal pain (1-6). According to the epidemiologic data, the prevalence among children and adolescents ranges between 10 - 21%. This difference might be related to sample selection, clinical definition, or study setting (7-9).

The pathogenesis of F GIDs remains elusive and may be multifactorial. A combination of several physiological derangements may be involved: motor hyperactivity, visceral hypersensitivity, altered mucosal immune function, changes in intestinal bacterial flora, defective central regulatory pain mechanisms, and psychosocial and environmental stressors (10-14).

The diagnosis of childhood FGIDs still is a clinical challenge and mainly relies on excluding organic differential diagnoses. To date, very few guidelines have been introduced to address the definition and clas-

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sification of this set of disorders and provide guidance for clinical diagnosis. The Rome II pediatric criteria tool was developed in 1999 as a symptom-based defining tool for diagnosing FGIDs and endorsing field research (15-18). The updated and revised Rome III tool was developed in 2006 with a few notable changes in the pediatric criteria (19). In the Rome III abdominal pain-related FGIDs in children and adolescents categorized as a main entity under FGIDs. That entity encompassed four subgroups defined as Functional Dyspepsia (FD), Irritable Bowel Syndrome (IBS), Abdominal Migraine (AM), and childhood Functional Abdominal Pain (FAP) (20) with a new subordinate as "childhood Functional Abdominal Pain Syndrome (FAPS)". Based on the Rome III, submission a diagnosis under abdominal pain-related FGIDs requires the presence of abdominal pain or discomfort, either constant or intermittent, for at least two months; in contrast to a minimum duration of 3 months deemed mandatory in the Rome II. Additionally, the Rome III committee sought to eliminate the requirements that the pain should be continuous, limit daily activities, not related to physiological events, and not be factitious. The adoption of this less restrictive tool was an effort to increase sensitivity of the Rome III criteria for diagnosing FGIDs (21).

In fact, there is fair evidence indicating that the Rome III is more inclusive and leaves a significantly smaller proportion of non-organic chronic abdominal pain cases as unclassified (22-25).

In a population of 368 pediatric patients in whom evaluations for chronic abdominal pain yielded no evidence of organic disease, Baber et al reported that 86.6% fulfilled the Rome III criteria in comparison to 68.0% who met the Rome II (26).

Nevertheless, since the establishment of Rome III criteria, a limited number of studies have focused on assessing the frequency of abdominal pain-related FGIDs among children presenting with abdominal pain in ambulatory settings (27). There is scant data from developing countries and to the best of our knowledge non from the Middle East region. We expect exploring pertinent epidemiological data promotes awareness of health professionals to this challenging and important medical issue and prevents non-yielding investigations, unnecessary costs, and children and parents anxiety.

In this study we used the Rome III criteria to assess the frequency of abdominal pain-related FGIDs among children and adolescents with abdominal pain referred to a gastroenterology clinic in a major pediatric hospital in Iran.

Methods

We conducted this prospective cross-sectional study in Ali-Asghar Children's Hospital, the main pediatric care center affiliated to the Iran University of Medical Sciences, in Tehran, Iran.

A minimum of 185 patients was calculated to be required given an assumption of 14% for the prevalence of abdominal pain-related FGIDs (1-6). Significant level was set at 0.05, and a confidence interval of 5% based on formula for calculation of sample size in descriptive studies.

The study population consisted of patients aged between 4 and 18 years referred to the gastroenterology clinic of the hospital during the study period. According to the routine practice of that clinic, the patients were initially visited by pediatric residents and then the diagnoses were confirmed by a pediatric gastroenterologist.

All patients underwent a thorough history and physical examination. Laboratory and imaging studies were performed if clinically indicated. Upper gastrointestinal endoscopy was performed for all children suspicious to acid peptic disease because of suggestive symptoms such as dyspepsia. Mucosal biopsy was taken from gastric antrum routinely during all upper endoscopic evaluations. We also provided mucosal biopsies from suspicious or gross lesions in other parts accessible to endoscopic view. Whenever there was a clinical possibility for celiac disease or gastroesophageal reflux dis-

ease biopsies were taken from duodenal and distal esophageal mucosa, correspondingly. Colonoscopy was considered for all children suspected of inflammatory bowel disease. Cases with gross endoscopic abnormalities or abnormal biopsy findings were excluded. We enrolled all children with no clinical evidence of inflammatory, anatomic, metabolic, or neoplastic process to explain the symptoms.

The case enrollment started in October 2011 and lasted until February 2013 to include the sample size. A questionnaire was designed based on the key information required to classify the abdominal pain-related FGIDs according to the Rome III criteria (20). We obtained data on the frequency, duration and location of abdominal pain, bowel habit characteristics and other relevant associated clinical findings, past medical history with particular attention to underlying organic diseases and psychiatric illnesses. A trained research assistant was assigned to attend in the active clinic days during the study period. He was responsible for recording the demographic data and clinical diagnosis for any patient visitor who met the age entry criteria as well as assisting children and parents in filling out the questionnaire. If further outpatient evaluations were planned for diagnostic purposes, patients either were followed until the next visit or contacted two months later whichever came sooner.

To meet ethical issues, we obtained written consents from parents or participants' proxies. Moreover, we assigned code numbers for patients' real names on data sheets to maximize their privacy. The proposal of this study was approved by the Committee of Ethics of Iran University of Medical Sciences.

Results

Of 1307 patients visited in the gastroenterology clinic during the study period, 183 (14%) were diagnosed with abdominal pain-related FGIDs; selected as study samples. The median age of the sample group was 10 years with an inter-quartile range of 6 to 13 years. Figure 1 demonstrates the age distribution pattern of patients with abdominal pain-related FGIDs. Females comprised the majority of cases; 114 (62.3%) females versus 69 (37.7%) males.

The prevailed mode of delivery was Cesarean section which reported in 151 (82.5%) patients versus natural delivery in

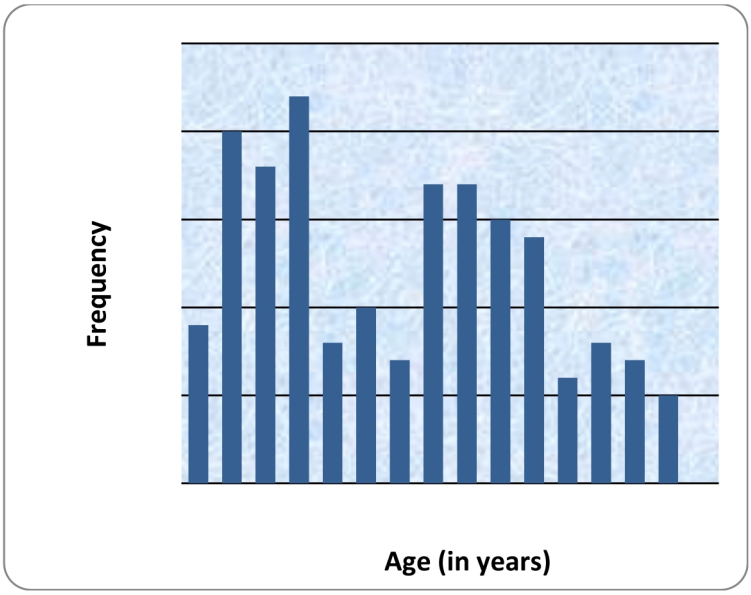

Fig. 1. Age distribution of 183 children with abdominal pain-related FGIDs

Table 1. Relative frequencies of various clinical diagnoses in 183 Iranian children meeting the Rome III criteria for pain-related FGIDs

Pain-related FGIDs	%
Irritable bowel syndrome	46
Abdominal migraine	21
Functional abdominal pain	14
Functional dyspepsia	11
Functional abdominal pain syndrome	4
Unclassified cases	4

32 (17.5%) cases. There was a history of at least one hospital admission for an organic disease of non-gastrointestinal tract origin since birth in 24 (13.1%) children. Forty-two (22.9%) had been already diagnosed with a psychiatric disorder including depression, anxiety, and Attention Deficit Hyperactivity Disorder by other physicians.

The history of migraine headaches was present in 21 (11.5%) parents and 15 (39.5%) children with AM. In 64 (34.9%) children with abdominal pain-related FGID, at least one of the parents had a history of medical evaluation and/or management for gastrointestinal disorders.

The most common location for abdominal pain was periumbilical area in 124 (67.8%) children followed by epigastric area in 42 (22.9%). Diffuse abdominal pain or other regional abdominal pain symptoms were reported in 17 (9.3%) cases.

After applying the Rome III diagnostic criteria to those affected by FGIDs, we diagnosed IBS in 84 patients, AM in 38, FAP in 26, FD in 21 and FAPS in 7 individuals. Seven cases remained unclassified as they either fulfilled criteria for none or more than one category (Table 1).

Discussion

This study showed abdominal pain-related FGIDs accounted for 14% of diagnoses among children and adolescents presented to the gastroenterology clinic of Ali-Asghar Children's Hospital. This prevalence is in line with reports available from other communities ranging from 10 to 21% (1-9). Aside from the possibility of genuine differences in the prevalence of abdominal pain-related FGIDs, multiple factors including inconsistency in definition, study settings, and inclusion criteria may affect results of epidemiologic studies. We sought to include children between 4 to 18 years and observed a bimodal age distribution in those with FGIDs, characterized with an early peak at 5 to 7 years and a late peak at 11 to 14 years. This bimodal pattern of age distribution has been also reported in other studies. In a case series, Apley et al reported a same pattern with slightly different peaks: an initial peak at age less than 5 years and a second peak at 8 to 10 years (1). To date, no clear cause for this bimodal pattern has been described, though it appears to coincide with two stressful situations in early life: the first at pre- and early school training and the second at early adolescence period (7).

Almost two-thirds of our patients were female. The female majority for abdominal pain-related FGIDs has been previously reported (5,7,26,28). The literature suggests that there is an association between psychiatric disorders and FGIDs. Anxiety disorders have been reported in 42-85% of children with FAP (29-31). We detected psychiatric disorders in 22.9% in our patients. The importance of association of abdominal pain-related FGIDs with psychiatric disorders is two-fold. First, this indicates a need for careful evaluation of psychiatric disorders in any child with FGIDs. Second, a co-existing psychiatric disorder may be associated with a higher level of functional impairment in children with FGIDs (30). Attention to this fact may help a successful plan to improve patient symptoms and optimizing coping mechanisms (32, 33). In fact, the accurate and in time diagnosis of FGID may reduce the anxiety of parents and children and preventing the burden of frustrating and unyielding evaluations.

Similar to other studies, IBS was the most common abdominal pain-related FGID in our case series (33-38) with a high prevalence of AM. In recent years a trend toward diagnosing more cases with AM has been observed (39). This trend may be directly related to the replacement of the Rome II with the newer Rome III version (40-42). The latter is more generous to define AM as the presence of headache, photophobia, and aura are no longer considered essential. Accordingly, Baber et al in their case series detected a frequency of 5.7% for AM using the Rome II criteria. This figure increased to 23.1% when they applied the Rome III criteria (26).

FAP, a recognized entity among FGIDs, is diagnosed when non-organic constant or episodic abdominal pain (not less than once weekly) occurs and there is no clues referring to other specified FGIDs (43-45). Since introducing the Rome III more cases of FAP are diagnosed. The main reason may be the higher sensitivity of the Rome III for classifying FAP. This assumption is supported by a case series of FGIDs in which FAP accounted for 2.7% and 11.4% of the total population using the Rome II and III criteria, respectively (26). We diagnosed 26 (14%) of our patients with FAP, exceeding the 7 cases (4%) we diagnosed with unclassified FGID. This illustrates a shift from diagnosing the unclassified FGID to FAP by applying the Rome III criteria.

The Rome III criteria introduced a new category for FGIDs called as "FAPS" to differentiate a subcategory of children with FAP who are functionally impaired due to the severity of symptoms. Nevertheless, it is still uncertain whether FAPS differs from FAP in terms of pathophysiology, course of illness, and management needs (26, 27). In our study, 7 patients (4%) who could have otherwise fulfilled the criteria for FAP, had a constant or frequent episodic abdominal pain in at least 25% of the time and severe enough to impair their functions; hence were classified as FAPS.

In the Rome III criteria the minimum symptom duration required for classifying FGIDs has been decreased by two months (21). This decrement was an attempt to develop a more sensitive and inclusive tool (22-25). As a result the Rome III tool leaves fewer cases of FGIDs as unclassified (26). In accordance, using the Rome II criteria, Baber et al was unable to classify 32.1% of their cases with abdominal pain-related FGIDs. This figure reduced to 13.3% when they used the Rome III criteria. Likewise, we were able to classify a total number of 176 (96%) under recognized classes of FGIDs and only 7 patients were left unclassified.

As study limitations, we enrolled all patients from a tertiary care metropolitan children's hospital. This sample may not be representative of suburban or rural ambulatory clinics. However, this bias is more probable to affect the total frequency estimate of abdominal pain-related FGID and the relative frequencies of individual subcategories under abdominal pain-related FGIDs may have been less affected. Second, this was a cross-sectional study. Follow-up data were not available for all participants and we were not able to reject the possibility of exploring organic disorders in follow-up appointments. However, we did every effort to rule out organic diseases by clinical evaluation, laboratory tests, as well as imaging or endoscopic studies if were indicated. Most of the cases had established FGID diagnoses for a while before enrollment, therefore leaving a small chance for missed organic problems. Furthermore, our method for enrollment was similar to other counterpart studies, suggesting that our results are comparable to them. Third, there was no control group. So we could not determine if selected demographic features (such as female gender) or associated factors (such as psychiatric disorders) were more frequent in patients than expected.

Conclusion

Abdominal pain-related FGIDs were diagnosed in a significant proportion of children and adolescents referred to our gastro-

enterology clinic. Applying the Rome III criteria resulted in classification of the majority of FGIDs. IBS was the most common followed by AM, FAP, FD, and FAPS. Only a few of abdominal pain-related FGIDs remained unclassified. These findings demonstrate that the Rome III tool is a sensitive tool with an acceptable power to differentiate FGIDs categories.

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