Published in final edited form as:
J Pediatr Gastroenterol Nutr. 2008 September ; 47(3): 299–302. doi:10.1097/MPG.0b013e31816c4372.

Rome II Versus Rome III Classification of Functional Gastrointestinal Disorders in Pediatric Chronic Abdominal Pain

Kari F. Baber[*], **Julia Anderson**[†], **Martina Puzanovova**[*], and **Lynn S. Walker**[*]

[*]Department of Pediatrics, Division of Adolescent Medicine and Behavioral Science, Vanderbilt University Medical Center, Nashville, TN

[†]Department of Pediatrics, Division of Gastroenterology, Hepatology, and Nutrition, Vanderbilt University Medical Center, Nashville, TN

Abstract

Objectives—The updated Rome III criteria for pediatric functional gastrointestinal disorders (FGIDs) include new FGID categories and changes to the Rome II criteria for various FGIDs. To our knowledge, the implications of these revisions for patient classification have not been identified. The purpose of this study was to compare classification results using Rome II versus Rome III criteria for FGIDs associated with chronic abdominal pain.

Patients and Methods—Participants were 368 pediatric patients whose subspecialty evaluations for chronic abdominal pain yielded no evidence of organic disease. The children's gastrointestinal symptoms were assessed with the parent-report version of the Questionnaire on Pediatric Gastrointestinal Symptoms (QPGS).

Results—More patients met the criteria for a pediatric pain-related FGID according to the Rome III criteria (86.6%) than the Rome II criteria (68.0%). In comparison with the results from the Rome II criteria, the Rome III criteria classified a greater percentage of children as meeting criteria for Abdominal Migraine (23.1% vs 5.7%) and Functional Abdominal Pain (11.4% vs 2.7%). Irritable Bowel Syndrome was the most common diagnosis according to both Rome II (44.0%) and Rome III (45.1%).

Conclusions—Changes to the Rome criteria make the Rome III criteria more inclusive, allowing classification of 86.6% of pediatric patients with medically unexplained chronic abdominal pain.

Keywords

Abdominal pain; Pediatric functional gastrointestinal disorders; Rome criteria

Standardized symptom-based criteria for pediatric functional gastrointestinal disorders (FGIDs) were introduced in 1999 with the publication of the Rome II criteria for FGIDs in children (1). Since their publication, the Rome II criteria have been used to assess the prevalence of FGIDs in community settings (2,3) and have served as selection criteria in laboratory studies of pediatric FGIDs (4). Several empirical studies have used the Rome II criteria to estimate the rates of various FGIDs among children with primary symptoms of abdominal pain (5–7). In addition, psychosocial characteristics of children who meet criteria

Address correspondence and reprint requests to Lynn Walker, Division of Adolescent Medicine, Vanderbilt University Children's Hospital, Doctor's Office Tower 11128, 2200 Children's Way, Nashville, TN 37232-9060 (lynn.walker@vanderbilt.edu).

for FGIDs defined by the Rome II criteria have been identified (8,9). Thus, the Rome II criteria for pediatric FGIDs have considerably advanced research in this area.

Research using the Rome II criteria provided the foundation for the updated Rome III criteria (10,11). Changes from the Rome II to the Rome III criteria for pediatric FGIDs include a reduction in the required duration of symptoms, the addition of new FGID categories (eg, Functional Abdominal Pain Syndrome), changes to specific criteria for several FGIDs, and separate criteria defining FGIDs among infants versus children and adolescents. The rationale for these changes is described in detail alongside the published Rome III criteria (11). However, the implications of these changes for patient classification are so far unknown, to our knowledge.

The purpose of this study was to compare the results of Rome II versus Rome III criteria in the classification of gastrointestinal symptoms described by children undergoing medical evaluation for chronic abdominal pain. Specifically, the study compared classification results using Rome II versus Rome III criteria for 5 FGIDs associated with abdominal pain: Irritable Bowel Syndrome (IBS), Abdominal Migraine, Functional Dyspepsia, Functional Abdominal Pain, and Functional Abdominal Pain Syndrome.

PATIENTS AND METHODS

The study participants were consecutive new patients referred to the Pediatric Gastroenterology Clinic at Vanderbilt University Medical Center for evaluation of abdominal pain of at least 3 months' duration. Patients were eligible if they were between the ages of 8 and 17 years and had no significant chronic illness or disability by parent report, and the referring provider found no evidence of organic disease to explain the abdominal pain. The parent accompanying the child to the clinic also participated.

Procedure

Parents of patients scheduled for evaluation of chronic abdominal pain were informed of the study by telephone before the patients' initial clinic visits. Of the 790 families contacted, 548 met the eligibility criteria, of whom 53 declined to participate and 56 failed to keep their clinic appointments, leaving 439 participating families. Upon arrival at the clinic, patients and their parents provided written assent/consent for study participation.

Parents completed the Questionnaire on Pediatric Gastrointestinal Symptoms (QPGS) (6) in the clinic waiting room before the medical evaluation. A trained research assistant was available to answer parents' questions about the questionnaire.

The conditions of all patients were evaluated by a board-certified pediatric gastroenterologist. The medical evaluation included medical history, review of records from the referring primary care provider, family and social history, review of systems, and complete physical examination. Specific laboratory tests and procedures were conducted as indicated, at the discretion of the attending physician. At least 6 months after the medical evaluation, the patients' medical records were reviewed for laboratory evidence of organic disease.

Questionnaire on Pediatric Gastrointestinal Symptoms—The children's gastrointestinal symptoms were assessed by parent report with the 83-item QPGS-Form A (6). Items on the QPGS are grouped in 5 sections: pain/discomfort in the upper abdomen above the navel, pain/discomfort in the lower abdomen around and/or below the navel, defecation habits, other symptoms (nausea, vomiting), and restriction of child and family activities because of symptoms. The QPGS may be scored according to Rome II or Rome III

criteria for pediatric FGIDs. The QPGS has adequate content validity and test-retest reliability (6).

RESULTS

Of the 439 participating families, 52 were excluded because of positive evidence of organic disease (ie, positive results of esophageal, gastric, or duodenal biopsy or colonoscopy in conjunction with symptoms usually associated with organic disease, including blood or mucus in stool, vomiting, or significant weight loss). The biopsy result was classified as positive if marked basal layer hyperplasia, vascular ectasia, and numerous intraepithelial eosinophiles or lymphocytes were present in the esophagus; lymphoid aggregates appeared in the gastric antrum or fundus; and/or crypt hyperplasia, moderate or marked villous atrophy, or increased intraepithelial lymphocytes were found in the duodenum. The criteria for eosinophilic esophagitis were met if 20 eosinophiles per high power field were found on esophageal biopsy. Of patients whose esophageal biopsy results were positive, clinical diagnoses included reflux esophagitis (88%) and eosinophilic esophagitis (12%).

Of the remaining 387 patients who met the eligibility criteria, 19 were excluded because of incomplete data. Analyses were completed for a final sample of 368 patients. The participating patients ranged in age between 8 and 17 years. The mean age was 11.8 ± 2.5 years. Most patients were Caucasian (91%) and female (64%).

The QPGS was scored according to both Rome II and Rome III criteria. Table 1 shows the percentage of patients meeting the criteria for each pain-related FGID according to Rome II versus Rome III criteria. In comparison with the Rome II criteria, application of the Rome III criteria increased the percentage of patients meeting the criteria for Abdominal Migraine (5.7% for Rome II vs 23.1% for Rome III) and Functional Abdominal Pain (2.7% for Rome II vs 11.4% for Rome III). In addition, the Rome III criteria resulted in fewer patients with unclassified conditions, decreasing the percentage of patients with unclassified conditions by more than half (32.1% for Rome II vs 13.3% for Rome III). Rome II and Rome III yielded similar classification results for Functional Dyspepsia and IBS. The proportion of patients meeting the criteria for 2 FGIDs was somewhat higher according to the Rome III criteria (13.0%) than the Rome II criteria (4.1%). Fewer than 1% of patients met the criteria for 3 FGIDs according to the Rome II or Rome III criteria.

Further examination of the 49 cases that did not meet the Rome III criteria for an abdominal pain–related FGID revealed that 9 patients (18.4%) met the criteria for another (non–pain-related) FGID (ie, Aerophagia, Cyclic Vomiting, Functional Constipation, or Nonretentive Fecal Incontinence). All cases that were unclassified according to the Rome III criteria also could not be classified by the Rome II criteria.

DISCUSSION

This study compared classification results for pediatric pain-related FGIDs according to the Rome II versus the Rome III criteria. Changes in the Rome III criteria for Functional Abdominal Pain and Abdominal Migraine resulted in fewer unclassified patients (13.3% Rome III vs 32.1% Rome II). Changes in the Rome III criteria for Functional Abdominal Pain included a decrease in the duration of symptoms (from 3 months to 2 months) and the elimination of criteria that the pain be continuous, disrupt daily functioning, be unrelated to physiological events, and “not be feigned” (11). Thus, children who met only partial criteria for Functional Abdominal Pain according to the Rome II criteria met the Rome III criteria. In fact, more than half (59.5%) of patients who met the Rome III criteria for Functional Abdominal Pain were unclassified by the Rome II criteria.

The pediatric Rome III criteria introduced Functional Abdominal Pain Syndrome (FAPS) as a diagnosis distinct from Functional Abdominal Pain (FAP) because of concern that the Rome II criteria for FAP were overly restrictive and confounded severity with impairment by requiring loss of daily functioning (11). Thus, the Rome II criteria did not provide for the classification of youth with frequent abdominal pain who maintained their activities despite pain. By contrast, Rome III classifies these youth as FAP patients and reserves the FAPS classification for those whose abdominal pain is associated with impairment and extraabdominal symptoms. In the current sample, FAP was more common (11.4%) than FAPS (6.0%). Additional research is needed to assess whether the distinction between FAP and FAPS is clinically meaningful with respect to cause, course of illness, and treatment needs.

Considerable revision of the Rome criteria for Abdominal Migraine contributed to an increase in the classification of Abdominal Migraine by Rome III criteria. We examined the individual cases that met the Rome III but not the Rome II criteria for Abdominal Migraine and found that differences in classification were due primarily to changes in the criteria for symptoms associated with episodes of abdominal pain. Specifically, the majority of cases that met the Rome III criteria had been excluded from the Rome II criteria because neither headaches, photophobia, nor aura (symptom criteria for Rome II but not Rome III) accompanied their abdominal pain episodes. Interestingly, although family history of migraine headache was dropped from the Rome III criteria for Abdominal Migraine, the majority (77.6%) of patients who met the Rome III criteria for Abdominal Migraine reported a family history of migraine headache.

Irritable Bowel Syndrome was the most common FGID in this study. Nearly half of our sample met the criteria for IBS according to both Rome II (44.0%) and Rome III (45.1%) criteria. This finding is similar to that in a classification of a previous cohort of patients evaluated in our medical center by the Rome II criteria (5). Furthermore, the current findings are consistent with a growing body of research suggesting that symptoms of IBS are common in children and adolescents (9,12–14). Thus, consistent evidence is emerging to suggest that, among children whose subspecialty evaluation for chronic abdominal pain yields no positive findings, approximately half meet the criteria for IBS.

Whereas pediatric patients with chronic abdominal pain often have been labeled as having “recurrent abdominal pain,” it is increasingly recognized that this description obscures differences in symptom chronicity, physiological and psychosocial correlates, and functional outcomes in a heterogeneous group of patients (15). The standardized Rome criteria represent a significant improvement in our ability to identify patients with distinct symptom profiles, including IBS, in the clinical and laboratory settings.

In this study, 15% of children met the Rome III criteria for functional dyspepsia, which is considerably lower than that reported by Schurman et al (7). This discrepancy may be due to differences in eligibility criteria for the 2 studies. The study by Schurman et al (7) included patients with histological evidence of mild to moderate inflammation on esophagogastroduodenoscopy, whereas the current study excluded all patients with positive histological findings during endoscopy.

The use of the QPGS is both a strength and a limitation of this study. The QPGS is a standardized questionnaire that facilitates comparison of symptoms across patients and patient subgroups. A limitation of this standardized approach to symptom assessment is that it lacks the flexibility of the clinical interview to gather additional information and corroborate discrepancies in symptom reporting between parent and child. One study using the QPGS found that classification of pediatric FGIDs differed depending on whether the

parent or the child reported on the child's symptoms (7). However, another study reported fair to good concordance of parents' and children's reporting on the QPGS, noting that discrepancies were most likely when parents were reporting about an adolescent child's defecation or menstruation (6). It is possible that such discrepancies could be identified and clarified during the course of a clinical interview.

The committee that developed the Rome III criteria stipulates that the diagnosis of pediatric FGIDs requires the clinician to gather a detailed history, including "dietary, psychological and social factors," physical examination, and inspection of growth curves (10). The QPGS alone cannot deliver FGID diagnoses. However, in a research setting in which pediatric patients have been examined by a physician and appropriate laboratory tests and procedures have been performed, the QPGS can facilitate the identification of symptoms associated with distinct FGID diagnoses. Careful selection of homogeneous groups of patients is critical for research on etiology, course and outcomes, and treatment efficacy.

The Rome III criteria were established based on research using the Rome II criteria and the Delphi consensus method (16) within the pediatric Rome Committee (10). The results of this study suggest that revisions to the Rome criteria for pain-related FGIDs have increased the proportion of pediatric patients with chronic abdominal pain who meet the symptom criteria for an FGID. Without biological markers against which to evaluate the validity of Rome III criteria, unique approaches to external validation of these symptom-based criteria are needed. For example, cluster or factor analysis may be used to assess the extent to which symptoms grouped by Rome III criteria are also empirically convergent (17). In addition, clinical research is needed to establish the utility of the Rome III criteria in distinguishing homogeneous groups of patients with similar pathological processes, course of illness, and response to treatment. Future research examining the validity and clinical utility of the Rome III criteria will allow for improved identification of patient subgroups and greater treatment specificity in addressing pediatric FGIDs.

Acknowledgments

Supported by a grant to Dr. Walker from the National Institute of Child Health and Human Development (HD23264).

REFERENCES

1. Rasquin-Weber A, Hyman PE, Cucchiara S, et al. Childhood functional gastrointestinal disorders. Gut. 1999; 45:60–68.
2. Miele E, Simeone D, Marino A, et al. Functional gastrointestinal disorders in children: an Italian prospective study. Pediatrics. 2004; 114:73–78. [PubMed: 15231910]
3. Uc A, Hyman PE, Walker LS. Functional gastrointestinal disorders in African American children in primary care. J Pediatr Gastroenterol Nutr. 2006; 42:270–274. [PubMed: 16540795]
4. Faure C, Wieckowska A. Somatic referral of visceral sensations and rectal sensory threshold for pain in children with functional gastrointestinal disorders. J Pediatr. 2007; 150:66–71. [PubMed: 17188617]
5. Walker LS, Lipani TA, Greene JW, et al. Recurrent abdominal pain: symptom subtypes based on the Rome II criteria for pediatric functional gastrointestinal disorders. J Pediatr Gastroenterol Nutr. 2004; 38:187–191. [PubMed: 14734882]
6. Caplan A, Walker LS, Rasquin A. Validation of the pediatric Rome II criteria for functional gastrointestinal disorders using the questionnaire on pediatric gastrointestinal symptoms. J Pediatr Gastroenterol Nutr. 2005; 41:3105–3216.
7. Schurman JV, Friesen CA, Danda CE, et al. Diagnosing functional abdominal pain with the Rome II criteria: parent, child, and clinician agreement. J Pediatr Gastroenterol Nutr. 2005; 41:291–295. [PubMed: 16131983]

8. Robins PM, Glutting JJ, Shaffer S, et al. Are there psychosocial differences in diagnostic subgroups of children with recurrent abdominal pain? J Pediatr Gastroenterol Nutr. 2005; 41:216–220. [PubMed: 16056102]

9. Varni JW, Lane MM, Burwinkle TM, et al. Health-related quality of life in pediatric patients with irritable bowel syndrome: a comparative analysis. J Dev Behav Pediatr. 2006; 27:451–458. [PubMed: 17164617]

10. DiLorenzo, C.; Rasquin, A.; Forbes, D., et al. Childhood functional gastrointestinal disorders: child/adolescent. In: Drossman, DA., editor. Rome III: The Functional Gastrointestinal Disorders. 3rd edition. McLean, VA: Degnon Associates, Inc; 2006. p. 723-777.

11. Rasquin A, Di Lorenzo C, Forbes D, et al. Childhood functional gastrointestinal disorders: child/adolescent. Gastroenterology. 2006; 130:1527–1537. [PubMed: 16678566]

12. Hyams JS, Treem WR, Justinich CJ, et al. Characterization of symptoms in children with recurrent abdominal pain: resemblance to irritable bowel syndrome. J Pediatr Gastroenterol Nutr. 1995; 20:209–214. [PubMed: 7714688]

13. Hyams JS, Burke G, Davis PM, et al. Abdominal pain and irritable bowel syndrome in adolescents: a community based study. J Pediatr. 1996; 129:220–226. [PubMed: 8765619]

14. Walker LS, Guite JW, Duke M, et al. Recurrent abdominal pain: a potential precursor of irritable bowel syndrome in adolescents and young adults. J Pediatr. 1998; 2:1010–1015. [PubMed: 9627595]

15. von Baeyer C, Walker LS. Children with recurrent abdominal pain: research criteria for selection of subjects. J Dev Behav Pediatr. 1999; 20:307–313. [PubMed: 10533986]

16. Milholland AV, Wheeler SG, Heick JJ. Medical assessment by a Delphi group opinion technique. N Engl J Med. 1973; 298:1272–1275. [PubMed: 4703316]

17. Talley NJ, Holtmann G, Agreus A, et al. Gastrointestinal symptoms and subjects cluster into distinct upper and lower groupings in the community: a four nations study. AmJ Gastroenterol. 2000; 95:1439–1447. [PubMed: 10894576]

TABLE 1

Percentage of cases meeting criteria for pain-related FGIDs according to Rome II versus Rome III criteria

	Rome II	Rome III
Irritable bowel syndrome	44.0	45.1
Abdominal migraine	5.7	23.1
Functional dyspepsia	19.6*	15.2
Functional abdominal pain	2.7	11.4
Functional abdominal pain syndrome†	—	6.0
Unclassified cases	32.1	13.3

Percentages do not sum to 100 because some patients met criteria for more than 1 FGID.

*Rome II criteria further classified Functional Dyspepsia as ulcer-like (1.9%), dysmotility-like (0.3%), or unspecified (17.4%).

†New FGID category introduced with Rome III criteria.