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Importance of Addressing Anxiety in Youth With Functional Abdominal Pain: Suggested Guidelines for Physicians

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Abstract

Functional abdominal pain (FAP) is a common pediatric disorder associated with impairment in functioning that may persist for the long term. Anxiety is common in youth with FAP, and may be an important factor in predicting youth who are at greatest risk for increased impairment because of pain symptoms. In this article, we examine the relation between anxiety and impairment in youth with FAP. Furthermore, we explore various biopsychosocial factors (eg, neurobiological substrates, coping strategies, social factors) that may be implicated in the relation among FAP, anxiety, and increased impairment. Finally, we propose physician guidelines for screening and treatment of youth with FAP and co-occurring anxiety. Youth with FAP and co-occurring anxiety may benefit from cognitive-behavioral therapy in the context of multidisciplinary care.

Keywords

anxiety; functional abdominal pain; physician guidelines

Based on Rome III criteria, functional abdominal pain (FAP) in youth is abdominal pain occurring at least 3 times in the last 3 months without an identified organic cause, and includes several subtypes such as functional dyspepsia, irritable bowel syndrome, abdominal migraine, and childhood FAP syndrome (1). Common symptoms associated with FAP include diarrhea, nausea, constipation, vomiting, fatigue, headache, and other pains. FAP has also been referred to in the literature as recurrent abdominal pain (2), abdominally related functional gastrointestinal disorders (1), and chronic abdominal pain (3). For the purposes of this review, we use the term FAP to denote chronic abdominal pain in youth

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without an identified organic cause, which is consistent with the recommendations of the American Academy of Pediatrics and the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (4).

Prevalence of FAP

In pediatric settings, FAP is a common presenting problem among children and adolescents ages 2 to 18 years with a median prevalence rate of 12% in the general population (5). Several studies suggest a higher prevalence in females (6), particularly adolescents (7). Another investigation (8) found no sex differences but reported higher rates in rural versus urban areas. The literature is inconsistent regarding difference among prevalence rates based on age, with some evidence of rates increasing with age (8) and others suggesting decreases with age or no differences (8,9). Despite these differences, which may be the result of varying sociodemographic and geographic characteristics, it is apparent that FAP in youth is an extremely common problem.

Impairment in Functioning Related to FAP

In addition to pain symptoms, other gastrointestinal (GI)-related symptoms can contribute to significant functional impairment (4). Children with FAP experience decreases in quality of life (10) that are comparable to children with identifiable organic diseases such as inflammatory bowel disease (11). Youth with FAP and other recurrent pain conditions are more likely to be considered in poor health by their parents and are more likely to visit medical providers with a variety of unexplained medical complaints compared with those without FAP (12). In addition to somatic symptoms (13), research studies have consistently found that children with FAP experience difficulties in psychological functioning, including elevated anxiety (14,15) and depression (14). They are also more prone to impairment in social and academic functioning, including school refusal/absences, poor academic performance, and higher levels of social problems (12), such as an increased risk of peer victimization (16).

Outcomes of FAP

A significant number of children with FAP continue to experience abdominal pain symptoms in adolescence and adulthood (17). Longitudinal follow-up studies found that for a significant portion (25%–45%), pain symptoms persist 5 years later (18,19). Furthermore, some develop additional pain conditions such as headaches (19) or other somatic complaints (18). In addition to recurrent pain, difficulties in school and social functioning may also persist, and this effect is particularly strong for school absences (17,19).

Co-Occurrence of Anxiety and FAP

Preliminary evidence suggests that anxiety frequently co-occurs with FAP (14,15,20). This is not to suggest that FAP is a manifestation of a psychological disorder, but rather that anxiety and FAP may frequently co-occur because of potentially shared etiological factors (eg, heightened physiological arousal) (15) or as a consequence of coping with recurrent pain (15,20). Interestingly, not only do children with FAP have more anxiety symptoms but

anxiety disorders are also more likely to be diagnosed in youth with FAP compared with the general population (10,17). Anxiety disorders are characterized by extreme distress and worry and may be generalized or result from specific triggers (beyond pain-related situations), such as separation from attachment figures, social situations, or specific objects and situations (21). In samples of youth presenting to pediatric GI clinics, anxiety disorders are estimated to affect 42% to 85% of youth with FAP (14,15, 20), and generalized anxiety disorder, separation anxiety disorder, and social phobia appear to be the most common. Although replication of these findings with larger sample sizes is needed, the prevalence of anxiety disorders among youth with FAP receiving treatment in pediatric GI practices appears to be substantial. Moreover, even youth with FAP who do not meet diagnostic criteria for a specific anxiety disorder may evidence elevated levels of anxiety symptoms, and therefore screening for anxiety should be an important component of routine assessment. Screening for anxiety can be done without implying that anxiety caused the patient's pain. This can be a delicate topic when medical causes cannot be pinpointed and parents seek a clear answer; however, a discussion of psychological functioning is an important consideration in helping the child managing his or her pain and maintaining daily activities even despite the pain.

The relation between anxiety and FAP has been documented in longitudinal studies (22–24) and some have suggested that anxiety disorders in youth with FAP may predict the maintenance of symptoms over time (23,24). Other investigations have found that youth with FAP are at significantly greater risk for developing anxiety disorders (17,22) or anxiety symptoms (25) following pain onset. The temporal relation between the onset of FAP symptoms and anxiety has not been thoroughly investigated, and additional longitudinal or epidemiological research is necessary. Evidence does suggest that the presence of co-occurring anxiety in youth with FAP may exacerbate symptoms and heighten impairment in their daily lives.

Impairment in Youth with Co-Occurring Anxiety and FAP

For the purposes of this review, impairment in functioning is defined as functional disability (ie, difficulty with daily tasks such as chores, school, and recreational activities) and impairment in psychosocial functioning (ie, psychological distress and difficulties in social relationships). The relation between anxiety and impairment in youth with FAP may be complex. A 2005 technical report by the American Academy of Pediatrics concluded that youth with FAP are more likely to be diagnosed as having anxiety disorders and are at greater risk for the development of other psychiatric symptoms. This report did not find evidence that anxiety and other emotional symptoms predicted symptom severity, course, or response to treatment in youth with FAP (4); however, more recent research on pain in children suggests that anxiety is associated with heightened pain sensitivity (26), and longitudinal examinations of youth with FAP (24) have shown that higher levels of anxiety in childhood are associated with more long-term problems with persistent pain. There is also emerging evidence that anxiety is related to increased functional impairment in youth with FAP over and above pain severity (23,27). In one of these studies (23), increased pain and functional impairment in clinic-referred youth with FAP for 5 years were predicted by high levels of baseline anxiety and related symptoms. Interestingly, the youth in the group at high

risk for poor outcomes did not initially have the highest levels of pain; thus, it was the presence of anxiety over and above reported pain intensity at baseline that predicted long-term impairment.

Relation Between Anxiety and FAP

A number of biopsychosocial factors are hypothesized to increase impairment in youth with FAP and anxiety. We focus on 3 areas in which FAP and co-occurring anxiety may have overlapping substrates or operate to increase impairment including neurobiological substrates, coping strategies, and social factors. These factors have been examined in a number of separate investigations, and some common themes are evolving, as reviewed below.

Neurobiological Factors

FAP is thought to result in part from dysregulation of communication between the brain and GI system (28). The brain and GI system are highly integrated and communicate in a bidirectional fashion largely through the brain–gut axis, which consists of the central nervous system (CNS) and the autonomic nervous system. Hyperarousal of the autonomic nervous system is implicated in the expression of anxiety (28) and may also be present in youth at risk for increased pain sensitivity and pain disorders, such as FAP (29). There is also evidence that FAP may be related to nervous system dysregulation, leading to visceral hyperalgesia, or a decreased threshold for pain in the intestinal tract (30,31). Evidence for the common underlying or overlapping neurobiological factors in FAP and anxiety are reviewed below. It should be kept in mind that some of these studies suggest factors that may not be unique to FAP but to heightened risk for pain disorders in general or specific GI disorders such as irritable bowel syndrome.

CNS—Within the CNS, the limbic system in particular may play an important role in the development and maintenance of both FAP and anxiety symptoms. The limbic system is involved in the processing of emotions, including anxiety, as well as social interactions and learning. Neuroimaging studies suggest activations in the limbic system (eg, amygdala “fight or flight”) are evident in adult patients experiencing emotional distress (32). Research also suggests that the limbic system receives input from the gut, and it has been suggested that bidirectional feedback between the gut and limbic system may lead to the development and maintenance of GI symptoms (29). Interestingly, there is also evidence that neural activity in these same brain regions can be modified by psychological intervention. For example, at the completion of a cognitive intervention, adults with FAP and anxiety showed significant reduction in pain and anxiety symptoms as well as reduced activity in the limbic system (33). One mechanism by which the limbic system may exert its influence is by its effects on endocrine activity, including cortisol release. Cortisol affects motility and gut sensitivity, which are reported to be altered in youth with FAP (34). Similarly, chronic anxiety is also known to be associated with increased cortisol release (35). Research has shown increased levels of cortisol in adult patients with FAP both generally and in response to stressful or anxiety-provoking situations (36,37). Taken together, the evidence implicates potential shared underlying CNS-related factors in the co-occurrence of pain and anxiety. It

would be beneficial for future research investigations to directly compare neurobiological functioning in youth with FAP with youth with anxiety disorders to understand the common and unique pathways within the CNS involved with each of these conditions.

Autonomic Factors—In addition to centrally mediated susceptibility, common mechanisms may also be found within the autonomic nervous system (28). For example, systolic blood pressure rates were found to be higher in children with FAP and in children with anxiety (without FAP), as compared with healthy controls (15). Adult patients with FAP and high anxiety may also experience reduced functioning of the parasympathetic nervous system (38), which has been highlighted as a possible mechanism for increased pain.

Similarly, research suggests that youth with FAP show slower sympathetic nervous system recovery from pain than do healthy children (39), and children who experience anxiety also demonstrate slower recovery/reactivity patterns (40). Behavioral inhibition, a pattern of behavior involving fear/avoidance and over-arousal of the sympathetic nervous system, is a predictor of the development of both FAP (41,42) and anxiety disorders (40) in youth, although research directly comparing the 2 groups is scant. Taken together, the evidence seems to suggest that there are some common nervous system influences that are associated with both anxiety and increased sensitivity to gut visceral sensations in youth with FAP, potentially indicative of a more generalized sensitivity and a lower pain threshold (31,43).

Coping Strategies

Coping is defined as voluntary efforts to regulate emotion, thought, behavior, physiology, and the environment in response to stressful events or circumstances (44). Coping and adaptation to chronic illness are associated with greater risk of impairment in individuals with recurrent and chronic pain (2). Furthermore, as defined in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (21), individuals with clinically significant levels of anxiety are characterized by impaired coping, which may further serve to increase pain symptoms. Thus, coping skill deficits may be amplified by anxiety in youth with FAP. We focus specifically on the role of coping strategies, including passive/active coping and pain catastrophizing.

There is strong empirical support for the relation between specific maladaptive coping profiles and impairment in youth with FAP. Passive coping responses (eg, wishful thinking, avoidance, denial) are associated with increased levels of pain, somatic symptoms, anxiety, and depressive symptoms; however, active coping (problem solving, emotional expression, emotional modulation) is associated with decreased anxiety and depressive symptoms, although pain and somatic complaints remained increased for active copers (2,45). Pain catastrophizing is a specific form of maladaptive coping, which is characterized by fearful and exaggerated appraisals of pain and its consequences (46). Pain-related catastrophizing is a powerful mechanism that predicts higher pain intensity and higher pain-related disability in youth with FAP (47).

Social Factors

There has been limited research examining the role of social factors in youth with co-occurring FAP and anxiety. Most of the research on youth with FAP thus far has been in the area of parental and family factors (a specific aspect of the child's social environment), with relatively less empirical attention to social behavior in peer settings; however, there is strong evidence supporting the link between anxiety and parenting/family factors (eg, overprotection, criticism) and peer factors (eg, peer victimization) (48–50). Taken together, the effect of social factors on impairment may be particularly strong for anxious youth with FAP.

Parenting Factors—In terms of parent responses to pain behaviors, overprotecting (eg, caretaking behaviors that place a child in a passive sick role) and minimization (eg, criticism of a child's pain behavior) are considered maladaptive parent responses to pain that have been associated with increased disability in youth with FAP (51,52), greater health care use, and higher medical costs for gastrointestinal symptom management (53). One mechanism underlying this relation may be heightened expressions of child distress, which predicts increased parent criticism of FAP symptoms (54). Further support of this relation was found in a recent study, which showed children with higher levels of emotional distress, coupled with their parents' maladaptive responses to pain (which could be in the form of minimizing/discounting of pain or increased attention to pain/granting of special privileges), increased disability and somatic symptoms ((51); references 51–74 can be viewed at <http://links.lww.com/MPG/A198>). Parent encouragement of a child's pain/illness behaviors may be particularly detrimental to youth with FAP who are already anxious and have lower levels of academic competence (55).

In terms of parental mental health factors, mothers of youth with FAP are significantly more likely than mothers of unaffected children to have anxiety, depressive symptoms, or somatoform disorders (10,56,57). Furthermore, mothers who reported higher levels of anxiety, depressive symptoms, and somatic complaints had children with a poorer quality of life and greater use of ambulatory health services (56). Although there is less research on fathers of children with FAP, one early study found that anxiety levels for fathers of youth with FAP were also elevated (58). Furthermore, a family history of generalized anxiety disorder was found to be common in youth with FAP (22). Other family factors, such as parent pain history (including irritable bowel syndrome, migraine, and other broad somatic complaints), are associated with FAP in youth (56), and greater family conflict and family enmeshment are associated with increased impairment in this population (59).

Social Problems—By definition, FAP is characterized by severe pain episodes that have an effect on social role participation. Youth with FAP are known to have problems with regular school attendance, participation in sports, and social and extracurricular activities (12,16). Youth with FAP are also more likely to experience peer victimization compared with healthy controls (16). Given the level of these youths' social difficulties, primary care clinicians are likely to identify psychosocial problems in youth with FAP (14). Furthermore, there may be a relation among high anxiety, poor social competence, and increased functional impairment in youth with FAP (18). Walker et al found that socially stressful

events, such as having an argument with a friend, resulted in high levels of somatic symptoms in youth with FAP (60). Thus, these results suggest that social stress (a possible proxy for social anxiety) may lead to increased impairment in functioning in children with FAP.

Implications for Multidisciplinary Assessment and Treatment

Assessment

FAP—Given the complex array of medical and psychosocial contributing factors, assessment of youth with FAP may be most effective in the context of a multidisciplinary team (61). Based on our comprehensive review of the literature, we present a step-by-step set of guidelines for assessment and treatment of FAP (Fig. 1). The process should begin with the establishment of a positive relation among the medical provider, the child with suspected FAP, and the family. Initial assessment should include a thorough medical history including onset/progression of puberty, growth pattern measurement, constitutional symptoms, nocturnal symptoms, gastrointestinal bleeding, and family history of gastrointestinal diseases including irritable bowel syndrome, inflammatory bowel disease, and celiac disease, and a complete physical examination. Assessment of “red flags” (eg, gastrointestinal bleeding, nocturnal pain, weight loss/delayed growth, fever) will assist in predicting the likelihood of organic versus functional etiology. Initial evaluation should include a review of earlier results and any additional diagnostic testing indicated by the history and examination. It is important to rely on a culmination of assessment, history, and laboratory studies because a subset of patients (approximately 20%) with organic GI diseases will have normal laboratory studies, but will express other “red flag” symptoms.

To assist families in accepting a diagnosis of FAP, the provider may anticipate and predict normal testing results during the assessment process; however, it is also important for the medical provider to validate that the patient's pain experience is real. A developmentally appropriate explanation of pain sensation via the brain–gut axis may be helpful in clarifying the child's pain symptoms. After the diagnosis of FAP is made, the provider should address the family's questions/concerns and provide reassurance to the patient and family that a diagnosis of FAP is not a failure to identify an organic condition, but rather a real diagnosis. Families should be told it is unlikely that a serious medical condition may be diagnosed in the future. Additional unnecessary, expensive, and invasive testing should be discouraged (62). There is no evidence that further testing provides reassurance or improves outcomes. Possible pharmacologic interventions for youth with FAP include antidepressants, antispasmodics, acid suppressants, prokinetics, and other agents (61); however, a review endorsed by the American Academy of Pediatrics and the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition generally found limited evidence to support the use of pharmacologic interventions or herbal preparations in youth with FAP (63). It is suggested that the use of a low-dose antidepressant may be beneficial for a selected group of patients, particularly those with co-occurring anxiety or other psychological comorbidities (61).

Anxiety—The need for screening for anxiety in youth with FAP is important for determining those who may be at increased risk for pain-related impairment. Screening tools

that measure general psychological symptom levels (eg, Behavioral Assessment Scale for Children) have been used to screen for anxiety and other problematic behaviors for youth with FAP (64); however, an anxiety-specific screener may be a more refined method of initial assessment, given the role of anxiety in predicting increased impairment in youth with FAP. Furthermore, it identifies children with clinically significant anxiety symptoms, which may capture a broader array of youth who may benefit from care rather than targeting those who have anxiety disorders exclusively. The Screen for Child Anxiety and Related Disorders (SCARED) (65) is one measure that assesses for general anxiety levels and specific anxiety subtypes (eg, social anxiety, separation anxiety). It is brief, normed in various languages for youth ages 8 to 18 years, available in both parent and child versions, and can easily be incorporated into clinic flow. If a child with FAP expresses clinically significant anxiety symptoms based on results from a brief screener, a more comprehensive assessment may be warranted by a clinical psychologist. The comprehensive assessment for anxiety may include a clinical assessment accompanied by a validated semistructured interview, such as the Anxiety Disorders Interview Schedule, which is available for use with parents and children and assesses for all major psychiatric disorders of childhood, with a focus on anxiety disorders (66).

Psychological Treatment

When possible, psychological intervention is recommended in the context of multidisciplinary care, especially when the child with FAP has difficulty coping, has significant anxiety symptoms, or meets criteria for an anxiety disorder. Overall, refusal to engage in psychological services has been associated with poorer outcomes (eg, persistent pain symptoms for 1 year) in children with FAP (67). Cognitive-behavioral therapy (CBT) is a well-established intervention for anxiety (68) and has been adapted for the treatment of children with recurrent and chronic pain, including FAP, with promising results (69, 70). CBT can be provided by a psychologist in collaboration with a GI clinic, either within the GI setting or on an outpatient basis. An essential first step is that the health care providers (physicians, nurses) should take an active role in reassuring patients that serious organic causes for pain have been ruled out and educating the patient and family about the benefits of coping skills training as a safe and effective way to manage their pain. Education from medical providers about the nature of CBT intervention is especially important, given patient/family misconceptions about seeking psychological care that may deter them from seeking psychological care. The medical provider may wish to educate the patient and family that in contrast to traditional psychotherapy, CBT takes a more direct problem-solving approach to their pain. CBT for pain uses a blend of cognitive strategies (eg, distraction, thought modification, problem solving) and behavioral approaches (eg, activity pacing, relaxation training, parental instruction of behavioral strategies) to improve functioning and reduce pain symptoms in youth (69). CBT for youth with FAP is effective in improving youth's ability to cope with pain, and may in turn reduce pain symptoms. CBT may also be beneficial for children with FAP who have a range of psychological problems (eg, depression, oppositionality) and/or coping with psychosocial stressors. Given that anxiety most commonly co-occurs in individuals with FAP and may be predictive of increased impairment, these youth may particularly benefit from CBT intervention. Although CBT interventions have the strongest empirical support, other treatment

approaches such as hypnosis have also shown positive effects (71), but additional research is needed.

For medical providers who are interested in learning about multidisciplinary pain programs that incorporate psychological care into their practice, the Pain in Infants, Children, and Adolescents Special Interest Group of the American Pain Society provides links to pain programs in the United States and Canada. Several of these programs offer exemplars for multidisciplinary care (<http://www.ampainsoc.org/membership/sig/sites/infchildadol-sig.htm>). The issue of billing within the context of a multidisciplinary team varies from state to state. Generally, psychologists treating patients with medical disorders are now permitted to bill under “health behavior” codes, which are covered under medical insurance. This has greatly expanded access to care for those with emotional difficulties related to FAP or other chronic health conditions.

For those providers who opt to refer patients and their families to psychologists outside their medical practice, several factors should be taken into consideration. It is important to refer to providers who specialize in pediatric behavioral pain management, preferably with expertise in CBT.

Recently, CBT interventions have been specifically adapted for use in youth with FAP to treat co-occurring anxiety and mood-related symptoms (72,73). These interventions are tailored to target both pain-specific complaints and broader anxiety symptoms, with evidence of beneficial effects, particularly for the management of anxiety symptoms. Although additional research is needed, these investigations take an important step in designing interventions tailored to address anxiety disorders commonly seen in youth with FAP in clinical settings. A recent movement in the field has been to develop Internet-based CBT programs for youth with FAP to increase the feasibility of psychological treatment approaches and ease of access (74), particularly for those families who travel long distances to receive specialty care. These interventions have shown initial evidence of leading to reductions in pain, although the effect on anxiety is not known. Future research may benefit from designing interventions with brief, user-friendly formats that address specific anxiety symptom presentations of these youth.

Summary

The prevalence rates of youth with FAP and co-occurring anxiety are substantial, and it is clear that these youth are at increased risk for impairment in functioning. In youth with co-occurring anxiety, biological factors, coping strategies, and family environment/social factors may exacerbate functional disability. This highlights the importance of anxiety screening in youth to predict those patients most at risk for increased impairment that can persist over time. It is recommended that youth with FAP and co-occurring anxiety receive psychological services in the context of multidisciplinary care. Youth with FAP and comorbid anxiety in particular may benefit from intervention related to coping and family environment/social factors, which are potentially amenable to cognitive behavioral strategies. Use of relatively easy-to-teach noninvasive self-management and behavioral strategies can effectively reverse physiological arousal and other biological mechanisms

associated with pain and anxiety. Furthermore, innovative research designs using new technology (eg, those using online or mHealth technology) are emerging to address comorbid anxiety in youth with FAP, which provide brief, user-friendly, and tailored approaches for intervention delivery; however, research in this area is ongoing to investigate their efficacy compared with traditional face-to-face treatments in improving outcomes of youth with FAP and comorbid anxiety.

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Initial evaluation

- Build positive relationship between patient, family, and medical provider
- Conduct thorough history and physical exam
- Assess for red flags (eg, nocturnal pain, delayed growth, bleeding)
- Perform standard diagnostic testing
- Anticipate and predict normal testing results
- Validate the pain experience is real
- Education of pain sensation via the brain–gut axis
- Administer brief anxiety screener during GI visit

Management following diagnosis

Medical considerations

- Reassure patient and family that FAP is not a failure to identify an organic condition
- Additional medical testing should be discouraged
- Consider a low-dose antidepressant when appropriate

Psychosocial considerations

- If child expresses *elevated* levels of anxiety, refer for comprehensive assessment by a clinical psychologist
- Educate families about cognitive-behavioral treatment (ie, pain-coping skills) for youth with FAP to target functional disability, pain symptoms, and co-occurring anxiety

Figure 1.

Guidelines for assessment and treatment of youth with FAP and co-occurring anxiety.