The pediatric patient with IBD – "Am I special?"

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INFLAMMATORY BOWEL DISEASES (IBD), including ulcerative colitis, Crohn's disease and nonspecific colitis, are well-documented disorders causing morbidity in childhood (1-3). Although the pathogenesis of these diseases is thought to be the same in pediatric and adult populations, the clinical presentation and effects of IBD in childhood are unique. Any chronic illness which has the potential to curtail normal childhood activities and retard growth can result in major disruption in the child's development. In the pediatric patient, pharmacological agents may have more significant side effects; therefore, they must be employed with caution. Successful management of pediatric patients involves not only caring for the physical and psychosocial needs of the child, but also supporting family members on whom the child's disease has a major impact. The presentation, psychosocial aspects, management and outcome of IBD in children are reviewed here.

Approximately 15 to 30% of patients with IBD will have symptoms in childhood or adolescence (4,5). Although not common, both Crohn's disease (6) and ulcerative colitis (7) can occur in infancy. Most children with IBD present in middle childhood between eight and 13 years old. In a recent report (8), the diagnosis of both diseases was made at approximately age 11 years. Unfortunately, in children there is often a long delay in the diagnosis of IBD, particularly Crohn's disease. This likely is due to the insidious onset of rather nonspecific complaints as well as the high prevalence of benign recurrent abdominal pain of childhood (9), which may be given as a diagnosis in children with early symptoms of Crohn's disease. The diagnosis of ulcerative colitis is less delayed because the presence of gross blood in the stools prompts the child or parent to seek medical attention. Presumably because of increased awareness of these diseases in childhood and advances in radiographic and endoscopic technology, the time from symptom onset to diagnosis has reportedly decreased (3).

CLINICAL PRESENTATION

Typically, the child with Crohn's disease presents with abdominal pain, anorexia and weight loss with or without poor linear growth. The crampy pain tends to be localized to the right lower quadrant and may be exacerbated by eating. Unfortunately, in some cases it is periumbilical and if not severe may be confused with functional abdominal pain of childhood. Generally the pain does not awaken the child from sleep but the child may have nocturnal diarrhea. Crohn's disease commonly causes delays in growth and pubertal development (10,11). Less frequently, the child has loose stools or constipation, lethargy, rectal bleeding or urgency. Although much less common, extraintestinal manifestations such as joint pains, rash and mouth ulcers may also bring the child to the doctor. In spite of poor health, these children often attempt to continue school and other activities.

Almost all children with ulcerative colitis have a history of diarrhea, including nocturnal diarrhea in about half the cases (3). The majority also have hematochezia. Other typical features are urgency, tenesmus and crampy lower abdominal pain. Ulcerative colitis and Crohn's colitis have a similar clinical presentation.

On physical examination, characteristically the child with Crohn's disease appears systemically ill, with evidence of weight loss, poor growth and delayed pubertal development. The abdomen is tender and often a fullness or mass of bowel may be palpable. Clubbing is common with diffuse small bowel disease (12). In several retrospective reviews (3,13,14), perianal disease was present in approximately 30 to 50% of children and adolescents with Crohn's disease. Other physical findings observed less commonly are pallor, aphthous ulcers, clubbing and inflamed joints. Erythema nodosum and pyoderma grangrenosum are rare. The child with ulcerative colitis can appear as ill as the child with Crohn's disease. However, in the majority of cases of children with ulcerative colitis, marked weight loss and delayed puberty are not evident.

DIFFERENTIAL DIAGNOSIS

As in adulthood, the differential diagnosis is determined by the clinical presentation and can be extensive. However, the age of the child tends to modify the likelihood of certain diagnoses. A thorough history and physical examination assists in narrowing the

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diagnostic possibilities and obviates lengthy investigations.

Although typically the pain of small bowel Crohn's disease is localized to the right lower quadrant, it may be located in the periumbilical region as in functional abdominal pain. Usually the pain is the only similarity between these disorders; nevertheless, as benign recurrent functional abdominal pain of childhood is prevalent in 10 to 15% of female and 9 to 12% of male school-age children, this latter disorder must be considered in a child with recurrent abdominal pain. By history, functional abdominal pain of childhood is nonspecific, not severe, lasts for brief periods of time, does not awaken a child from sleep, and is generally not related to eating. This disorder should not affect a child's growth. Characteristically, it is not severe enough to affect the child's activities, but there is a tendency in children with functional abdominal pain to take very long school absences. On the other hand, children with Crohn's disease seem to attempt to attend school regularly.

Lymphoma of the small bowel fortunately is uncommon in children, but must be considered. *Yersinia enterocolitis* can cause clinical manifestations and radiographic findings which are almost indistinguishable from Crohn's disease. Other disorders in the differential diagnosis are peptic ulcer disease, disease of the biliary tract and infectious diseases such as giardia. Celiac disease may cause diarrhea, but generally does not cause significant abdominal pain and does not present in the younger child.

Bloody diarrhea is the predominant presenting complaint of the child with ulcerative colitis. It is extremely difficult to differentiate Crohn's colitis from ulcerative colitis by history and physical examination, although perianal disease certainly sways the diagnosis towards Crohn's disease. Infections including salmonella, shigella and campylobacter must be ruled out. Bloody diarrhea accompanied by crampy abdominal pain is often the presenting feature of the hemolytic uremic syndrome (15), Henoch-Schonlein purpura (16) or pseudomembranous colitis (17). Nodular lymphoid hyperplasia, polyps and Meckel's diverticulum also present with significant blood in the bowel movements, but typically these disorders do not cause abdominal pain or diarrhea.

In young infants with bloody diarrhea, necrotizing enterocolitis (18), Hirschsprung's enterocolitis and milk protein-induced colitis must be considered before ulcerative colitis or Crohn's disease.

INVESTIGATIONS

Appropriate investigations for the individual patient depend upon the clinical presentation and differential diagnosis. Hematological and biochemical tests are essentially the same as in adults and are not specific for IBD; however, these tests contribute to the diagnosis and are frequently useful in assessing the severity of the child's clinical condition. A complete blood count and differential may reveal anemia or thrombocytosis, which often occur when children are very ill. Erythrocyte sedimentation rate (ESR) can be valuable in following disease activity, although some children have an essentially normal ESR in spite of severe IBD. Serum albumin and total protein are primarily useful in assessing severity of the disease and determining management. Although not common, sclerosing cholangitis is reported in children with IBD (10,19). Some children have elevation of their liver function studies when their disease is active. Therefore, values for gamma glutamyltransferase, aspartate aminotransferase, alanine aminotransferase and alkaline phosphatase should be obtained routinely. As pancreatitis is reported in IBD (20), an amylase and lipase are included in the initial investigations. In cases where the child has evidence of malabsorption, assessment for nutritional deficiencies include a serum calcium, phosphorus, zinc, folic acid and ferritin. A serum B_{12} level and a Shillings' test are worthwhile investigations if the child has involvement of the ileum or has had a resection of the terminal ileum.

Barium studies, particularly upper gastrointestinal tract and follow-through, remain the mainstay of diagnosis of IBD in the pediatric population. The majority of pediatric patients have both of these investigations during the time of diagnosis. When the symptoms are primarily those of small bowel disease and air contrast barium enema is negative, a rectal biopsy is performed to obtain pathological confirmation of Crohn's disease. Recent studies (21,22) in the pediatric population have evaluated upper endoscopy in Crohn's disease and found it useful in evaluation and confirmation of diagnosis. In Crohn's disease, this procedure (23) is used for cases with symptoms suggestive of proximal involvement not confirmed radiologically (and in some cases to confirm the diagnosis). Colonoscopy under sedation has become an efficient diagnostic procedure in children of all ages (24) including neonates (25) who have symptoms suggesting large bowel disease. If this yields a firm diagnosis and elucidates the extent of the disease, air contrast barium enema may be eliminated.

EFFECTS ON GROWTH AND DEVELOPMENT

Growth and development as well as family involvement are the factors that most distinguish the care of pediatric patients from that of adults with chronic disease.

Growth and pubertal development can be assessed in a variety of ways (26-28). In general, a single measurement is not as useful as a series of measurements over a year. Minimal variations in weight occur with intercurrent illnesses; however, a marked loss of weight or lack of weight gain over several months suggests a more chronic illness. Children should have at least a 5 cm increase in height over one year. When a child presents with small stature, the parental heights should be obtained and a midparental height calculated. As well, heights of siblings should be obtained. These assist in giving more realistic estimates of a particular child's potential height. The timing of the adolescent growth spurt and advancement through pubertal stages (28) is variable in healthy children due to genetic differences. Therefore, inquiring into the age at

which each parent entered puberty may be worthwhile.

IBD has well-documented effects on children's nutritional status and growth (13,14,29,30). Growth failure occurs in 30% of children with Crohn's disease and 5 to 10% of children with ulcerative colitis (13). The etiology of this growth failure primarily is secondary to inadequate calories (29) which usually is the result of anorexia and the exacerbation of abdominal pain with eating. Other factors which also affect growth are increased caloric requirements due to chronic inflammation and prolonged treatment with daily corticosteroids. In some children, growth failure is the prominent feature of the illness and other complaints are minimal or nonexistent. Growth failure particularly is distressing in the pubertal child who may not enter into the adolescent growth spurt or progress normally through puberty. In IBD, growth failure must be managed aggressively and its effects on the child's psychosocial development realized.

PSYCHOSOCIAL DEVELOPMENT

The healthy child experiences sequential stages of development. Unhindered advancement through these stages of development contributes significantly to the overall psychosocial stability of the mature adult. In children, there is no evidence for a psychological etiology of IBD. Nevertheless, a chronic illness can have far-reaching effects on the child's psychosocial development. Feeling unwell on a chronic basis can adversely affect interpersonal relationships and participation in school or extracurricular activities. Likewise, a delay in growth and pubertal development can significantly alter a child's perception of self. Not only do these children feel less mature at a stage in development when they think being 'grown up' is so important, but if they are small they may be unable physically to participate in activities appropriate for their age group. In many cases, a younger sibling has more physical maturity than the ill child. All of these factors are particularly difficult for the adolescent child who generally dislikes feeling 'different'.

The family may treat the child in a manner which both increases the child's feeling of being different or ill and creates resentment from siblings who are receiving less attention. Long hospitalizations or absences from school not only impact on the child, but also on the parents, who may have to take absences from employment and significantly curtail activities.

MANAGEMENT

The management of IBD in children involves one or more modes of treatment, including pharmacological, bowel rest, nutritional, surgical and psychological approaches.

Pharmacological: Until recently, the pharmacologic management of Crohn's disease of the small bowel in children has entailed almost exclusively the use of corticosteroids. Initially, children are treated with 2 mg/kg/day of prednisone (to a maximum of 40 mg/day). If bowel rest also is required, an equivalent dose of corticosteroid is given intravenously. The high dose corticosteroids are continued for four weeks and then tapered. Once children are on 20 mg daily, they are switched to alternate daily doses of 40 mg and gradually weaned by 5 mg weekly. Unfortunately, some children continue to require a small dose of steroids (10 mg) either on alternate days or daily. With the use of chronic corticosteroids, the potential for further growth delay, Cushingoid effects and acne remain a major concern in the pediatric population.

Recently, newer medications such as slow release 5-aminosalicylic acid (5-ASA) have shown efficacy in adults and are being evaluated in children (31). If these medications prove efficacious and decrease the need for prolonged steroid use, they will obviously have very positive effects on the medical management of pediatric Crohn's disease. Centres vary, but in general, pediatricians are reticent to use immunosuppressive medications except in extremely resistant or complex cases. Although azathioprine has been found effective and to have caused minimal short term side effects in children (32), it is recommended only for cases resistant to chronic low dose steroids, when there are multiple areas of small bowel involvement, making surgery a very poor alternative.

In the pediatric population, metronidazole is used for patients with severe perianal disease, but patient and family must be aware of the risks of neuropathies and questioned about paresthesias (1). Sulphasalazine (Salazopyrine; Pharmacia) or 5-ASA remain the mainstay of treatment for ulcerative colitis and Crohn's colitis in children. The dosage for sulphasalazine in children is approximately 50 to 75 mg/kg/day (1). The limited experience with oral 5-ASA suggests that 800 to 1200 mg three times a day is an appropriate dose for most children (33). However, the author has seen patients in whom remission was maintained with only 400 mg three times a day. Corticosteroids are employed when a child with ulcerative colitis presents acutely ill with weight loss and severe bloody diarrhea with tenesmus. These are given in the same manner as in Crohn's disease.

Sulphasalazine or 5-ASA should be initiated before beginning the corticosteroid tapering at four weeks. Although either of these medications can be started with corticosteroids, if there are side effects, it is difficult to determine the offending medication. Side effects from sulphasalazine are the same as in adults. The most common are headache, which are often dose-related and less likely to occur if the medication is introduced gradually over five to seven days. The child is maintained on sulphasalazine or 5-ASA preparation. If children have minor flare-ups of symptoms and are otherwise well, often either aminosalicylic acid or steroid enemas are employed.

The medical management of Crohn's colitis is similar to ulcerative colitis; however, there is good evidence that maintenance sulphasalazine or 5-ASA has not been proven beneficial in Crohn's colitis.

Bowel rest and nutrition: Bowel rest has been shown to induce remission in Crohn's disease. This has been achieved either by the use of total parenteral nutrition (34) or elemental feeding (35,36). Nocturnal nasogastric feeds

with or without boluses during the day have been used successfully to improve growth (37). This therapy has enabled some adolescent patients to advance through puberty as well as achieve appropriate growth. This mode of treatment must be presented in a positive informative manner to the child. The author routinely has other patients who have been treated with nasogastric feeds demonstrate self introduction of the nasogastric tube.

Although there is no evidence that bowel rest is efficacious in the treatment of ulcerative colitis, it is occasionally necessary when children have extremely severe diarrhea, tenesmus or a markedly low serum hemoglobin or albumin. In these latter cases, it is reasonable to give the child complete bowel rest with total parenteral nutrition, while waiting for a response from intravenous steroids and hoping to decrease the amount of blood and protein loss from the bowels.

Most of the author's patients with IBD are counselled by a registered dietitian regarding appropriate nutrition for age. Rather than recommending a low fibre diet which has not been shown to be efficacious in healing (39), it is suggested that the patients eliminate specific food items that they find increase their symptoms. Most children tolerate fibre and spicy foods even following surgery. High calorie commercial formulas are available for children who cannot achieve their caloric requirements through a normal diet, and can be taken orally or by nasogastric or nasojejunal tube (40).

Surgery: In Crohn's disease, surgery is recommended only for bowel obstruction, relentless symptoms necessitating long term high dose steroids, or significant growth delay or growth retardation (38) which is not responsive to a trial of nocturnal nasogastric feeds.

Because surgery offers essentially a cure in ulcerative colitis, and there is a high risk of cancer (41), surgery is more readily recommended. The decision for colectomy is made in children who require high dose steroids multiple times over six months to a year, or who continue to have severe symptoms with marked anemia and hypoalbuminemia after several weeks of intravenous corticosteroids. Obviously, it is essential for the parents and the patient to be prepared psychologically before surgery. This entails not only intensive discussions with the physicians involved, but also with the ostomy nurse. In most cases, the child's symptoms have been so incapacitating that the child responds very positively to the surgery and the feeling of well-being which occurs quite soon thereafter. In most cases, an ileoanal anastomosis is attempted at a later date. Unfortunately, due to ongoing inflammation, this procedure is not always successful, but in the successful cases the children do extremely well with bowel continence.

Psychosocial: The psychosocial management of the child with IBD involves awareness of the potential effects of the disease on the patient and family. Where possible, problems are prevented; however, if problems arise, they must be attended to without delay. Essential to the medical management of any child with a chronic, potentially debilitating illness is in-depth communication with the patient and the parents. In older children or adolescents, this includes 'talks' with the child and parents. Families vary significantly in the extent to which they believe their child should be informed about his/her disease. The parental wishes must be respected; however, honest open communication with children should be encouraged. Usually children are more frightened of the unknown or feelings that information is being withheld from them. Children also comply with management, especially taking medications, when they are given some understanding of their disease and the proposed treatment. Teaching aids such as articles written for the lay person and videos are extremely valuable in imparting an understanding of IBD to children. The availability of a clinic nurse or a physician to respond to questions as they arise assists in creating a positive, trusting environment for the patient's future management. In special cases, such as when a child requires nasogastric nocturnal feeds or a colectomy, it is helpful to involve other patients, preferably adolescents or young adults who have undergone similar treatment.

Usually, the patient with IBD and his/her family function extremely well (3). We do not routinely consult a psychologist for these children but when problems occur for a child or family, a psychologist and/or a social worker readily is involved.

COURSE AND OUTCOME

Children with Crohn's disease have a chronic disease which has periods of inactivity and episodic exacerbations. Unfortunately, a number of children with Crohn's disease require chronic low dose steroids to obtain periods of inactivity of their disease. Gryboski and Spiro (18) found pediatric patients with solely small bowel involvement have a better outcome than those with large and small bowel involvement. The risks for colon cancer in children with colonic involvement are the same as adults with Crohn's disease. Asymptomatic children are seen in clinic and have blood work half yearly.

Ulcerative colitis generally is intermittent but can be chronic and smouldering. In contrast to adults, children commonly have pancolitis and even when they initially present with proctitis, subsequently the entire colon becomes involved. Pancolitis and chronic smouldering disease hold a more grave prognosis than left-sided colitis or intermittent disease. Acutely ill children with ulcerative colitis can have a severe deterioration with toxic megacolon; therefore, they must be monitored closely. As with Crohn's disease, asymptomatic children are seen and have blood work half yearly. However, because of the high incidence of carcinoma after 10 years of the disease (41), children with ulcerative colitis are colonoscoped at least yearly for the first five to six years and then every six months.

In spite of the chronic nature of IBD, with optimal medical management children should return to a normal lifestyle for their age. This occurs with a comprehensive approach to both the medical and psychosocial or developmental aspects of the disease. While IBD is similar in children and adults, there are features of the presentation and complications of the disease

and its therapies that make the management more complex. The potentially major adverse effects of IBD on children during fragile stages of development make each case unique and successful management extremely rewarding.

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