Hirschsprung’s disease in a young adult: report of a case and review of the literature

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Abstract
Hirschsprung’s disease (HD) in adults is rare and often undiagnosed or misdiagnosed. We report a case of HD in a 26-year-old woman who had a history of chronic constipation that required laxatives and enemas since early childhood. She developed severe intestinal obstruction and presented to the emergency department with significant abdominal distension. A computed tomographic scan confirmed significant fecal loading of the entire colon and rectum. An anal manometry revealed lack of normal rectoanl inhibitory reflex. A rectal biopsy showed hypoganglionic anorectum, suspicious for HD. Because of the severe fecal retention that was refractory to conservative management, total proctocolectomy with ileal pouch-anal anastomosis was performed. The entire colon showed massive dilatation and marked wall thickening. Histologic examination showed absence of ganglion cells in submucosal (Meissner’s) and myenteric (Auerbach’s) plexuses in the distal rectum. A diagnosis of adult HD was made. Her postoperative course was uneventful with complete resolution of the symptoms. Hirschsprung’s disease should be considered in adults who have long-standing and refractory constipation.

Keywords: Hirschsprung’s disease; Constipation; Megacolon; Adult

1. Introduction
Hirschsprung’s disease (HD) is a congenital aganglionosis of the submucosal and myenteric neural plexuses principally affecting the rectosigmoid or rectal segments of varying length. Most cases become manifest during the neonatal period [1], but in rare instances, the disease is initially diagnosed in adult patients [2-5]. In these cases, the patients have milder disease and go undiagnosed early in their lives because the proximal innervated colon can be hypertrophied and, thus, compensates for the distal obstructed, aganglionic rectum. In addition, these patients often try to relieve the constipation by taking cathartics and using enemas. Eventually the dilated colon is no longer able to propel the feces distally. These patients then develop rapidly worsening constipation or fecal retention. We report a case of a 26-year-old woman who developed massively distended nonfunctional colon and was treated by total proctocolectomy with ileal pouch after more than two decades of constipation.

2. Case report
A 26-year-old woman reported to the emergency department complaining of many years of constipation. She had previously been hospitalized and evaluated multiple times and had undergone colonoscopy, barium enema, and anal manometry, with all study results being reported as normal. She was admitted to the gastrointestinal medicine service for evaluation and treatment. Her mother confirmed negative workup results for constipation during a hospitalization at age 8 with slowly worsening symptoms since that time. There was no history of delayed passage of meconium. Her family history was remarkable for similar constipation symptoms of unknown origin in her mother and aunt. Upon physical
examination, she was found to be emaciated with significant abdominal distension and tympany to palpation. There was evidence of chronic distension of the abdominal skin. An anteroposterior portable view of the abdomen revealed extensive fecal retention throughout the colon. A follow-up computed tomographic scan in the axial plane through the abdomen confirmed the severe colonic dilatation along with extensive fecal loading and generalized colonic wall thickening (Fig. 1). The rectum was markedly dilated and there was no obstructive lesion identified. Bowel rest, nasogastric tube decompression, and daily enemas were effective for several days. Additional studies were then performed. Flexible sigmoidoscopy revealed a markedly distended colon. A gastric emptying study showed severe delay. A small bowel follow-through showed displacement of the small bowel due to the distended colon with a delayed transit time. Laboratory studies were remarkable for significant iron-deficiency anemia, and endocrine function tests were within normal limits. Because of her prolonged history of constipation since childhood and multiple inconclusive evaluations, she was taken for anal manometry that revealed a lack of a normal rectoanal inhibitory reflex consistent with HD or megarectum. Full-thickness rectal biopsies demonstrated a paucity of ganglion cells, suggestive of HD.

Fig. 1. Computed tomographic scan of the abdomen with contrast showing a dilated colon packed with feces and thickened bowel wall.

Fig. 2. Gross photograph of the colon before (A) and after (B) opening the lumen. Note the massively dilated colon and rectum without distal narrowing.

Fig. 3. Low- (A) and medium-power (B) view of the distal rectum. Note the absence of ganglion cells between two layers of muscles.
She underwent a total proctocolectomy and ileal pouch anal anastomosis with diverting loop ileostomy. The lumen of the entire colon was packed with firm solid fecal material. The colon was massively dilated, worse in the distal portion, with a maximal internal circumference of up to 23 cm (Fig. 2). The colonic wall was significantly thickened, up to 1.0 cm. No ganglion cells were identified in the submucosa or between the muscular layers in the distal rectum and up to 5.7 cm from the anal-rectal junction (Fig. 3). Hypertrophic nerve bundles were present in this region (Fig. 4). Proximal to this aganglionic segment was a 2.6-cm hypoganglionotic segment or transitional zone where rare ganglion cells and associated thick nerves were seen (Fig. 5). The rest of the colon and small bowel showed normal distribution of the ganglion cells (Fig. 6).

After the operation she reported dramatic improvement in her bowel function and gained weight rapidly. Her diverting ileostomy was taken down and she reports markedly improved bowel function and quality of life.

3. Discussion

The first recorded observation of HD is credited to Frederick Ruysch [6], who published an autopsy report entitled “Enormis intestini coli dilatatio” in 1691. Nearly two centuries later, the disease was reported in 1888 by Hirschsprung [7]. It was not until 1948 that its pathogenesis was recognized. Whitehouse and Kernohan [8] documented the absence of ganglion cells in the myenteric plexus of Auerbach and the submucosal plexus of Meissner in all patients with true congenital megacolon. Their findings led to the development of an effective surgical treatment by Swenson and Bill [9] in 1948.

Hirschsprung’s disease affects approximately 1 in 5,000 live births and usually presents in infancy and early childhood. Only a small number remain undetected after 5 years of age [1]. The primary pathogenic defect is regarded as the total absence of ganglion cells of the submucosal (Meissner’s) and myenteric (Auerbach’s) plexuses in the affected portion of the large bowel. Studies of human embryos and fetuses suggest that this is the result of a defective migration of ganglion cell precursors of the neural crest into the hindgut [1]. Recent molecular studies have linked HD to defects in neural crest stem cell function [10]. The aganglionic segment in HD remains persistently contracted, whereas the proximal segment retains its

Fig. 4. Medium-power view of the distal rectum showing hypertrophic nerves in the submucosal (A) and myenteric (B) plexus.

Fig. 5. Medium-power view of the transitional zone immediately proximal to the aganglionic segment. Note a rare ganglion cell in association with the hypertrophic nerves in the submucosal plexus (A), but no ganglion cell in the myenteric plexus (B).
peristaltic function. As a result, there is work hypertrophy, eventual dilatation (megacolon), and sometimes perforation of the normally innervated colon [1].

The diagnosis of HD rests primarily upon 3 methods of evaluation, including barium enema, anorectal manometry, and rectal biopsy. The initial step is a barium enema study. The most reliable roentgenographic finding is a clear-cut zone of transition between the aganglionic distal segment, which is narrow or of normal caliber, and the dilated proximal colon with normal ganglion cells. The transition zone to the dilated segment is often characterized as “funnel shaped” or “inverted cone.” When the transition zone is observed, the examination is usually discontinued because of the potential to cause impaction in the proximal dilated bowel. Although the transition zone can be a very reliable sign, nonvisualization of this sign does not rule out HD. Other reliable signs may include retention of barium and the mixing of barium and stool [11]. Conventional radiography may demonstrate findings typically seen in most other low small bowel obstructions such as variable gaseous distension of the colon and small bowel, often with air-fluid levels. However, the colon is difficult to differentiate and gas is usually absent in the rectum [12]. Computed tomographic scan may therefore be more useful for better anatomic delineation. Anorectal manometry typically demonstrates no internal anal sphincter relaxation in response to rectal distension. The diagnosis is confirmed by rectal biopsy. A biopsy from the narrowed segment shows absence of ganglion cells, hyperplasia, and hypertrophy of nerve fibers, and an increased level of the enzyme acetylcholinesterase.

The term “adult HD” has been arbitrarily applied by some investigators to cases in which the patient is older than 10 years when the diagnosis is established [2,13], whereas others have defined adult HD as cases in which the diagnosis was made after age 18 or 19 years [4]. Although case reviews in the English literature based on different diagnostic criteria have given different numbers of total cases, the clinical presentation, radiological features, and pathologic findings have been similar among the various reports. The first well-documented case of adult HD was described in 1950 by Rosin et al in a 54-year-old physician with a short aganglionic segment [13]. Thereafter, occasional case reports appeared in the literature [2-5,14-17]. Nearly 300 cases with at least some features of adult or adolescent HD have been documented, some of which were diagnosed by rectal biopsy or resection. Fairgrieve [2] documented HD in 7 men whose ages varied from 17 to 34 years. All of the patients had short-segment aganglionosis. Two of their patients had megarectum with no demonstrable stenotic segment on the barium enema films as seen in our case. Anuras et al in 1984 [4] reported 4 cases of adult patients with HD in whom the diagnosis was confirmed by rectal biopsy. Three of them showed pancolonic dilatation similar to our patient, but only 2 of the cases had rectal narrowing. Most recently, Miyamoto et al [5] reported a 23-year-old man who had a history of chronic constipation that required daily enemas since early infancy. The patient had remained in good health until he experienced severe intestinal obstruction for which a subemergency colostomy was performed.

The typical adult patient with HD has a history of longstanding constipation since infancy or early childhood; the male to female ratio is approximately 4:1. Patient age ranges from 10 to 73 years, and the average age is 24.1 years. Half of the patients are younger than 30 years [2-5,13-16]. Other symptoms include abdominal discomfort, distension, and abdominal pain. Physical examination frequently reveals palpable fecal masses. The patients tend to use cathartics, suppositories, and enemas chronically to achieve bowel movements. Fecal incontinence is not a feature of the adult patient in contrast to infants. Rectal narrowing on barium enema is seen in three quarters of the patients. However, in about 20% of the patients with adult HD, a dilated colon without characteristic rectal narrowing, as seen in our patient, is demonstrated. This finding may be due to a short, or more commonly, an ultrashort diseased segment. The exact incidence of adult HD is unknown because those cases are frequently misdiagnosed or undiagnosed.

The diagnosis of HD in the adult can be much more difficult than the diagnosis in early infancy. This is due to the rarity of the disease in adults and the higher incidence of
short or ultrashort segment aganglionosis with relative mild symptoms during the early stage of the disease. As in the newborns, the diagnosis of HD in adults must be established by rectal biopsy showing absence of ganglion cells in the distal rectum. Rectal biopsy should be performed only after more common causes of constipation and megacolon have been ruled out. Constipation and acquired megacolon in adults may be due to neoplasm, volvulus, stricture, slow colonic motility, Chagas disease, anatomical or functional outlet obstruction, or idiopathic (non-Hirschsprung’s) megacolon. Causes from external factors include dietary factors, medications, psychologic factors, and systemic diseases. Whenever there is a reasonable doubt, manometric studies and biopsies are warranted.

In conclusion, we report a case of HD in an adult and emphasize the typical clinical presentation and massive dilatation of the entire colon without rectal narrowing. The diagnosis may be easily overlooked or misdiagnosed in adult patients with chronic constipation, particularly in the rare individual with ultrashort HD such as our patient. Therefore, all patients who have severe chronic constipation since birth or childhood need a thorough evaluation to rule out HD. The diagnosis can be suspected by barium enema and manometry, and confirmed by rectal biopsy. Making the diagnosis of HD is extremely important because surgical management is effective with satisfactory long-term functional results and significantly improved quality of life [5,17].

References