HIRSCHSPRUNG'S DISEASE

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INTRODUCTION

This congenital anormaly, first reported by Hirschsprung(1) in 1886 is characterized by constriction of a segment of the colon in infants. Clinically, the disease causes constipation, abdominal distension, and vomiting after birth.(2) It was by Tittel(3) in 1901 that the principal lesion in this disease was found to be absence or degeneration of Auerbach's plexus in the constricted segment of the colon. This concept was confirmed later by many authors(4,5,6,7,8,9.) There are some publications concerning the different causes of megacolon in the literature. Ternberg and Winters(10) reported a case of plexiform meurofibromatosis of the colon and attributed this disease as the cause of megacolon in their patient. In 1966, Ehrenpreis(11) raised a new conception, suggesting vascular dirturbance would cause aganglionosis. Acquired megacolon is known to be caused in many diseases, such as in poliomyelitis, spina bifida, or Chagas' diseases(12).

The present paper is to report a case of this disease recently autopsied in the Department of Pathology, Chung-Shan Medical & Dental College,and a brief literature review on the disease.

CASE REPORT

A 37-day-old premature male infant, native of Taiwan, was admitted to the pediatric Ward of Chung-Shan Medical & Dental College Hospital on September 11, 1971, with the chief complaint of diarrhea for 3 weeks and quick respiration of one day.

Past history revealed normal spontaneous delivery and milkfeeding. At the age of 18 days, patient suffered from passage of watery, yellowish, granular stool over 15 times per day. The diarrhea did not improve with mith medication untill the day of admission, and his general condition became worse. On the day before admission, hypehnea was noted, and he was admitted to our hospital.

Physical examintion on admission disclosed malnutrition, emaciation and pallor. The chest was not remarkable. The breathing sound was clear. The abdomen was scaphoid and tympanic. By auscultation, increased gurgling sound was found. Liver was enlarged on palpation, 1½ fb. below the right costal margin. Spleen was not made out.

Roentgenological examination showed enlarged right hilar shadow with increased density in the right lower lung field, suggesting of pneumonia. Laboratory examinations revealed leukocytosis (14,300 to 25,100) with shift to the left. No enteropathogen was isolated by stool culture.

Immediately after admission, fluid therapy, antibiotics, and O_2 inhalation were given. Diarrhea persisted and emaciation got worse day by day. At 8:00 p.m. on September 22 air hunger developed

suddenly. Enforced resuscitation was done in vain, and he expired at 10:50 p.m. on the same day.

AUTOPSY FINDINGS

At autopsy, marked dilatation of small intestine and distal half of the larga intestine was found, while the distal 3 cm. of ileum, cecum, ascending colon and most part of the transverse colon were markedly narrowed and collapsed (Fig.1). The circumference of the ileum proximal to the narrowed portion was 13.6 cm., and that of the colon distal to the narrowed transverse colon was 5.1 cm., and it was 1.3 cm. in the narrowed ileum and transverse colon. The appendix measured 6.5 cm. in length and 0.3 cm. in diameter, and it showed no remarkable change. On opening, the dilated bowel revealed marked flattening of the mucosa with moderately greenish color. The inner surface of the narrowed portion was pale and wrinkled. The musle coat and serosa throughout the whole intestine was remarkable. No dilatation of the esophagus was seen.

Atelectasis was noticed in both lungs, and focal bronchopneumonia was present also in the right lung. The liver was pale, yellow and soft, indicating of moderate fatty metamorphosis. Other visceral organs were not remarkable. On opening, the cranial cavity mild imbibitious bleedings were noted in the subarachnoid spaces. The brain was smaller than usual, showing underdeveloped sulci. Particularily interesting was the cerebellum, which was much smaller than usual, while the diencephalon and mesencephalon were quite larger comparing to the cerebrum and cerebellum. The ventricle system was normal.

MICROSCOPICAL FINDING

Many sections from narrowed inestine and from dilated loops, both proximal and distal to the former were studied after embedding in paraffine and stained with Hematoxylin-Eosin. In sections from the dilated intestine, ganglion cells were found in Auerbach's plexus between the inner circular and outer longitudinal muscle layers (Fig.3). There were, however, no ganglion cells or occasional ones in the plexus in the sections from the narrowed intestine (Fig.4). Even these ganglion cells observed here showed degenerative changes evidenced by ill-defined cell membranes, lysis of cytoplasm and presence of vacuoles in the cytoplasm. Nerve fibers were also reduced in number in these sections.

DISCUSSION

Incidence

Hirschsprung's disease is a rather rare disease. Fenwick(13) estimated the incidence of conienגtal megacolon as one in 10,000 births and Swenson(14) estimated one in 5,000 births. Tsai(15) collected 4 cases from 1838 autopsy cases in the Institute of Pathology, National Taiwan University Hospital in 1963.

Age and Sex

Hirschsprung's disease is most commonly seen infant. But, Rosin et al.(24) reported a case of man aged 54 years. Male is more frequently attacked than female with the ratio of 3:1(12) to 9:1 (25).

Genetic Problem

A pair of female twins suffered from this disease was reported by Popper.(20) Swenson(2) reported 3 families of this disease. He found 3 proved and 2 suspicious cases in the first family, two cases in a pair of identical twins in the second, and the mother and child suffering from this disease in the third. In 1948, Zuelzer and Wilson(6) reported 11 cases in which six children were from one family. All died with signs of progressive obstruction, peritonitis, or pneumonia.

Based on passarge's paper(16), about 2% of these cases had a chromosomal abnormality, mostly involving trisomy 21.

The present patient has an elder brother and parents, and all of them are living and well.

Biopsy

For the porpose of determining the extent of resection, multiple frozen sections at the time of surgery is necessary to ensure that the colon is transected proximally at a point where ganglion cells are present in normal number. The incision should include mucosa, submucosa, and superficial portion of muscularis, but should not penetrate the serosa.

Symptons

The cardinal symptoms of Hischsprung's disease are constipation, abdominal distension and vomiting(2). Very occasionally, however, diarrhea was only symptom in this disease. Stockdale and Miller(19) reported 2 cases of Hirschsprung's disease presenting persisting diarrhea as chief complaint. Both cases were found to have aganglionsis in sigmoid. They also mentioned in their paper that some infants with typical megacolon had had histories of brief bouts of diarrhea. Also they stated that they did not know how often diarrhea would be the manifestation of this disease. In Tsai's(15) report, we found chronic diarrhea for about 6 months in his third case. The symptoms occur, in majority of cases, within 3 days after birth. However delayed onset is not uncommon.

Localization

Acase of aganglionosis from the duodenojejunal junction down to anus was reported(17). However affecetd segment usually begins at or near the anus and extends proximally for 5 to 20 cm..(14)

Whitehouse and Kernohan(18) studied 11 cases of their own and found absence of ganglion cells in rectum in 100%, transitional region 80%, distal sigmoid 60%. and proximal sigmoid 20%. There were no absence of ganglion cells in descending colon, transverse colon and ascending colon. In Tsai's 7 cases, 5 cases were found to be classical type involving the lower part of colon, one from rectum to terminal ileum and the last one from hepatic flexure to terminal ileum. In the present case, the constriction was found in the distal 3 cm. of ileum and 25 cm. of proximal colon, a rather unusual location.

X-ray examination

X-ray study by barium enema was first applied by Battle(21 in 1926. In most cases of Hirschsprung's disease narrowed segment of the bowel which is aganglionic and dilated proximal bowel which is ganglionic can be demonstrated, and this finding togethar with clinical symptoms may suggest Hirschsprung's disease in infant.

Differential Diagnosis

Differential diagnosis between Hirschsprung's disease, acquired organic megacolon, and acquired functional megacolon is summarized in the Table I, chiefly based on the studies by Raffensperger(12) and Singleton(22).

Table I: Differential Diagnosis of Megacolon

	Hirschsprung's disease or Aganglionic. m. or Congenitalm.	Acquired organic m.	Acquired functional m. or Psychologic m. or Idiopathic m. or Habit constipation or Pseudo-Hirschsprung's disease

Onset	Neonatal	Variable	Usually early childhood
Sex	Males +	No difference	No difference(?)
Symptoms	Frequently severe	Severe to mild	Mild
Diarrhea	Infreqent	Infrequent	Frequent(over flow type)
Peristalsis	Visible & audible	Increased	Normal
abdomen	Markedly distended (thin wall)	Distend (mild to moderate)	Distend (variable)
General debilitv	Frequent	Depends on lesion	None usually
X-ray of rectum	Normal or narrow caliber distal segment	Depends on lesion	Dilated throughout
Stools	No fecal soiling	?	Fecal soiling of diaper or underclothes
pathology	Aganglionosis	Normal ganglia	Normal ganglia
Treatment	surgical	Surgical/Medical	Medical
Rectal	Normal	Possibly diagnostic for lesion	Fecal impaction dilated

Complication

The complication of Hirschsprung's disease is impaction, perforation, enterocolitis, and pneumonia in the order of frequency, and the commonest complication causing death is perforation.

Prognosis

In 1945 Bailey and Haber(23), in a review study of all types of megacolon found a mortality of 66 to 98% in patients treated 238 patients, other than sympathetectomy the mortality ranged between 26% and 48%, and the cure rate was from 34% to 74%.

But, since Swenson(26) reported later a surgical method of pull-through technique to excise the narrowed segment had been widely accepted, the prognosis of Hirschsprung's disease became more excellent.

SUMMARY

A case ot Hirschsprug's disease involving proximal colon and distal ileum was presented. It was noteworthy that the disease began with diarrhea at the age of 18 days, and terminated one month later. Through the clinical course, diarrhea was persisted instead of various treatment. Diarrhea is an infrequent chief complaint in the Hirschsprung's disease and only a few cases were mentioned in the literature. The mechanism with which this disease cause diarrhea is not known, and further study is necessary.

Brief review of the literature on the disease is also made.

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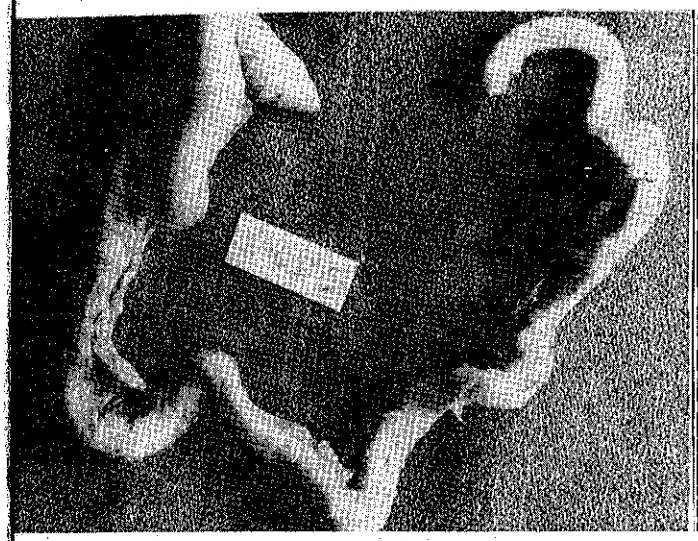

Fig.1. Showing constriction of terminal ileum and proximal colon. The dilated colon is part of descending colon.

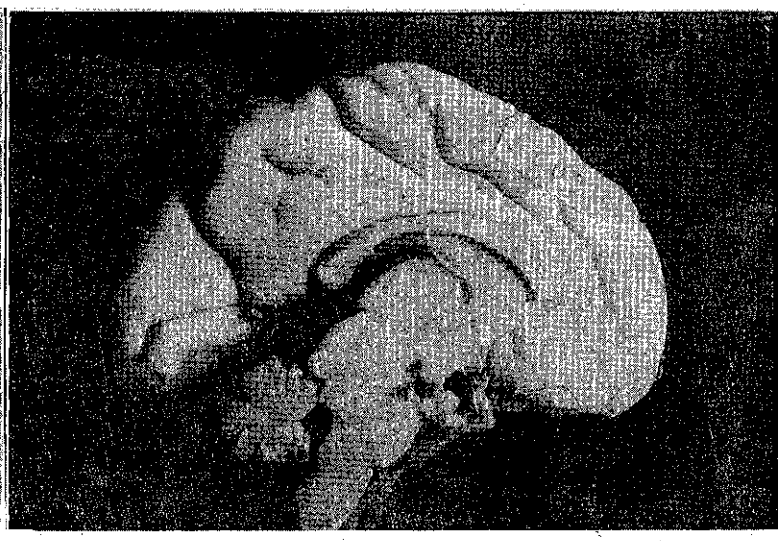

Fig.2. Sagittal section of the brain showing small cerebellum and large basal ganglia and brain stem. Note underdeveloped sulci in cerebral hemisphere.

Fig.3. Section from proximal part of the narrowed ileum showing ganglion cells in Auerbach's plexus between inner circular and outer longitudinal muscle layer.

Fig.4. Sections from narrowed transverse colon showing no ganalion cells in Auerbach's plexus.

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