Comparative Study between Contrast Enema Findings and Rectal Biopsy in the Diagnosis of Hirschsprung's Disease

Thesis

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By

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DEDICATION

This work is dedicated with affection to my Family…

LIST OF ABBREVIATIONS

AChE	: Acetylcholine esterase enzyme
BE	: Barium enema
CAM	: Cellular Adhesion Molecular
CE	: Contrast enema
DPM	: Delayed passage of meconium
ECM	: Extracellular Matrix
EDN	: Endothelins
ENS	: Enteric nervous system
GDNF	: Glial-derived neurotropic factor
GFR	: Glycosyl-phosphatidyl-inositol-anchored binding component
HD	: Hirschsprung's disease
IASNA	: Internal Anal Sphincter Neurogenic Achalasia
IC	: Idiopathic constipation
ICCs	: Interstitial cells of Cajal
ID	: Intestinal dysganglionosis
IND	: Intestinal neuronal dysplasia
MEN	: Multiple endocrinal neoplasia syndrome
NANC	: Nonadrenergic noncholinergic autonomic nerves
NC	: Neural crest
NO	: Nitric oxide
NTN	: Neurturin
UHD	: Ultrashort segment Hirschsprung's disease
WSCE	: Water-soluble contrast enema

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Abstract

The diagnosis of Hirschsprung's disease presents a clinical challenge to the pediatric surgeon. Hirschsprung's disease should be considered in any child who has a history of constipation dating back to the newborn period.

In our study the results of the contrast enema are well correlated and comparable to the rectal biopsy in the diagnosis of Hirschsprung's disease.

As barium enema is a noninvasive diagnostic tool, the presence of strongly positive enema findings associated with classic clinical presentation is considered in the author's point of view sufficient evidence to operate.

In cases of obistipant constipation and inconclusive contrast enema findings, thorough and careful medical management should be initially attempted, if failed; rectal biopsy by an experienced pediatric surgeon is indicated.

Key Word

Comparative Study between Contrast Enema Findings and Rectal Biopsy in the Diagnosis of Hirschsprung's Disease

INTRODUCTION AND HISTORICAL BACKGROUND

Herald Hirschsprung, senior pediatrician at the Queen Louise Children's Hospital in Copenhagen, presented the classic description of the disease that now carries his name to the Pediatric Congress in Berlin in 1886 [1]. He described two children with the classic clinical and anatomic characteristics of the disease. The children died at 7 and 11 months of age from what appeared to be repeated bouts of enterocolitis. Subsequently, several case reports were presented, including 10 additional children described by Hirschsprung in 1904; he called the disease congenital dilatation of the colon [2].

An understanding of the pathogenesis of Hirschsprung's disease took several more decades. Three basic theories were advanced. The first was the "malfunction theory" which stated that the hypertrophied colon was the primary congenital defect. The second was the "obstructive theory" which attributed the dilated colon to a mechanical blockage caused by redundancies of the colon or rectal valves. The "spastic theory," which posited that the distal colon was in spastic contraction, causing a functional obstruction, was initially put forward by Fenwick in 1900 [3].

An appreciation that the distal colon was the actual abnormality was initially advanced by Tittel in 1901; he identified an absence of ganglion cells in the distal colon of a child with Hirschsprung's disease [4].

Ehrenpreis in 1946 was the first to appreciate that the colon became secondarily dilated due to the more distal obstruction. In 1948 both Whitehouse and Kernohan and Zuelzer and Wilson definitively documented the absence of ganglion cells of the myenteric plexus in patients with Hirschsprung's disease. The first corrective surgery for

Hirschsprung's disease was performed by Swenson and Bill in 1948; a historical perspective of the cause and treatment of this disease was then published by Swenson [5].

In the presence of the world's most recognized investigators of this issue, controversies concerning diagnostic guidelines for anomalies of the enteric nervous system were discussed in the Fourth International Symposium on Hirschsprung's disease and related neurocristopathies, held in Sestri Levante in Italy in April, 2004. It was agreed that Intestinal Dysganglionoses (IDs) represent a heterogeneous group of Enteric Nervous System anomalies including Hirschsprung's disease (HD), Intestinal Neuronal Dysplasia (IND), Internal Anal Sphincter Neurogenic Achalasia (IASNA) and Hypoganglionosis. At present HD is the only recognized clinico-pathological entity, whereas the others are not yet worldwide accepted or diagnosed [6].

The most important diagnostic features of HD are the combination of hypertrophic nerve trunks and aganglionosis in adequate specimens. Acetylcholinesterase staining is the best diagnostic technique to demonstrate hypertrophic nerve trunks in lamina propria mucosae, but many pathologists from different centers still use H&E. staining effectively. Although it is not clear whether IND is a separate entity or some sort of secondary acquired condition, it is concluded that both IND and IASNA do exist. "Are they true congenital malformations or acquired phenomena?" This was the major debate that was raised regarding the origins of these anomalies [6].

Although more than 70 diagnostic, enzymatic-Histochemical and immunohistochemical staining techniques, have been proposed for enteric nervous system evaluation. Most of the hospital facilities cannot afford the adoption of expensive and sophisticated staining techniques on a daily

routine basis. Therefore these hospitals use nonspecific histomorphological staining techniques such as H&E. European and Asian investigators routinely use AChE to diagnose HD, whereas the American counterparts think that H&E is more user friendly, cheaper, and more reliable for the diagnosis of HD [7].

There is an agreement that anorectal manometry is unnecessary to diagnose Hirschsprung's disease, yet some still use manometry as an adjunct to help the diagnosis or as a study complement. Anorectal manometry is more useful in the diagnostic workup of Internal Anal Sphincter Achalasia rather than Hirschsprung's Disease. Barium enema is the most important radiographic study, either to diagnose Hirschsprung's disease or in selecting the operative approach [6].

The diagnosis of Hirschsprung's disease (HD) should take place early in the neonatal period, because without an effective diagnosis and appropriate treatment, a considerable proportion of infants will develop serious complications, such as acute enterocolitis or toxic megacolon [8].

Because no more that 10% of HD cases have a late presentation with classical chronic constipation and megacolon, the clinician has to make difficult, early diagnosis, which is the crux of the clinical problem [8].

The aim of this review is to present all tools currently available to a clear diagnosis and to discuss the problems facing the clinician and the pediatric surgeon in the correct identification of Hirschsprung's disease.

AIM OF THE WORK

The aim of this work is to study the accuracy of contrast enema in the diagnosis of Hirschsprung's disease comparing it with the results of rectal biopsy which represents the gold standard.