Delayed Diagnosed of Hirschprung Disease: A Case Report

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ABSTRACT

Background: Late Sign of Hirschsprung disease (HD) always demanding cases and need full attention to care these cases to make better outcome and not burdening family and the child
Case presentation: We present case of 4 years old boy with shortness of breath, abdominal distention and bowel obstruction in emergency room.
Patient with his bloating abdomen from infant and being told that it was part of growth process by the family. After 7 days clinically ill in all part abdomen following with fever, Patient come to Emergency room with shortness of breath caused by pneumonia and sign of bowel obstruction. Patient have history of chronic constipation and faltering weight (12 kg). Intraoperative finding in urgent laparotomy significant colonic dilation from rectum to transverse colon. We perform resection sigmoid and double barrel colostomy, from colon biopsy confirmed HD. Patient discharged after 10 days post operatively because pneumonia treatment eventfully.
Conclusion: This case requires a thorough evaluation, as the family's limited awareness and lack of knowledge about HD contributed to the delayed diagnosis. Early diagnosis of this genetic disorder can significantly improve clinical outcomes and enable a more precise and individualized approach to management.

Background

Hirschsprung disease (HD) is a congenital enteric nervous system disorder caused by the absence of ganglion cells in the submucosal and myenteric plexuses of the distal bowel, resulting in functional obstruction and proximal bowel dilatation.[1-3] It occurs in approximately 1 in 3.500-5.000 live births and is usually diagnosed during the neonatal period, particularly in infants with delayed meconium passage, abdominal distention, vomiting, or intestinal obstruction.[1,4,5] However, delayed diagnosis beyond infancy may occur in patients with chronic constipation and progressive abdominal distention, especially when symptoms are misinterpreted as functional constipation or normal growth variation.[5-7]

Delayed HD is clinically important because chronic fecal stasis may lead to fecaloma, megacolon, malnutrition, enterocolitis, perforation, sepsis, and emergency surgical intervention.[5-8] From a molecular perspective, HD is a genetically heterogeneous neurocristopathy involving abnormal migration, proliferation, survival, or differentiation of enteric neural crest-derived cells during embryogenesis.[1,2,4] The RET proto-oncogene is the major susceptibility gene, acting through the GDNF/GFRα1/RET signaling pathway and downstream RAS/MAPK, PI3K/AKT, and PLCγ pathways that regulate enteric nervous system development.[4,9] Additional pathways, including EDNRB–EDN3 signaling and

transcriptional regulators such as SOX10 and ZEB2, contribute to variable penetrance and phenotypic diversity.[1,4,9,10]

Case Presentation

We present case of 4 years old boy with shortness of breath, abdominal distention and bowel obstruction in emergency room.

Patient with his bloating abdomen from infant and being told that it was part of growth process by the family member. After 7 days clinically ill in all part abdomen following with fever, Patient come to Emergency room with shortness of breath caused by pneumonia and sign of bowel obstruction. The clinical examination (Fig 1) found abdominal distention with fecaloma in left lower quadrant of the abdomen with radiology confirm it (fig 2). Patient have history of chronic constipation and faltering weight (12 kg). we suspecting of delayed diagnosed of HD and from intraoperative finding in urgent laparotomy significant colonic dilation from rectum to transverse colon. We perform resection sigmoid and double barrel colostomy, from colon biopsy confirmed HD. Patient discharged after 10 days (Fig.3) post operatively because pneumonia treatment eventfully.



Fig 1. Clinical picture of abdominal distention

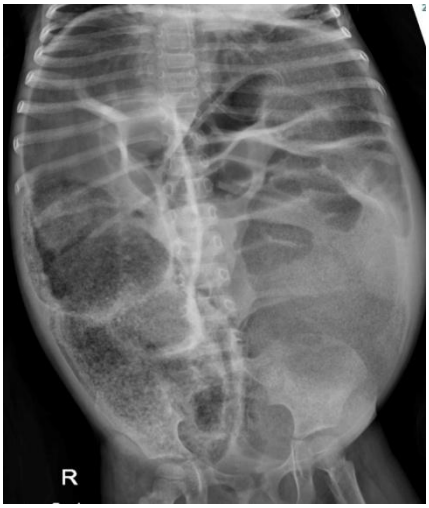


Fig 2. Pre-operative abdominal X-Ray



Fig 3. Post-operative colostomy

Discussion

Hirschsprung disease (HD) is a congenital disorder of the enteric nervous system characterized by the absence of ganglion cells in the submucosal and myenteric plexuses of the distal intestine, leading to functional bowel obstruction and progressive proximal dilatation.[1-3] The disease occurs in approximately 1 in 3,500–5,000 live births and shows a clear male predominance, particularly in short-segment disease.[1,4,5] Although HD is classically diagnosed during the neonatal period, especially in infants with delayed passage of meconium, abdominal distention, bilious vomiting, or intestinal obstruction, delayed diagnosis beyond infancy has been reported in children presenting with chronic constipation, abdominal distention, poor growth, enterocolitis, or acute bowel obstruction.[6,7] In the present case, the patient had abdominal bloating since infancy, chronic constipation, faltering weight, and finally presented at four years of age with severe abdominal distention, fecaloma, bowel obstruction, pneumonia, and shortness of breath.

Delayed diagnosis of HD is clinically important because persistent fecal stasis and progressive colonic dilatation may predispose patients to fecal impaction, enterocolitis, intestinal perforation, sepsis, and increased morbidity.[6-8] Children with late-presenting HD may be misdiagnosed as having functional constipation, particularly when symptoms are chronic but partially tolerated by the patient and family.[6-7] In this patient, the long history of abdominal distention and constipation since infancy, together with poor nutritional status and radiological evidence of obstruction, supported the suspicion of delayed-diagnosed HD. Massive abdominal distention may also worsen respiratory function by limiting diaphragmatic excursion, and this mechanism may aggravate respiratory distress in children with concurrent pulmonary infection.[8] In the present case, shortness of breath was clinically associated with pneumonia, while the markedly distended abdomen may have contributed to respiratory compromise.

The pathogenesis of HD is closely related to abnormal embryological development of the enteric nervous system.[1,2,4] Enteric neurons and glial cells originate mainly from neural crest-derived cells that migrate rostrocaudally along the developing gastrointestinal tract during early embryogenesis.[1,2,4] Failure of these enteric neural crest cells to migrate, proliferate, survive, or differentiate properly results in aganglionosis of the distal bowel.[1,2,4] Because the distal colon and rectum are the last segments colonized by migrating neural crest cells, they are particularly vulnerable to incomplete enteric innervation.[2,4] The aganglionic segment fails to relax normally, producing tonic contraction, impaired peristalsis, fecal retention, and proximal bowel dilatation.[1,3,5] These mechanisms are consistent with the intraoperative finding in the present case, where significant colonic dilatation was observed from the rectum to the transverse colon.

From a molecular perspective, HD is considered a genetically heterogeneous and complex disorder rather than a simple Mendelian disease in most cases.[1,2,4,9] More than 30 genes and several non-coding regulatory loci have been implicated in enteric nervous system

development and HD susceptibility.[4,9] The RET proto-oncogene is the major susceptibility gene for HD and encodes a receptor tyrosine kinase essential for enteric neural crest cell migration, proliferation, survival, and differentiation.[1,2,4] Binding of glial cell line-derived neurotrophic factor (GDNF) to the RET/GFRα1 receptor complex activates downstream intracellular pathways, including RAS/MAPK, PI3K/AKT, and PLCγ signaling, which are important for enteric neurogenesis.[4,9] Reduced RET signaling due to coding variants, non-coding enhancer variants, or interaction with other susceptibility genes can impair colonization of the distal bowel by enteric neurons.[2,4,9]

In addition to RET-GDNF signaling, the endothelin pathway also plays an important role in HD pathogenesis.[1,2,4] Mutations or functional variants in EDNRB and EDN3 can disrupt neural crest cell migration and differentiation, contributing to distal intestinal aganglionosis.[1,2,10] SOX10, PHOX2B, ZEB2, NRG1, and other genes have also been associated with syndromic or non-syndromic forms of HD.[4,9,11] The interaction among RET, EDNRB, EDN3, GDNF, SOX10, and other modifier loci explains the incomplete penetrance and variable expressivity of HD.[1,2,4,12] This genetic complexity may partly explain why some patients present with severe neonatal obstruction, whereas others present later in childhood with chronic constipation and progressive abdominal distention.[6,7,12]

The delayed presentation in this patient may reflect a clinically compensated phenotype during infancy and early childhood, followed by decompensation after progressive fecal retention, fecaloma formation, and infection.[6,7] Late-diagnosed HD has been described in children with a long history of abdominal distention and irregular bowel habits, emphasizing that persistent constipation from infancy should not be assumed to be functional constipation without further evaluation.[6,7] Faltering weight in this patient also supports chronic disease burden, because prolonged bowel obstruction and feeding intolerance may impair nutritional status in children with HD.[6-8] The emergency presentation in this case highlights that delayed recognition may shift management from elective diagnostic evaluation to urgent surgical intervention.[6-8]

Histopathological confirmation remains the diagnostic gold standard for HD.[3,5,8] The diagnosis is established by demonstrating absence of ganglion cells in the submucosal and/or myenteric plexuses, often with associated hypertrophic nerve trunks depending on the staining technique used.[3,5,8] In the present case, colon biopsy confirmed HD after urgent laparotomy and colostomy. Surgical management of HD depends on the patient's clinical condition, disease extent, and presence of complications such as enterocolitis, severe obstruction, or perforation.[5,8] In unstable or complicated patients, staged surgery with temporary colostomy may be required before definitive pull-through procedure.[5,8] Therefore, the decision to perform resection of the sigmoid colon and double-barrel colostomy in this patient was appropriate given the emergency presentation with bowel obstruction and concurrent pneumonia.

This case also has implications for genetic counseling and clinical awareness. HD may occur sporadically, but familial aggregation and recurrence risk have been reported, with risk influenced by sex, segment length, and family history.[1,2,4,9] Male sex, as observed in this patient,

is a recognized epidemiological feature of HD.[1,4,5] Genetic evaluation may be considered in selected cases, particularly in patients with long-segment disease, total colonic aganglionosis, family history, associated congenital anomalies, or features suggesting syndromic HD.[4,9,11] Although molecular testing is not required to establish the diagnosis, understanding the genetic basis of HD can support family counseling and may contribute to future risk stratification.[4,9]

In conclusion, this case emphasizes that HD should remain an important differential diagnosis in children with chronic constipation, abdominal distention, and poor growth beginning in infancy.[6,7] The clinical findings in this patient are consistent with delayed-diagnosed HD complicated by bowel obstruction, fecaloma, pneumonia, and respiratory distress. The molecular basis of HD involves abnormal enteric nervous system development, particularly through disruption of RET–GDNF, EDNRB–EDN3, and related neural crest regulatory pathways.[1,2,4,9] Early recognition of warning signs, timely radiological and histopathological evaluation, and appropriate surgical management are essential to prevent severe complications associated with delayed diagnosis.[5-8]

Conclusions

This case underscores the importance of a comprehensive clinical and family assessment, particularly in the context of limited awareness regarding hereditary disorders, which contributed to delayed recognition of Hirschsprung disease (HD). Insufficient family knowledge about the hereditary nature and early manifestations of HD may obscure its diagnosis, especially during the initial stages when symptoms are subtle or nonspecific. Earlier identification of this genetic disorder is clinically important, as timely diagnosis enables appropriate genetic counseling, anticipatory monitoring, and earlier implementation of supportive and targeted management strategies. In this context, early recognition not only improves clinical outcomes and quality of life, but also facilitates a more precise and individualized approach to patient care.

Declaration

Consent to publish

Consent to publish was not obtained this case series does not contain any personal information that could lead to the identification of the patient.

Competing interest

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Author's contribution

All authors have read and approved the manuscript and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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