Waardenburg Syndrome Presenting With Constipation Since Birth

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Background: Shah-Waardenburg syndrome is Waardenburg syndrome associated with Hirschsprung's disease. **Case characteristics:** A 10-day-old full-term male neonate of Waardenburg syndrome presented with constipation since birth along with features of small bowel obstruction. **Observation:** Exploratory laparotomy revealed distended proximal jejunal and ileal loops along with microcolon; an ileostomy was performed. **Outcome:** Postoperatively patient developed sepsis and died. Histopathology confirmed total colonic aganglionosis. **Message**: Suspect familial Shah-Waardenburg syndrome in a neonate of Waardenburg syndrome presenting with constipation since birth or intestinal obstruction.

Keywords: *Shah-Waardenburg syndrome, Colonic aganglionosis, Hirschsprung disease*.

Shah-Waardenburg syndrome (SWS) clinically manifests with pigmentary anomalies, sensorineural deafness and Hirschsprung disease [1-4]. We report a case of familial SWS presenting in the neonatal period with features of small bowel obstruction.

CASE REPORT

A 10-day-old full-term male neonate, born to non-consanguineous parents, presented with bilious vomiting, abdominal distension and constipation since birth. On examination, the child was febrile with pulse 180/min, Capillary refilling time >3 sec, respiratory rate 58/min, and features suggestive of sepsis. He had prominent white forelock (hair) affecting the anterior, central and lateral part of the scalp, broad nasal root, and bilateral hypochromic irides. His eyelashes were also white in color and there was partial albinism. Abdominal examination revealed distended abdomen with features of small bowel obstruction.

Hematological and biochemical investigations were within normal limits. The abdominal roentgenogram revealed dilated small bowel loops but no air-fluid levels. Barium enema showed a microcolon with no obvious transitional zone, giving a suspicion of Hirschsprung's disease (***Fig.* 1**). Exploratory laparotomy revealed distended proximal jejunal and ileal loops; microcolon was evident. Multiple sero-muscular biopsies were taken from unused colon and an ileostomy was performed. The histopathology confirmed aganglionosis in the entire colon. A diagnosis of Shah-Waardenburg syndrome was made as he met all the diagnostic criteria. Post-operatively, the patient developed sepsis and died.

On enquiring, one of his elder female siblings had pigmentary disorder of hair and skin, with involvement of all the hair on the scalp, eyebrows, eyelashes and heterochromia irides. She was admitted for intestinal obstruction and died in the neonatal period three years ago. His father has heterochromia of left eye but not a

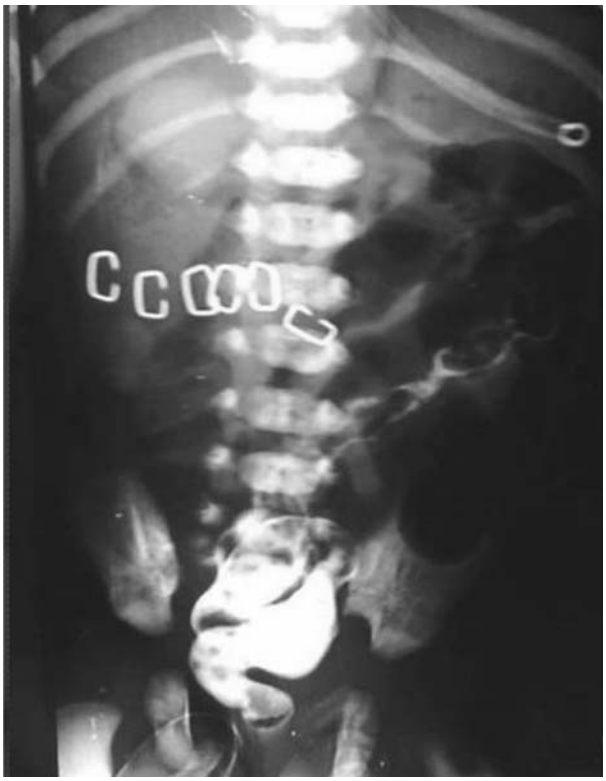

FIG.1 *Barium enema showing microcolon with no obvious transitional zone.*

white forelock. He also has a broad nasal root and premature graying of hair. Examination of other family members did not show any features of SWS or Waardenburg syndrome.

DISCUSSION

Waardenburg syndrome is a group of rare genetic conditions [1]. Features vary among affected individuals, even among people in the same family. It has been classified into four types, of which type IV is also known as Shah-Waardenburg syndrome or Waardenburg syndrome associated with long-segment Hirschsprung disease [4]. Shah-Waardenburg syndrome is very rare. Defective migration of the neural crest derived cell lines, melanocytes and the neuroblasts (contributing the enteric ganglion cells) during the embryonic phase, has been postulated as a cause of this disorder [5]. Thus characterizing it as a type of neurocristopathy [6].

Bowel involvement in Shah-Waardenburg syndrome is characteristic in the form of aganglionosis in the myenteric (Auerbach) plexus and the submucous (Meissner) plexus, with long-segment Hirschsprung disease [7]. The unusual finding in our case was the extension of the aganglionosis in the entire colon (total colonic aganglionosis) and familial incidence of Shah-Waardenburg syndrome.

Shah-Waardenburg syndrome have three variants described on the basis of genetics. Type IVA and type IVB are inherited as an autosomal recessive trait, while type IVC as an autosomal dominant trait [8,9]. Folic acid supplementation in pregnancy has been recommended for women at increased risk of having a child with Waardenburg syndrome [6].

Patients with Shah-Waardenburg syndrome and total colonic aganglionosis cases in isolation, usually present within first month of life with delayed passage of meconium (beyond 48 hours) or constipation since birth or with features of neonatal small bowel obstruction (as seen in our case), although cases presenting beyond the neonatal period have been reported [6,10]. The differential diagnoses of such presentation are ileal atresia, neonatal small left colon syndrome, meconium ileus, meconium plug syndrome, and intestinal neuronal dysplasias. Meticulous attention is required with preoperative evaluation for co-existence of other system abnormalities, airway management, and perioperative nutrition strategies.

Initial surgical approach in Shah-Waardenburg syndrome is histopathological confirmation of diagnosis by routine seromuscular colonic biopsy and stoma formation depending upon the involvement of the colon. Frozen section examination if available remains a useful diagnostic modality for this purpose with its inherent advantages of prompt intraoperative diagnosis. The definitive treatment of Hirschsprung's disease is performed at a later date [10]. Genetic counseling must be provided for families with this disorder.

Mutational analysis was not possible due to resource constraints. In conclusion, a high index of suspicion for Shah-Waardenburg syndrome should be present, in a child, particularly neonate with Waardenburg syndrome presenting with constipation since birth or with features suggestive of intestinal obstruction.

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