H9 Death as a Consequence of an Intestinal Obstruction Due to an Abnormal Congenital Band in a 4-Year-Old Child

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After attending this presentation, attendees will understand the necessity of a correct autopsy technique when rare pathologies are discovered.

This presentation will impact the forensic science community by demonstrating the relevance of a solid technical skill when atypical findings are present at autopsy.

A 4-year-old child was found dead inside his home without any apparent cause. Questioning of his parents revealed that he had experienced an ill-defined increasing abdominal pain, which had started three days before his death and was associated with a high fever (37.7°C) and vomiting. The abdominal pain was treated with enemas of lukewarm water containing glycerin, paracetamol, and peridon. He had previously been healthy. External examination of the body revealed no injuries.

An autopsy was performed. Upon opening of the abdominal cavity, copious amounts of transudate mixed with blood were revealed totaling approximately 2,000cc. The small bowel loops were markedly distended and, in some sections, purplish-brown in color, suggesting necrosis. Part of the intestine was entrapped and strangulated by a fibrous band connected to the mesentery at four locations. The multiple occlusions resulted in the development of two non-contiguous areas of necrosis, one between the ileum and the ileocecal valve and the other extending from the lower third of the sigmoid colon to include the rectum.

Histological examination of the fibrous band showed connective tissue, with areas of ischemic necrosis at the level of the intestinal mucosa. Toxicological tests were negative. Death was due to intestinal obstruction and infarction caused by a congenital band. The obstruction and infarction resulted in dehydration and circulatory collapse.

An Abnormal Congenital Band (ACB) is among the multiple conditions that may cause an intestinal obstruction. ACBs are extremely rare and often manifest as intestinal obstruction, especially during childhood.[1,2] The precise incidence of ACBs remain unknown, although studies have reported percentages varying from 1% to 3%.[3] The etiology of ACBs are obscure and their locations include known embryogenic remnants, including the vitelline arteries and veins, and the omphalomesenteric ducts.[4-6] The omphalomesenteric duct is an embryonic structure connecting the primitive bowel with the vitelline sac that disappears between weeks five and nine of fetal life. Incomplete regression may cause several types of congenital abnormalities, including Meckel diverticulum and entero-cutaneous fistula due to the persistence of the vitelline duct.

ACBs may originate from mesenteric anomalies. On approximately the 28th day of intrauterine life, the dorsal and ventral mesenteries transiently divide the peritoneal cavity into right and left halves; however, the ventral mesentery soon disappears, except around the liver and in front of the stomach. As the intestines assume their final positions, their mesenteries are pressed against the posterior abdominal wall. An ACB may therefore be a remnant of ventral mesenterium that failed to resorb completely

Four types of congenital peritoneal bands have been described. In type 1, the cecum, which lies abnormally in the right upper quadrant of the abdomen, has a band called Ladd's Band, which extends across the second and third parts of the duodenum to the paravertebral gutter. Duodenal obstruction may therefore result from compression by Ladd's Band and/or from midgut volvulus. Type 2 bands extend from the hepatic flexure of the colon across the second part of duodenum to the right paravertebral gutter, causing duodenal compression at that site. Type 3 bands are hypertrophied hepatoduodenal ligaments, which obstruct the duodenum at the junction of its first and second portions. Type 4 bands are dense fibrous bands that bind the distal portion of the third part of the duodenum to the paravertebral fascia, causing extrinsic obstruction and always being associated with an incompletely rotated duodenum.

The child described in this study demonstrated a rare cause of death from intestinal obstruction due to an ACB. The band observed at autopsy could be traced back to the remnants of the omphalo-mesenteric or vitelline duct, indicating that it was a type 4 band.

In conclusion, clinicians should be aware of this entity as ACB may cause death in children.

References:

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Anomalous Congenital Band, Autopsy Technique, Natural Death