

Sudden Death Associated with Incarcerated Small Bowel due to Mesodiverticular Band

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Sudden Death Associated with Incarcerated Small Bowel due to Mesodiverticular Band.

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Abstract:

Meckel's diverticulum is a congenital anomaly present in about 3% of the population and usually asymptomatic. Rarely, a mesodiverticular band extends from the tip of a Meckel's diverticulum to the mesentery, thought to be due to lack of involution of the left vitelline artery. The presence of this band creates a closed loop through which loops of bowel can become entrapped. Rare case reports have described incarceration of bowel, and sudden death in children. We present such a case, and discuss this entity.

Key words: Death, Sudden/etiology, Meckel Diverticulum/complications, Intestinal obstruction.

Introduction:

Meckel's diverticulum is a congenital anomaly present in about 3% of the population(1). It is usually asymptomatic, although may present with complications, often in adult life. Rarely, a mesodiverticular band extends from the tip of a Meckel's diverticulum to the mesentery, thought to be due to lack of involution of the left vitelline artery(1). The presence of this band creates a closed loop through which loops of bowel can become entrapped. Rare case reports have described incarceration of bowel, and sudden death in children(1). We present such a case, and discuss this entity. An awareness of this diagnosis may lead to earlier intervention in these diagnostically difficult cases.

Case:

The patient was a 9 year old male with no prior significant history who complained of abdominal pain and vomiting. He was taken to the ED of an outside hospital, and following evaluation including imaging and a tolerated food challenge, sent out with symptomatic treatment for nausea and constipation. The next day at home, he had intermittent complaints of abdominal pain and then complained of difficulty seeing. He then suddenly became unresponsive, developed seizure-like activity, vomited coffee ground vomitus and had black diarrhea. EMS arrived within minutes of the collapse, and started CPR. He arrived to the ED with a pulseless normal sinus rhythm and was severely acidotic. Resuscitation was performed vigorously, and although circulation was restored initially, perfusion was not sustained and he expired shortly after arrival to the hospital, the day after initial onset of symptoms.

Pathology:

At autopsy, there was approximately 500 cc of blood tinged fluid in the abdominal cavity. The entire small bowel was incarcerated through a loop formed by a mesodiverticular band(fig 1). The band was found to contain an arterial remnant on histology(fig 2). The small bowel was grossly necrotic, and on opening contained bloody fluid. Additional findings included massive cerebral edema, and acute tubular necrosis of the kidneys.

Discussion:

Meckel's diverticulum is present in about 3% of the population(1). It is due to partial lack of involution of the omphalomesenteric(vitelline) duct. Meckel's diverticulum is usually asymptomatic, with only a small percent of patients having a non-incidental diagnosis. However complications may present. These include intussusception, torsion, inflammation, incarceration of the diverticulum in an inguinal hernia, as well as bleeding or perforation, particularly if there is ectopic gastric or pancreatic mucosa.

Rarely, there is a band connecting the tip of a Meckel's diverticulum to the mesentery, a mesodiverticular band. Mesodiverticular bands have been estimated to occur in 3-6% of cases of Meckel's diverticulum(1). Histologic evidence of a vascular remnant in these bands has led to the theory that a mesodiverticular band is a remnant of the left vitelline artery, which fails to involute. The right vitelline artery normally becomes the superior mesenteric artery(1). A mesodiverticular band creates a closed loop, through which loops of bowel can become incarcerated. This is an extremely rare complication in children, with about 12 cases reported in the literature, of which 9, were previously reviewed(2). Sudden death has been described in some of these cases(1), as was seen in our case. Small bowel incarceration in a mesodiverticular band cannot usually be diagnosed specifically preoperatively(3), which probably explains the high mortality at least in part, although a few reports describe its diagnosis by CT scan in adult patients(4,5). In one literature review, only 6-12% of cases were diagnosed preoperatively(6).

Rarely, direct compression of the small bowel by the mesodiverticular band, rather than an internal hernia, as in our case, may be the cause of small bowel obstruction due to mesodiverticular band, as has been described in a newborn(2). Other rare complications associated with a mesodiverticular band have included axial torsion of the diverticulum itself due

to the band(7), and aneurysmal rupture of a mesodiverticular band artery, with significant peritoneal hemorrhage(8), both in adults.

It is imperative to include a consideration of mesodiverticular band in the differential of a child presenting with unexplained abdominal symptomatology suggestive of obstruction. Treatment is surgical. It is also important for pathologists to be familiar with this entity, including forensic pathologists who may see some of these cases, and take care not to disrupt the band during dissection, precluding the ability to establish the diagnosis(1).

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Legends:

Figure 1-The mesodiverticular band(arrow) formed a closed loop which entrapped multiple loops of small bowel

Figure 2-A cross section of the mesodiverticular band shows the remnant vessel.