

CASE REPORT

MESENTERIC VOLVULUS IN CHILDREN: TWO AUTOPSY CASES AND REVIEW OF THE LITERATURE

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Small bowel mesenteric volvulus when compared with mesocolonic volvulus, have not high incidence. Two autopsy cases of small bowel mesenteric volvulus in infants, highlighting the importance of a suspicion in early recognition of this rare but potentially fatal intra-abdominal emergency are reported. We also review the literature on possible aetiologies and mechanism of small bowel mesenteric volvulus, as well as its management.

Keywords: Forensic autopsy, mesentery, volvulus.

INTRODUCTION

Volvulus is one of the surgical emergency life treating pathologies of mesentery¹⁻⁶; small bowel mesenteric volvulus, when compared with mesocolonic volvulus, have not high incidence; for this reason, clinicians have limited experience on this issue.^{1,2} Emergencies can be missed easily in children, so history and physical examination are the most important diagnostic tools, physician must maintain a high index of suspicion for serious pathology in paediatric patients with abdominal complaints, if they do, one will be rewarded with the correct diagnosis.^{7,8}

CASE REPORT 1

A 7-year-old boy presented with a 2-day history of intermittent abdominal pain which acutely worsened. His family members stated that firstly he had been treated for common cold in a Primary Health Care Centre. Where it was explained that the patient had complaints, which did not represent a serious disease. A radiologic investigation had not been done, only analgesics were administered, and patient had not been referred to proper centre. However, he died on the same day after the transfer to the regional hospital emergency service. As the death was considered to be suspicious, an autopsy was mandated. On inspection; there were no findings. Macroscopic examination revealed paleness of the lungs. Peritoneal cavity trapped fluid between mesenteric folds and contained 300 cc of serohaemorrhagic fluid, small bowel serosal surface was dark red to chocolate brown in colour and greatly distended, from Treitz ligament continuing up to the 8 cm proximal of ileocaecal valve. A mesentery study detected that the patient undergone volvulus of approximately 360°, in the examination of mesentery, it was found that there was total, complete rotation around mesentery root in clockwise manner (Figure-1). On bowel dissection mucosal folds were disappeared and mucosal surface was dark red to purple in colour showing haemorrhagic

infarction. Microscopic findings consistent with hemorrhagic small bowel infarction were found, in addition haemorrhage, necrosis and reactive hyperplasia in mesenteric lymph nodes were observed. Histology of the other organs confirmed the gross findings. Toxicological studies revealed no special finding.



Figure-1: Rotation around mesentery root

CASE REPORT 2

A 3-year-old girl was admitted to the Health Centre emergency service with acute abdominal pain and vomiting complaint after meal. The patient's symptoms continued and an emergent medical treatment was performed but girl died several hours after admission to the emergency service. On the other hand, according to the prosecutors official investigation the family members declared that the girl had abdominal pain of 3 day's duration, and stated that because of economic reasons the physician investigation was delayed. The death was considered to be suspicious and the victim was taken to the Forensic Council Morgue Department for further examination. On gross physical examination there were needle puncture sites on the cubital fosses. Autopsy macroscopic examination determined paleness of the lung and kidney, red-purple in colour

small bowel serosal surface including duodenum and continuing up to the ileocaecal valve but not involving colic serosa. In the autopsy small bowel mesentery was found to have twisted approximately 270° around mesentery root in clockwise manner and when dissection performed diffuse haemorrhage was seen in mesenteric soft tissue after derotation (Figure-2). When dissection was performed red-brownish haemorrhagic fluid in the small bowel lumen, dark red bowel mucosa which showed acute infarction with necrosis of mucosa were observed. In microscopic investigation, mucosa with sloughing of the surface epithelium, transmural haemorrhage and infarction of small bowel were described. Analysis of the organ specimens revealed none of the substances screened for in systematic toxicological methods.



Figure-2: Bleeding areas in mesenteric soft tissue

DISCUSSION

Volvulus is one of the surgical emergency life treating pathologies of mesentery¹⁻⁶; small bowel mesenteric volvulus, when compared with mesocolonic volvulus, have not high incidence; for this reason, clinicians have limited experience on this issue.^{1,2} Surgical emergencies can be missed easily in children, who are not always able to volunteer relevant information.⁷ Complete history and physical examination are the most important diagnostic tools; physicians should listen carefully to parents and their children, respect their concerns, and honour their complaints.⁸ Bowel obstructions in childhood period have many causes such as malrotation abnormalities^{5,6}, mesenteric lipomas¹, mesenteric lymphatic malformations², and mesenteric cysts.⁹ Beside that, some cases without any detectable cause are regarded as idiopathic like our mesenteric volvulus cases.^{4,10} A classic malrotation of 180° has been reported in autopsy cases, but rotation of mesentery root in different degrees were also investigated.⁶ Cascio *et al*¹¹ reported case with total mesenteric agenesis presenting with mid-gut volvulus owing to internal herniation of the small bowel through a

mesenteric defect, with normal fixation and rotation of the small bowel mesentery root.

Although entity is frequently presented with acute abdominal symptoms¹⁻³ in clinical practice, there have been reported cases of chronic mesenteric volvulus with different presentation forms and indefinite clinical findings.^{5,6,9} Children with abdominal pain and vomiting should be considered to have ischemic or necrotic bowel ailments, and possible diagnoses include volvulus, intussusceptions, and necrotizing enterocolitis.⁷ Peitz stated that volvulus of the small-bowel occurs in children with malrotation and bile-stained vomiting starts within the first days of life and is followed by the clinical signs of high bowel obstruction and peritonitis.¹⁰ Tarabuchi *et al*² reported that volvulus should be considered in any child with acute abdominal pain, and imaging can aid in the diagnosis of this complication.

Abdominal radiographs can be normal in children with early volvulus.⁸ On the computed tomography mucosal necrosis and transmural infarction have been described.¹² Fukuya *et al*¹³ presented cases proved to be secondary to adhesions, and CT examinations showed focal, wedge-shaped, oedematous mesentery with trapped fluid between mesenteric folds radiating toward the site of torsion.

Besides Chao *et al*³ reported that ultrasonographic features of inversion of the superior mesenteric artery and superior mesenteric vein could aid in the diagnosis of malrotation, and certain sonographic features can also be used to evaluate volvulus.

Similar to our first case haemorrhages and coagulation necrosis in mesenteric lymph nodes have been detected; Mahy and Davies¹⁴, although they have recorded focal necrosis and hemorrhagic foci in mesenteric lymph nodes, they also impressed lymphocytes' depletion in nodes and hypervascularity in their capsules.

Researches are concerned with embryologic developmental process of mesenteric volvulus. Human ontogenesis of the colon could provide a pathophysiologic explanation for the volvulus of the superior mesenteric territory.^{12,15,16} Congenital variations of intestinal fixation have been implicated and malrotation of the intestinal tract was well defined as a product of aberrant embryology.^{12,15} During foetal development, the intestine results from unequal growth of the different segments which undergo pressure from the different intra-abdominal contents. The fixations of the different parts of the intestine are independent from each other¹⁵. Because the consequences of malrotation associated with a mid-gut volvulus may be catastrophic, an understanding of the anatomy, diagnostic criteria, and appropriate therapy for this putative emergency illness is imperative.¹² Particularly in the intestinal obstruction cases immediate surgical exploration should be done for

early recognition of mesenteric volvulus.^{4-6,12} The symptoms seen in adults are quite different from young children, who can display only lethargy, poor feeding or can appear happy and playful; therefore, the emergency physician must maintain a high index of suspicion for serious pathology in paediatric patients with abdominal complaints.⁸ We suggest that, from medico legal aspect due to the lack of mesenteric volvulus cases, there is an enormously increasing interest in physician diagnosis malpractice. Hence, different, detailed, thoroughly comprehensive research is needed. A delayed diagnosis and surgical treatment result in high rate bowel infarction which can lead to perforation and stercoral peritonitis.¹ A Ladd procedure was the preferred treatment, which as defined by us includes evisceration and inspection of the mesenteric root, counter clockwise derotation of a volvulus, inversion-ligation appendectomy, and placement of the caecum into the left lower quadrant.^{6,12} Kreisler-Marino *et al* reported series of enteropexies that were successful in the management of this disorder.⁴

CONCLUSION

Significant abdominal emergencies reveal their true nature, and if one can be patient with the child and repeat the examinations when the child is quiet, one will be rewarded with the correct diagnosis.

➤ This study was performed with permission from Council of Forensic Medicine of Turkey Scientific-Ethic Committee, First case was presented in Istanbul, 2004, second case in EAFS, Helsinki, 2006.

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