Case Report

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Acute gastric volvulus and congenital diaphragmatic hernia, case report and review

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ABSTRACT

Congenital diaphragmatic hernia (CDH) is the result of the incomplete fusion and closure of the pleuroperitoneal canal during the fetal development. CDH is usually diagnosed prenatally but, if undiagnosed, the clinical presentation ranges from asymptomatic children to serious respiratory or gastrointestinal symptoms. Acute gastric volvulus associated with CDH is a rare surgical emergency in children. We report two cases of acute gastric volvulus associated with CDH and review the literature.

Key words: Acute gastric volvulus, children, congenital diaphragmatic hernia, gastropexy

INTRODUCTION

Congenital diaphragmatic hernia (CDH) is the result of the incomplete fusion and closure of the pleuroperitoneal canal during the fetal development. CDH is usually diagnosed prenatally but, if undiagnosed, the clinical presentation ranges from asymptomatic children to serious respiratory or gastrointestinal symptoms.

Acute gastric volvulus associated with CDH is a rare surgical emergency in children. Delay in the diagnosis and treatment may result in serious morbidity. This report discusses two cases of acute gastric volvulus associated with CDH, one of them presented as well an hypertrophic pyloric stenosis.

CASE REPORTS

Case report 1

A 56 days of life male child presented with 24 h history of nonbilious nonfeeding related vomiting. A left diaphragmatic eventration was diagnosed prenatally with a magnetic resonance (MR) imaging scan. After birth, he remained asymptomatic and abdominal, and thoracic ultrasonography and plain X-ray were performed in neonatal period, and both were consistent with diaphragmatic eventration.

Upon clinical examination, he was deteriorated with nontender and nondistended abdomen. Initial capillary blood gasometry demonstrated pH 7.63, PCO_2 of 31 mm Hg, HCO_3 of 33 Na of 129, K of 3.5, Cl of 84 and lactate of 8.7. Due to abundant abdominal gas, the abdominal ultrasonography was not useful for diagnostic purpose. Plain abdominal X-ray and upper gastrointestinal contrast study showed an acute organoaxial gastric volvulus [Figure 1].

The patient was transferred to the operating room, and an emergency laparotomy was performed. Intraoperatively a mesenteroaxial gastric volvulus, an hypertrophic pyloric stenosis and a left diaphragmatic hernia with a peritoneal sac were discovered during the surgery.

Surgical treatment consisted of derotation and stomach reduction, reduction of small bowel, excision of the peritoneal sac, and closure of the diaphragmatic defect with direct suture and finally, Ramstedt pyloromyotomy and anterior gastropexy were performed successfully.

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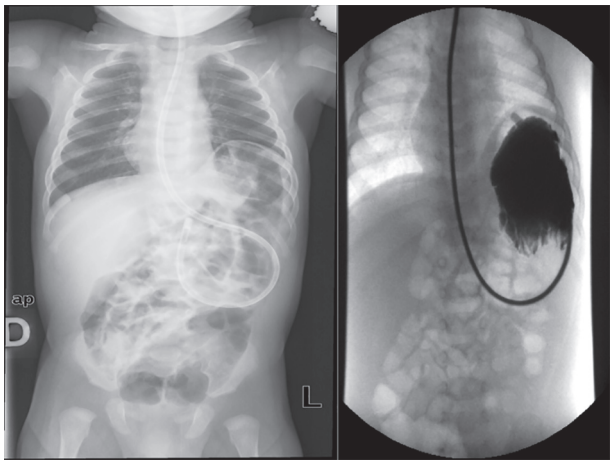

Figure 1: Plain abdominal X-ray and upper gastrointestinal contrast study showed an acute organoaxial gastric volvulus

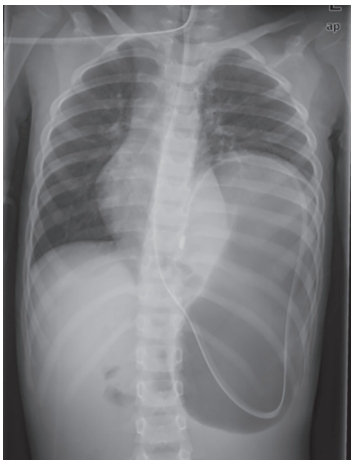

Figure 2: Plain abdominal X-ray showed a severe distension of an intrathoracic stomach

Oral feeding began 24 h postoperatively without further complication.

Case report 2

A 4-year-old female presented with a 24 h abdominal pain and nonbilious vomiting. Upon questioning parents revealed a chronic postprandial abdominal pain history. On clinical examination, she presented a painful and distended abdomen. Plain abdominal X-ray showed a severe distension of an intrathoracic stomach [Figure 2]. The patient underwent emergency laparotomy which demonstrated the presence of a mesenteroaxial gastric volvulus and a left diaphragmatic hernia with a peritoneal sac. Treatment consisted of derotation and reduction of the stomach, excision the peritoneal sac, direct suture closure of the diaphragmatic defect and anterior gastropexy. The patient was discharged on postoperative day 5 without complication.

DISCUSSION

Congenital diaphragmatic hernia is an incomplete fusion of the pleuroperitoneal canal. This lack of fusion creates a pathway through which the intraabdominal structures may herniate. This entity may be unnoticed during routine pregnancy controls. Most patients present with respiratory symptoms upon birth. In those cases in which newborns are asymptomatic, mortality rates decrease. In these patients, clinical manifestations tend to be variable.[1]

The association of a diaphragmatic defect increases the risk of a gastric volvulus[2] due to different reasons. The stomach is fixed by four ligaments (gastrocolic, gastrohepatic, gastrophrenic and gastrosplenic ligaments) and anomalies in these ligaments may increase the chance for the presence of a gastric volvulus.[3] In patients with diaphragmatic defect (CDH, diaphragmatic eventration, hiatal hernia) the gastric fixation can be elongated or absent,[4] as this ligaments are normally inserted in the diaphragm,[2] thus making this is a predisposing factor for an abnormal stomach rotation.[5]

In addition, an increased space under the diaphragmatic defect also increases the risk of gastric volvulus.[6,7]

In our first case, all the above-mentioned factors, plus the increased intragastric pressure caused by the hypertrophic pyloric stenosis[8,9] contributed to abnormal rotation of the stomach. As far as we know, this is the second case to be published in which there is an association between CDH, acute mesenteroaxial gastric volvulus, and hypertrophic pyloric stenosis and at the same time, one of the youngest patients with gastric volvulus associated with congenital diaphragmatic hernia reported in the literature.

The typical presentation of a gastric volvulus in the adult patient is the Borchardt triad (unproductive retching, inability to pass a nasogastric tube and epigastric distention) but this triad is an unusual clinical presentation in children. In children, on the contrary, the clinical presentation consists generally on unspecific symptoms.[3,10] Abdominal distension is usually shown in gastric volvulus[3,11,12] but when the gastric volvulus is associated with CDH, it may not be present because of the intrathoracic situation of the stomach, which makes the diagnosis more complicated.[2] Some studies conclude that in older children, late manifestations of CDH tend to be with gastrointestinal symptoms while early symptoms, thus in younger children, tend to be respiratory.[1,13] But in

our experience gastrointestinal manifestations can also be frequent after the few 1st day of life.

A plain abdominal x-ray and an upper contrast study are useful for diagnosis. Some studies suggest that either computed tomography or MR are required for the correct diagnoses[4] but in our experience if the diagnosis is clear with plain X-ray contrast studies, surgical treatment should not be delayed with further complementary imaging tests.

It has been argued that mesenteroaxial volvulus has an increased risk of ischemia compared with organoaxial volvulus because in mesenteroaxial volvulus the gastroesophageal junction and the pylorus are very close, and the vascularisation depends on a single tight pedicle.[11,14] This specific anatomical condition makes the difference between the initial approach of mesenteroaxial and organoaxial gastric volvulus. The organoaxial volvulus allows a nonemergent surgical treatment if the symptoms resolve with nasogastric decompression and digestive rest, as gastric perfusion is not compromised. On the other hand, the mesenteroaxial gastric volvulus requires, in our opinion, an emergency surgical treatment as there is an increased risk of ischemia and, therefore, gastric perforation.

The surgical treatment includes detorsion of the volvulus, reduction of herniated structures, reparation of diaphragmatic defect and fixation of the stomach. In our opinion and as published in other series,[2,7,8,10] gastrostomy is not enough to avoid future complications such as revolvulation of the stomach, and it is mandatory to fix the stomach to the anterior abdominal wall. Other findings during surgery require the appropriate treatment, as in our first case, with the performance of a pyloromyotomy upon discovery of an hypertrophic pyloric stenosis.

CONCLUSION

Gastric volvulus associated with HDC is a rare entity with a difficult diagnosis. Mesenteroaxial gastric volvulus is a surgical emergency. Gastropexy is essential to avoid future complications.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Kitano Y, Lally KP, Lally PA, Congenital Diaphragmatic Hernia Study Group. Late-presenting congenital diaphragmatic hernia. J Pediatr Surg 2005;40:1839-43.
2. Ayala JA, Naik-Mathuria B, Olutoye OO. Delayed presentation of congenital diaphragmatic hernia manifesting as combined-type acute gastric volvulus: A case report and review of the literature. J Pediatr Surg 2008;43:E35-9.
3. Cribbs RK, Gow KW, Wulkan ML. Gastric volvulus in infants and children. Pediatrics 2008;122:e752-62.
4. Karabulut R, Türkyilmaz Z, Sönmez K, Karakus SC, Basaklar AC. Delayed presentation of congenital diaphragmatic hernia with intrathoracic gastric volvulus. World J Pediatr 2009;5:226-8.
5. Mayo A, Erez I, Lazar L, Rathaus V, Konen O, Freud E. Volvulus of the stomach in childhood: The spectrum of the disease. Pediatr Emerg Care 2001;17:344-8.
6. Ito TE, Hasnie R, Crosby DL, Milbrandt JC, Ettema S, Duong M. Gastric volvulus complication in an infant with undiagnosed congenital diaphragmatic hernia presenting with acute respiratory distress. Pediatr Emerg Care 2012;28:1078-80.
7. McIntyre RC Jr, Bensard DD, Karrer FM, Hall RJ, Lilly JR. The pediatric diaphragm in acute gastric volvulus. J Am Coll Surg 1994;178:234-8.
8. Kotobi H, Auber F, Otta E, Meyer N, Audry G, Hélardot PG. Acute mesenteroaxial gastric volvulus and congenital diaphragmatic hernia. Pediatr Surg Int 2005;21:674-6.
9. Anagnostara A, Koumanidou C, Vakaki M, Manoli E, Kakavakis K. Chronic gastric volvulus and hypertrophic pyloric stenosis in an infant. J Clin Ultrasound 2003;31:383-6.
10. Gerstle JT, Chiu P, Emil S. Gastric volvulus in children: Lessons learned from delayed diagnoses. Semin Pediatr Surg 2009;18:98-103.
11. Tillman BW, Merritt NH, Emmerton-Coughlin H, Mehrotra S, Zwiep T, Lim R. Acute gastric volvulus in a six-year-old: A case report and review of the literature. J Emerg Med 2014;46:191-6.
12. Nayak HK, Maurya G, Kapoor N, Kar P. Delayed presentation of congenital diaphragmatic hernia presenting with intrathoracic gastric volvulus: A case report and review. BMJ Case Rep 2012;2012.
13. Chao PH, Chuang JH, Lee SY, Huang HC. Late-presenting congenital diaphragmatic hernia in childhood. Acta Paediatr 2011;100:425-8.
14. Oh SK, Han BK, Levin TL, Murphy R, Blitman NM, Ramos C. Gastric volvulus in children: The twists and turns of an unusual entity. Pediatr Radiol 2008;38:297-304.