Eur. Radiol. 9, 1675–1677 (1999)

European
Radiology

Case report

Perforation of multiple gastric duplication cysts: diagnosis by sonography

C. Koumanidou[1], **H. Montemarano**[2], **M. Vakaki**[1], **G. Pitsoulakis**[1], **D. Savvidou**[1], **K. Kakavakis**[1]

[1] Department of Radiology, Children's Hospital "Agia Sofia", Athens, Greece
[2] Department of Radiology, Children's National Medical Center, Washington DC, USA

Received: 5 August 1998; Revision received: 1 December 1998; Accepted: 5 March 1999

Abstract. A case of perforation of multiple gastric duplication cysts is presented. The rarity of this case is based on its multiplicity, its small size, its perforation into peritoneal cavity, as well as on the detection of tiny foci of ectopic pancreatic tissue at the site of perforation. The sonographic appearance and the clinical manifestations are discussed.

Key words: Duplication cyst – Sonography – Child

Introduction

Gastric duplication cyst represents only 4–5 % of all duplication cysts of the alimentary system [1, 2]. It may be attached firmly at the gastric wall or may develop at some distance [3].

Gastric duplication cyst may coexist with an oesophageal, duodenal or small bowel duplication cyst [4, 5, 6]. It may be associated with other congenital anomalies such as aberrant pancreas [7] or aberrant pancreatic duct [7, 8].

Case report

An 11-month-old female infant presented with a 2-day history of vomiting, abdominal pain and fever. On physical examination, an epigastric firm mass approximately 7 cm in diameter, was palpated. Tenderness, most marked in epigastrium, was present. Laboratory data revealed white cells $12 \times 10^3/\mu L$, haemoglobin 13.8 g/dL and normal serum amylase.

A sonogram was performed and revealed a heterogeneous ill-defined mass located superiorly to the pancreas and inferiorly to the left hepatic lobe and extending beneath the splenic hilum (Fig. 1). Two independent cystic lesions, measuring 2 and 3 cm in diameter, were visualized within the mass (Fig. 2). The cyst walls consisted of an inner echogenic rim and an outer hypoechoic. Central echoes were present. A small amount of free intraperitoneal fluid was detected in the Morrison' s pouch. A probable haemorrhagic perforation of duplication cysts was considered as the most likely diagnosis.

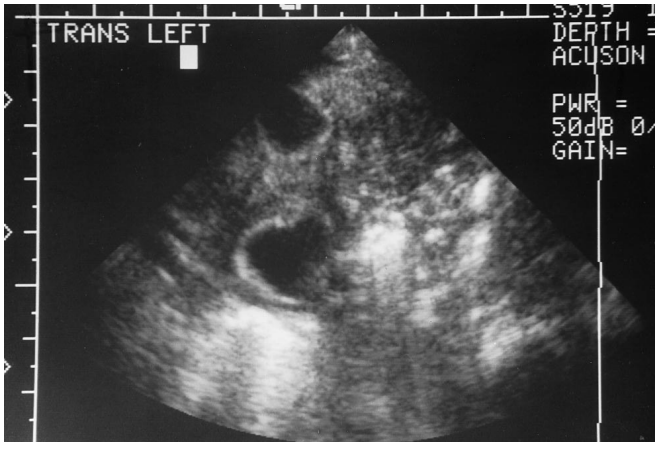

Fig. 1. Abdominal ultrasound. A heterogenic, ill-defined mass was revealed between the left hepatic lobe, the pancreas and the splenic hilum. Within the mass two small round cystic masses were noted

At surgery, the epigastric mass was completely resected with the cysts which were contiguous with the gastric serosal and muscular wall. One of the cysts was firmly attached to the antrum and the other was loosely attached to the pylorus and the medial aspect of the second part of the duodenum. In addition, mild oedema of the left pericolic gutter with some leakage of the cysts' content was found.

On gross examination, the solid mass consisted mainly of fibrotic tissue and gelatinous material. Upon open-

Correspondence to: C. Koumanidou

Present address: C. Koumanidou, Aiados 41, Pal Phaliro, GR-17563 Athens, Greece

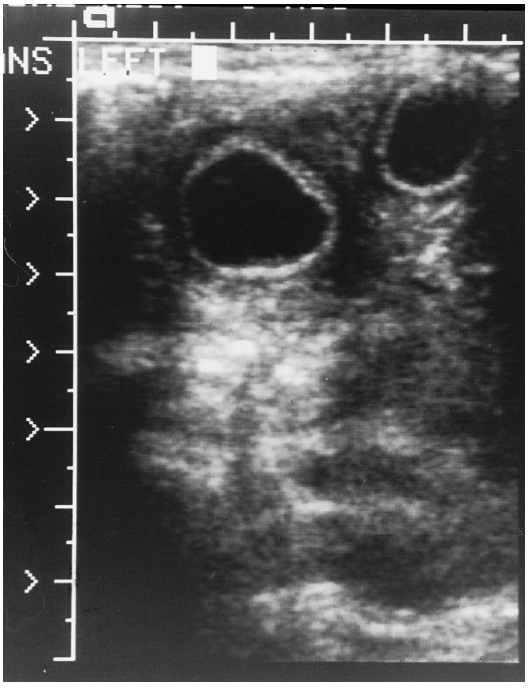

Fig. 2. Abdominal ultrasound. Two cystic round masses, 2 and 3 cm in diameter, were demonstrated. Their wall consisted of an inner echogenic layer (mucosa) and an outer (muscle layer)

ing the cysts, shaggy gelatinous material was found. The inner lining of the cysts contained areas resembling gastric folds and gastric mucosa. The cyst wall measured 2–4 mm in thickness.

Microscopic examination demonstrated the presence of tiny foci of pancreatic tissue at the site of leakage.

The postoperative course was uneventful and the patient was discharged on the sixth postoperative day.

Discussion

Gastric duplication cyst is frequently solitary, large and is located along the greater curvature, usually in the antrum [2]. Less commonly, it also arises from the posterior wall, the lesser curvature or the anterior wall of the stomach. When it is small or arises from the lesser curvature, it is difficult to identify [9].

A common blood supply by the gastroepiploic vessels and a common muscular coat with the corresponding segment of the stomach are frequent findings [10, 11]. Usually, the cyst is lined by gastric mucosa, but intestinal epithelium may also exist. The presence of ectopic pancreatic tissue within the duplication cyst especially along a fistula or ulceration, as in our case, has been established [1].

Multiple alimentary duplication cysts have been described infrequently [6, 11, 12]; some involved in the small bowel or were gastro-oesophageal [4] or non-contiguous oesophagointestinal [5] in origin. To our knowledge, multiple duplication cysts originating only from the stomach have been described once in the literature over the past 17 years [11]. Our case is one of multiple gastric duplication cysts originating from the antrum and the pylorus.

Gastric duplication cyst is usually manifested in early infancy. Occasionally, it is discovered on routine physical examination (if its size is large enough) or by an imaging method that was required for an unrelated reason. Pyloric duplication cyst may mimic symptoms of pyloric stenosis [13]. In our case there was no evidence of early projectile vomiting to suggest pyloric stenosis. Although an uneventful course is usual, complications, such as local ulceration and perforation or fistula formation, may cause symptoms suggestive of a malignant or inflammatory process that needs further investigation.

Differential diagnosis of a gastric duplication cyst includes other cysts arising from the adjacent organs, such as an omentum cyst, a pancreatic pseudocyst or a choledochal cyst.

The perforation of a gastric duplication cyst is either secondary to the development of a gastric ulcer or due to the pressure of accumulation of continued secretions of hydrochloric acid and enzymes produced by the inner lining gastric mucosa and probably by pancreatic tissue. A gastric duplication cyst may perforate into the lung parenchyma and/or the bronchial system causing respiratory symptoms, such as haemoptysis, tachypnoea and cough [1], or gives rise to a fistula with the pancreas or aberrant pancreas resulting in recurrent pancreatitis [11, 14]. Perforation of a solitary gastric duplication cyst into the peritoneal cavity has been described twice, but perforation of multiple gastric duplication cysts has never been reported [2, 15].

Our case is one of multiple gastric duplication cysts that had an occult perforation into the peritoneal cavity. Their sonographic appearance was characteristic due to the visualization of the double cystic wall consisting of one inner echogenic ring (representing the mucosa) and a second outer hypoechoic ring (representing the muscle layer). The visualization of this double cystic wall has already been reported as diagnostic but not pathognomonic of the alimentary duplication cysts [9, 16] as it has been described in ovarian cysts [5] complicated by haemorrhage or torsion [17, 18]. In addition, the mucosal layer can be destroyed due to gastric enzymes resulting in the disappearance of the echogenic layer. In such cases the appearance of duplication cysts does not differ from that of other cystic lesions. The presence of internal echoes, the heterogeneity of the surrounding mass and the presence of a small amount of free peritoneal fluid in Morrison' s pouch, in conjunction with the double cystic wall, were suggestive of perforated duplication cysts of the alimentary system. Due to the fact that CT can misdiagnose duplication cysts in the case of inflammatory, haemorrhagic or inspissated content (considering it as a solid mass) [9], and additionally involves ionizing radiation and sedation for infants, this was not done. The method of choice is scintigraphy by Tc-99 m pertechnetate which is taken up by the heterotopic gastric mucosa. The aforementioned method was not performed because it was not available. The sonographic diagnosis was confirmed at surgery highlighting once more the accuracy of sonography in the diagnosis of alimentary duplication cysts.

References

1. Faerber EN, Balsara R, Vinocur et al. (1993) Gastric duplication with hemoptysis: CT findings. AJR 161: 1245–1246
2. Sieunarine K, Manmohansingh E (1998) Gastric duplication cyst presenting as an acute abdomen in a child. J Pediatr Surg 24: 1152–1154
3. Dutheil-Doco A, Ducou Le Pointe H, Laroquet M et al. (1998) A case of perforated cystic duplication of the transverse colon. Pediatr Radiol 28: 20–22
4. Dresler CM, Paterson GA, Taylor BR, Moote DJ (1990) Complete foregut duplication. Ann Thorac Surg 50: 306–308
5. Olsen L, Annerum G, Henze A et al. (1992) Multiple intestinal duplication in a child with thoracic myelomeningocele and hydrocephalus. Eur J Pediatr Surg 2: 45–48
6. Egellhoff JC, Bisset GS III, Strife JL (1986) Multiple enteric duplications in an infant. Pediatr Radiol 16: 160–161
7. Ueda D, Taketazu M, Itoh S et al. (1991) A case of gastric duplication cyst with aberrant pancreas. Pediatr Radiol 21: 379–380
8. Hoffman M, Sugerman HJ, Heuman D et al. (1987) Gastric duplication cyst communicating with aberrant pancreatic duct: a rare cause of recurrent acute pancreatitis. Surgery 101: 369–372
9. Gupta AK, Berry M, Mitra DK (1994) Gastric duplication cyst in a child: report of two cases. Pediatr Radiol 24: 346–347
10. Knight J, Garvin PJ, Lewis E (1983) Gastric duplication presenting as a double esophagus. J Pediatr Surg 18: 300–301
11. De La Torre Mondragon L, Daza DC, Bustamante AP et al.(1997) Gastric triplication and peritoneal melanosis. J Pediatr Surg 32: 1773–1775
12. Milsom J, Unger S, Alford B et al. (1985) Triplication of the esophagus with gastric duplication. Surgery 98: 121–125
13. Bommen M, Singh MP (1984) Pyloric duplication in a preterm neonate. J Pediatr Surg 19: 158–159
14. Moss RL, Ryan JA, Katarck RA, Hatch EI (1996) Pancreatitis caused by a gastric duplication communicating with an aberrant pancreatic lobe. J Pediatr Surg 31: 733–736
15. Kleinhaus S, Boley SJ, Winslow P (1981) Occult bleeding from a perforated gastric duplication in an infant. Arch Surg 116: 122
16. Moccia WA, Astasio JE, Kaude JV (1981) Ultrasonographic demonstration of gastric duplication in infancy. Pediatr Radiol 11: 52–54
17. Schmahmann S, Haller JO (1997) Neonatal ovarian cysts: pathogenesis, diagnosis and management. Pediatr Radiol 27: 101–105
18. Godfrey H, Abernethy L, Boothroyd A (1998) Torsion of an ovarian cyst mimicking enteric duplication cyst on transabdominal ultrasound: two cases. Pediatr Radiol 28: 171–173