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Gastric teratoma

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ABSTRACT

Gastric teratoma is a very rare tumour that usually manifests as an abdominal mass, resulting in gastrointestinal bleeding and/or obstructive features. We report gastric teratoma occurring in a two-year-old boy who presented with an abdominal mass. Diagnosis was aided by the classical findings of teratoma on computed tomography, seen as the presence of fat, calcifications, and both solid and cystic areas.

Keywords: abdominal mass, computed tomography, gastric teratoma, stomach, teratoma

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INTRODUCTION

Teratomas are embryonic neoplasms which arise from totipotent cells and contain elements from all of the three germ layers, i.e. ectoderm, endoderm and mesoderm. Gastric teratoma is a rare tumour, accounting for less than 1% of all teratomas in infants and children.[1] To date, less than 100 cases have been reported in literature.[2-7] This report describes a two-year-old boy who presented with an abdominal mass.

CASE REPORT

A two-year-old boy presented with a palpable abdominal mass. He was a product of a normal delivery and had good physical growth. There was no past history of haematemesis and melaena. He was apparently in a good general condition. Routine laboratory investigations were within normal limits. Ultrasonography (US) revealed a large, mixed-echoic solid and cystic mass in the epigastrium. The organ of origin was not clear. Computed tomography (CT) showed a large, exogastric, well-defined heterogeneous mass with intratumoural nodular calcifications, a focal area of fat density, and both solid and cystic masses in the region of the gastrohepatic area (Fig. 1). The diagnosis of teratoma originating either from the gastrohepatic ligament or lesser curvature of stomach was made. Age-related serum alpha-foetoprotein (AFP) levels were normal. Upper gastrointestinal endoscopy revealed intact mucosa of the stomach. The tumour was totally excised, requiring a partial gastrectomy, and the defect in the stomach was repaired.

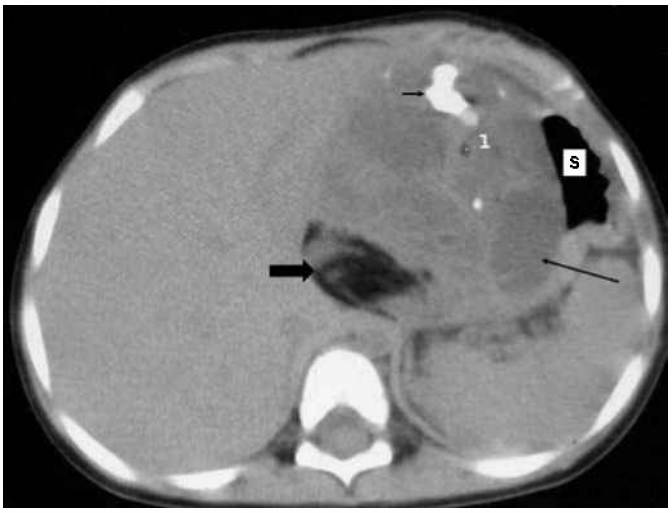

Fig. 1 Axial CT image shows a large well-defined mass containing fat (thick arrow), calcification (small arrow) and cystic areas (long arrow) in between the stomach (S) and liver i.e. gastrohepatic area, displacing the stomach laterally.

DISCUSSION

Gastric teratoma is very rare, with less than 100 cases having been reported in the literature.[2-7] Other benign gastric tumours in children include hyperplastic and adenomatous polyps, leiomyoma and lipoma. The first case of gastric teratoma was reported in 1922 by Eustermann and Sentry.[8] This tumour usually occurs in children less than one year of age, especially neonates. However, there have been reports of this tumour in older children.[8] Most of the reported cases are males but it can occur in females with a lesser frequency.[9] Gastric teratoma may present as an abdominal mass, gastrointestinal bleeding and/or obstructive manifestations.

In infancy and early childhood, the most frequent location of teratomas is extragonadal, whereas after childhood, they are more commonly located in the gonads. Although sacrococcygeal teratomas are diagnosed antenatally or in early childhood, most are diagnosed neonatally, usually on the first day of life. Cystic teratomas of the ovary can occur at any age, although they are far more common during the reproductive years. Testicular teratomas may occur at any age but are more common in infants and children. In adults, pure testicular teratomas are rare. Mediastinal teratomas can be found in any age group but occur most commonly in adults aged 20–40 years.

Teratomas are associated with potential complications that vary, depending upon their location.

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Sacrococcygeal teratomas, with complications in utero, include polyhydramnios and tumour haemorrhage, which can lead to anaemia and nonimmune hydrops foetalis.[10] Complications of ovarian teratomas include torsion in 3%–16%, rupture in 1%–4%, infection in 1%, and malignant degeneration in 1%–2%.[11] Testicular teratomas in children behave as a benign tumour, whereas in adults and adolescents, they invariably are malignant neoplasms.[12] Gastric teratomas are associated with increased risk of haemorrhage. Central nervous system teratomas are difficult to diagnose and are more aggressive. Teratoma is exclusively benign. However, 1%–2% of ovarian teratomas[13] and 2%–3% of testicular teratomas[14] undergo malignant transformation, mainly into squamous cell carcinomas (75%).[13] Malignant transformation of teratomas has also been reported in the mediastinum, stomach, brain, and sacrococcygeal region.[15]

Diagnosis of gastric teratoma might be feasible by detecting the presence of calcification on abdominal radiographs and more accurately on abdominal CT.[5,16] CT helps in deciding the extent of the growth, and the findings include a well-defined mass with separate cystic and solid components in varying proportions, discrete areas with densities similar to that of fat, and coarse globular calcifications within solid components. Coincidence of gastric teratoma with the Wiedemann-Beckwith syndrome and peritoneal gliomatosis have also been described.[17] Most mature cystic teratomas can be diagnosed at US. Three appearances have been described.[19] The most common appearance is a cystic lesion with a densely echogenic tubercle (Rokitansky nodule) projecting into the cyst lumen. The second appearance is a diffusely or partially echogenic mass with the echogenic area usually demonstrating sound attenuation owing to sebaceous material and hair within the cyst cavity. The third appearance consists of multiple thin, echogenic bands caused by hair in the cyst cavity. Pure sebum within the cyst may be hypoechoic or anechoic. Fluid-fluid levels result from sebum floating above aqueous fluid, which appears more echogenic than the sebum layer.[18]

In a prospective US study, it has been found to have a sensitivity of 58% and a specificity of 99% in the diagnosis of mature cystic teratoma. Numerous pitfalls have been described in the US diagnosis of mature cystic teratoma.[19] Blood clot within a haemorrhagic cyst can appear echogenic, although a mature cystic teratoma usually demonstrates sound attenuation rather than increased through-transmission. Haemorrhagic cysts or blood clots typically demonstrate increased through-transmission. Echogenic bowel can frequently be mistaken for diffusely-echogenic mature cystic teratoma, and vice versa. The diagnosis of mature cystic teratoma on CT and magnetic resonance imaging is fairly straightforward because these modalities are more sensitive for fat.[18] On CT, fat attenuation within a cyst, with or without calcification in the wall, is diagnostic for mature cystic teratoma. A floating mass of hair can sometimes be identified at the fat-aqueous fluid interface. On magnetic resonance imaging, the sebaceous component of dermoid cysts has very high signal intensity on T1-weighted images, similar to retroperitoneal fat. The signal intensity of the sebaceous component on T2-weighted images is variable, usually approximating that of fat.[18]

Gastric teratomas are usually benign in nature, although malignancy has been reported in two cases.[7,20] This tumour arises most commonly from the posterior wall of the stomach and is exogastric in 58%–70% of cases, while it is endogastric in 30% of cases.[21] Although gastric teratomas can arise from any part of the stomach, the common sites where it is encountered are the lesser curvature of stomach, antrum and fundus of stomach. Some of these tumours are pedunculated and are attached by a pedicle to the stomach.[21]

AFP synthesis occurs in the foetal liver, yolk sac and gastrointestinal tract. Preoperatively, an abnormally-elevated level can be obtained because of the presence of intestine in these teratomas or due to the presence of germ cell tumour in immature teratomas. Therefore, a serum AFP level is very useful as it provides information regarding recurrence or presence of residual tumour and malignant transformation. Treatment of this tumour is surgical removal. Total excision and primary closure of the gastric wall is the treatment of choice. Partial, subtotal and total gastrectomies have been performed as dictated by the extent of stomach involvement.[22] The prognosis following surgical excision of a gastric teratoma has been shown to be excellent.

REFERENCES

1. Cairo MS, Grosfeld JL, Weetman RM. Gastric teratoma: unusual cause for bleeding of the upper gastrointestinal tract in the newborn. Pediatrics 1981; 67:721-4.
2. Munoz NA, Takehara H, Komi N, Hizawa K. Immature gastric teratoma in an infant. Acta Paediatr Jpn 1992; 34:483-8.
3. Joo M, Kang YK, Lee HK, et al. Intrapulmonary and gastric teratoma: report of two cases. J Korean Med Sci 1999; 14:330-4.
4. Shirodkar NP, Chopra PS, Marker M, et al. Conjoined gastric and mediastinal benign cystic teratomas. Case report of a rare occurrence and review of literature. Clin Imaging 1997; 21:340-5.
5. Dunlap JP, James CA, Maxson RT, Bell JM, Wagner CW. Gastric teratoma with intramural extension. Pediatr Radiol 1995; 25:383-4.
6. Matsukuma S, Wada R, Daibou M, et al. Adenocarcinoma arising from gastric immature teratoma. Report of a case in an adult and a review of the literature. Cancer 1995; 75:2663-8.
7. Bourke CJ, Mackay AJ, Payton D. Malignant gastric teratoma: case report. Pediatr Surg Int 1997; 12:192-3.

8. Eustermann GB, Sentry EG. Benign tumours of the stomach: report of 27 cases. Surg Gynecol Obstet 1922; 34:372-8.
9. Senocak ME, Kale G, Buyukpamukcu N, Hicsonmez A, Caglar M. Gastric teratoma in children including the third reported female case. J Pediatr Surg 1990; 25:681-4.
10. Bond SJ, Harrison MR, Schmidt KG, et al. Death due to high-output cardiac failure in fetal sacrococcygeal teratoma. J Pediatr Surg 1990; 25:1287-91.
11. Comerci JT Jr, Licciardi F, Bergh PA, Gregori C, Breen JL. Mature cystic teratoma: a clinicopathologic evaluation of 517 cases and review of the literature. Obstet Gynecol 1994; 84:22-8.
12. Ross JH, Rybicki L, Kay R. Clinical behavior and a contemporary management algorithm for prepubertal testis tumors: a summary of the Prepubertal Testis Tumor Registry. J Urol 2002; 168:1675-8; discussion 1678-9.
13. Scully RE, Young RH, Clement PB. Germ cell tumors. Atlas of Tumor Pathology: Tumors of the Ovary, Maldeveloped Gonads, Fallopian Tube, and Broad Ligament. Volume 23, series 3. Washington, DC: Armed Forces Institute of Pathology, 1998: 239-306.
14. Motzer RJ, Amsterdam A, Prieto V, et al. Teratoma with malignant transformation: diverse malignant histologies arising in men with germ cell tumors. J Urol 1998; 159:133-8.
15. Wang LJ, Chu SH, Ng KF, Wong YC. Adenocarcinomas arising from primary retroperitoneal mature teratomas: CT and MR imaging. Eur Radiol 2002; 12:1546-9.
16. Bowen B, Ros PR, McCarthy MJ, Olmsted WW, Hjermstad BM. Gastrointestinal teratomas: CT and US appearance with pathologic correlation. Radiology 1987; 162:431-3.
17. Falik-Borenstein TC, Korenberg JR, Davos I, et al. Congenital gastric teratoma in Wiedemann-Beckwith syndrome. Am J Med Genet 1991; 38:52-7.
18. Outwater EK, Siegelman ES, Hunt JL. Ovarian teratomas: tumor types and imaging characteristics. Radiographics 2001; 21:475-90.
19. Hertzberg BS, Kliewer MA. Sonography of benign cystic teratoma of the ovary: pitfalls in diagnosis. AJR Am J Roentgenol 1996; 167:1127-33.
20. Balik E, Tuncyurek M, Sayan A, et al. Malignant gastric teratoma in an infant. Z Kinderchir 1990; 45:383-5.
21. Ratan SK, Kulshreshtha R. Immature gastric teratoma in an infant. Indian Pediatr 1999; 36:847-9.
22. Matias IC, Huang YC. Gastric teratoma in infancy: a report of a case and review of world literature. Ann Surg 1973; 178:631-6.