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SHORT COMMUNICATION

Prenatal sonographic diagnosis of congenital hiatal hernia

Rodrigo Ruano[1]*, Alexandra Benachi[1], Marie-Cecile Aubry[1], Jean-Pierre Bernard[2], Fréderic Hameury[3], Claire Nihoul-Fekete[3] and Yves Dumez[1]

[1]*Maternité, Hôpital Necker-Enfants Malades, AP-HP Université de Paris V, Paris, France*
[2]*Maternité, Hôpital Saint-Germain-Poissy, AP-HP, Université de Versailles-Saint-Quentin, Poissy, France*
[3]*Chirurgie pediatrique, Hôpital Necker-Enfants Malades, AP-HP Université de Paris V, Paris, France*

Objectives To report a rare case of congenital hiatal hernia illustrating the importance of its prenatal diagnosis as well as to discuss the prenatal sonographic criteria.

Case Report A case of congenital hiatal hernia was diagnosed by ultrasound at 33 weeks of gestation. After a normal second-trimester morphologic ultrasound examination, a hypoechogenic mass was detected in the posterior mediastinum juxtaposed to the vertebral body and seemed to be in continuity with the intra-abdominal stomach bubble. Congenital hiatal hernia was suspected mainly because of the dynamic position of the stomach during the examination, without mediastinal shift, and normal appearance of the diaphragm on parasagittal sections of the thorax. Postnatal management was planned with no urgency and surgery was successfully performed, confirming the diagnosis.

Conclusion This rare case illustrates the importance of prenatal diagnosis of congenital hiatal hernia for prenatal counseling and postnatal management. The ultrasound criterion for prenatal diagnosis is the presence of a herniated stomach in the posterior mediastinum, sometimes having a dynamic position during examination, with no mediastinal shift associated with normal diaphragm appearance on parasagittal sections of the thorax.

KEY WORDS: prenatal diagnosis; ultrasound; congenital hiatal hernia; congenital diaphragmatic hernia

INTRODUCTION

Herniation of the stomach through a lax esophageal hiatus is a well-recognized situation in childhood (Skinner, 1983). However, congenital hiatal hernia (CHH) has been reported three times *in utero* (Bahado-Singh *et al*., 1992; Chacko *et al*., 1998; Ogunyemi, 2001); it should be differentiated mainly from congenital diaphragmatic hernia (CDH). Prenatal detection of this type of herniation is also important in order to plan surgical correction before the onset of neonatal complications. We report a case of CHH that was diagnosed at 33 weeks of gestation. The ultrasound findings are described in order to improve prenatal diagnosis.

CASE REPORT

A 31-year-old gravida 2, para 1 woman was referred to our fetal unit for evaluation of a probable small diaphragmatic hernia at 33 weeks of gestation. The patient had undergone two previous normal ultrasound examinations, at 12 and 23 weeks of gestation. More specifically, the stomach bubble was normally seen in the abdominal cavity during these two examinations.

Ultrasound examination at referral showed an hypoechogenic image behind the fetal heart in the posterior mediastinum, anterior to the vertebral body (Figure 1a). This cyst was in continuity with a small fetal stomach that was identified in the abdominal cavity just below the diaphragm in a median position (Figures 1b and 1c). Parasagittal sonographic sections of the fetal thorax showed an intact diaphragm on both sides (Figures 2a and 2b). No mediastinal shift, pleural or pericardial effusion, polyhydramnios or other structural malformations were observed. Moreover, during the examination, stomach peristalsis was visualized, and it was possible to observe the up and down movements of the stomach into the fetal thorax. On the basis of these sonographic findings, the first hypothetic diagnosis was a hiatal herniation of the stomach, with a congenital diaphragmatic hernia (defect of the foramen of Bochdalek) being the second diagnostic possibility. In view of the second hypothesis, amniocentesis for karyotyping was declined, revealing a 46,XY.

At 38 weeks of gestation, the patient was admitted for spontaneous rupture of the membranes and went into labor the following day. A male newborn, weighing

*Correspondence to: Rodrigo Ruano, Maternité, Hôpital Necker-Enfants Malades, 149 rue de Sèvres, 75743 Cedex 15, France. E-mail: rodrigoruano@hotmail.com

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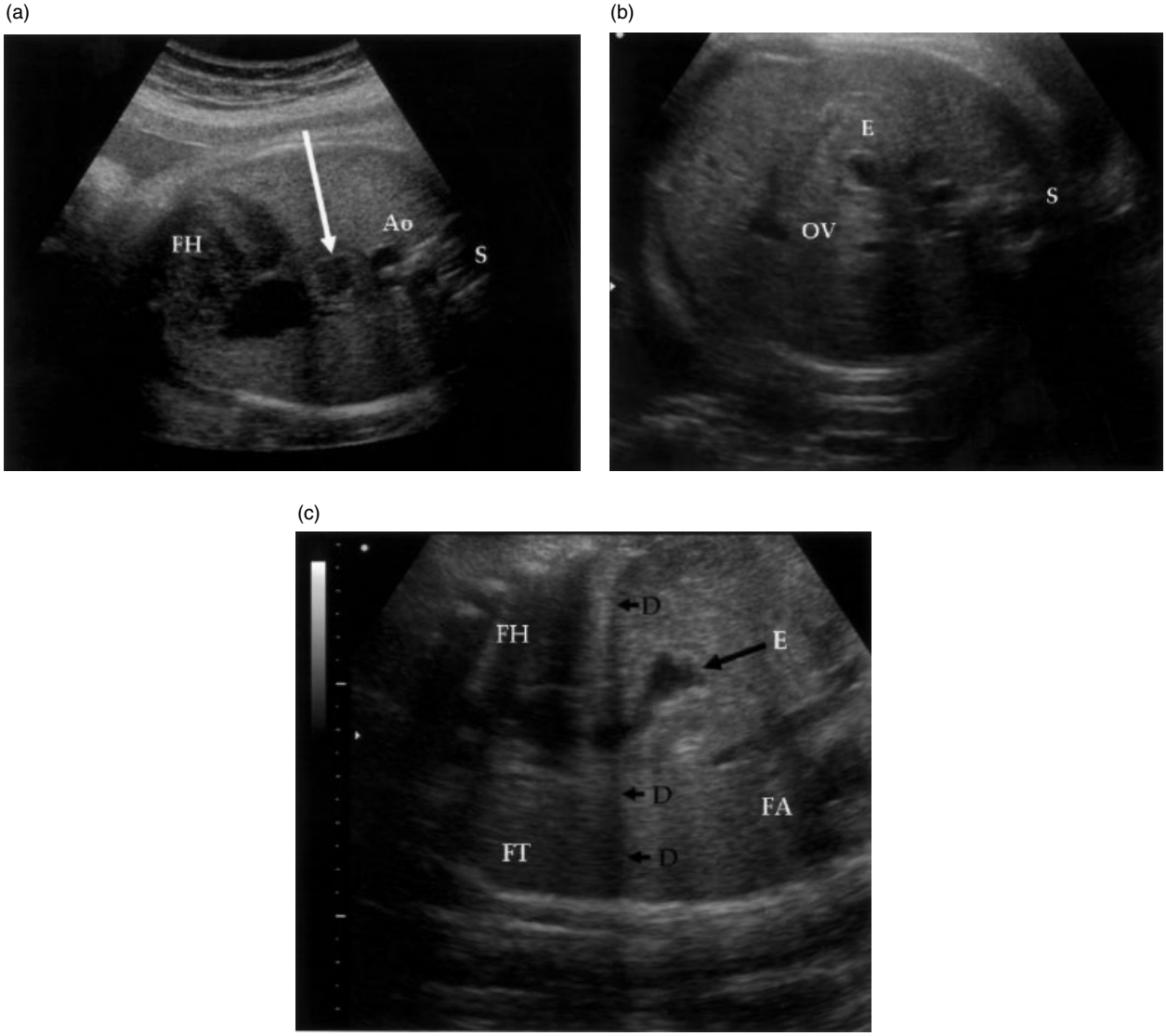


Figure 1—(a) Transverse view of the fetal thorax showing an hypoechogenic mass (arrow) behind the fetal heart (FH), just anterior to the vertebral body (S). Ao: Aorta. (b) Transverse ultrasound view of the fetal abdomen showing a small stomach (E), which was just below the diaphragm. S: fetal spine; OV: umbilical vein. (c) Frontal ultrasound plane of the fetal body demonstrating that the thoracic cyst was in continuity with the small stomach (E). FH: fetal heart; FT: fetal thorax; FA: Fetal abdomen

3030 g was delivered vaginally with Apgar scores of 10 and 10 at 1st and 5th min respectively. No respiratory distress was observed. Postdelivery chest radiography revealed normal pulmonary status and diaphragmatic image, with no heart deviation (Figure 3). The upper gastrointestinal tract series using barium by nasogastric tube revealed that the stomach was above the diaphragm, being herniated through the posterior mediastinun (Figures 4a and 4b). The newborn did not present esophageal reflux. Because of poor weight gain, a surgical procedure was planned on the 40th day of life. Laparotomy under general anesthesia was performed, confirming that the stomach had migrated through the esophageal hiatus. The stomach was returned to the abdomen and a hernia sac excised. Approximation of the left and right crura of the diaphragm was accomplished and was followed by fundoplication and gastroplexy.

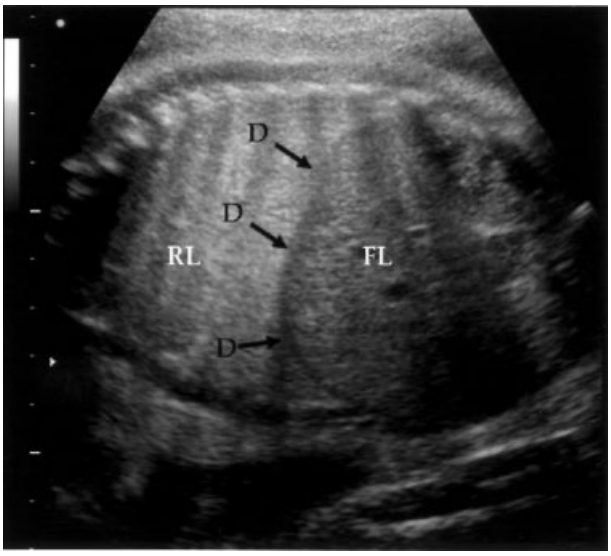
DISCUSSION

Prenatal sonographic examination was able to identify correctly the herniation of the stomach into the fetal thoracic cavity through the esophageal hiatus.

A hiatal hernia is characterized by the herniation of the abdominal organs, most commonly the stomach, through a physiological but lax esophageal hiatus into the thoracic cavity (Bahado-Singh *et al*., 1992). It should be differentiated from diaphragmatic hernia, herniation or eventration of the diaphragm with gastric volvulus, esophageal duplication or para-esophageal gastric herniation. It should also take into account the abnormalities of bowel rotation when a small median intra-abdominal stomach just anterior to the vertebra is seen.

The following prenatal sonographic criteria for prenatal diagnosis of CHH was first proposed by Bahado-Singh *et al*. (1992): (1) location of the herniated organ

(a)



(b)

Figure 2—(a) Right parasagittal sonographic section of the fetal body demonstrating a normal diaphragmatic image (D). RL: right lung; FL: fetal liver. (b) Left parasagittal sonographic section of the fetal body showing a normal diaphragmatic image (D). LL: left lung; FH: fetal liver

just anterior to the vertebral body, (2) the absence of mediastinal shift or polyhydramnios, pleural or pericardial effusion, or any other structural anomalies, (3) the presence of an intraabdominal stomach. The first sonographic sign was common in the other two reports (Chacko *et al.*, 1998; Ogunyemi, 2001) and in ours. The absence of mediastinal shift or pleural or pericardial effusion was also observed in all cases. However, polyhydramnios was seen in one case, probably because of a stomach obstruction and subsequent esophageal reflux (Ogunyemi, 2001). An intra-abdominal stomach was absent in one case (Chacko *et al.*, 1998; Ogunyemi, 2001) and intermittently absent in another (Ogunyemi, 2001). Indeed, owing to the absence of an

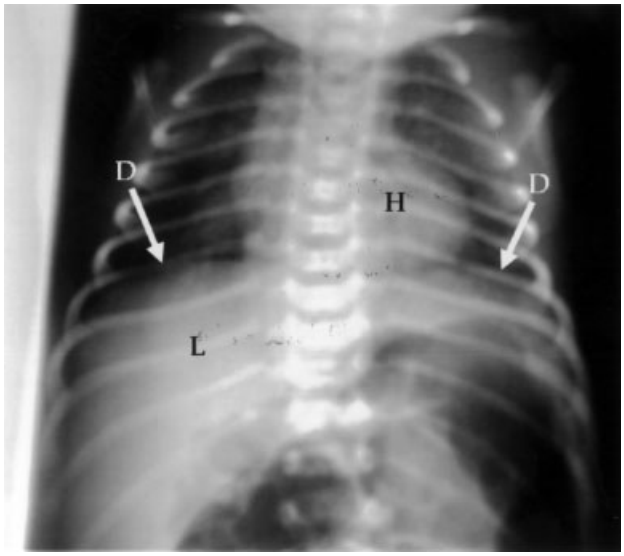


Figure 3—Postdelivery chest radiography revealing normal pulmonary status and diaphragmatic image (D), with no heart (H) deviation. L: liver

intra-abdominal stomach associated with polyhydramnios, the major differential diagnosis in the case reported by Ogunyemi (2001) was esophageal atresia.

The criteria described previously can therefore be reemphasized and refined as follows: (1) a hypoechogenic image in the posterior mediastinum, just behind the heart and anterior to the vertebral body. This sonographic finding was seen in all four cases and corresponds to herniated stomach (Table 1); (2) absence of mediastinal shift or pleural or pericardial effusion, which was also common in all cases; (3) abnormal location of the stomach, which can be identified in the abdominal cavity but in a median position, or is not visible in the abdomen because of its complete herniation through the fetal thorax; and (4) the dynamic aspect of the herniated stomach, which means its up–down movements through the enlarged hiatal into the thoracic cavity. This is probably the most helpful aspect of the diagnosis. In two cases, there was no intra-abdominal stomach, but in the other two fetuses, including the present case, the stomach was intermittently herniated into the thoracic cavity. In our case, the intra-abdominal stomach was small and in a median position and was mobile during the examination. We also suggest that parasagittal sections of the fetal thorax showing normal diaphragmatic images on both sides were important to differentiate the CHH from those cases of CDH. Normal sonographic aspects of the fetal lung should also be considered, with Doppler ultrasound examination showing normal pulmonary blood supply and no deviation of the hepatic veins.

CHH is usually identified in the third trimester of pregnancy. One fetus had been followed by serial ultrasound examination for a suspicion of esophageal atresia since 21 weeks of gestation, but CHH was only considered as a differential diagnosis after 36 weeks (Ogunyemi, 2001).

In all the four cases, prenatal diagnosis was helpful for counseling the couples that this situation does not have

Table 1—Sonographic aspects in the prenatal diagnosis of congenital hiatal hernia (CHH)

Case	Author	GA at diagnosis	Location of herniated hernia	Mediastinal shift	Hydramnios	Pleural or pericardial effusion	Other structural anomalies	Aneuploidy	Intra abdominal stomach	Differential diagnosis	Outcome	Herniated organ at surgery
1	Bahado-Singh *et al.*, 1992	33	Posterior mediastinum	No	No	No	No	No	Yes	CDH	Surgery and alive	Stomach
2	Chacko *et al.*, 1998	29	Posterior mediastinum	No	No	No	No	No	No	CDH	Surgery and alive	Stomach
3	Ogunyemi, 2001	28	Posterior mediastinum	No	Yes	No	No	No	Intermittent	Esophageal atresia	Surgery and alive	Stomach
4	The present case	33	Posterior mediastinum	No	No	No	No	No	Yes	CDH	Surgery and alive	Stomach

CDH, Congenital diaphragmatic hernia.

Figure 4—(a) The antero-posterior image of the upper gastrointestinal tract series using barium demonstrating that the stomach (E) was above the diaphragm. H: heart; L: liver. (b) The lateral image of the upper gastrointestinal tract series using barium demonstrating that the stomach (E) was above the diaphragm (D), being herniated through the posterior mediastinum. S: spine

significant postnatal morbidity and mortality compared to its main differential diagnoses. The most common neonatal complications of CHH are gastroesophageal reflux, vomiting and aspiration pneumonia, which can be avoided at the time of delivery if a prenatal diagnosis was made (Skinner, 1983; Ogunyemi, 2001). CHH is also not known to be associated with aneuploidies or other structural malformations (Skinner, 1983).

In conclusion, CHH is rarely prenatally diagnosed, but it should be considered in fetuses presenting herniation of the stomach into the posterior mediastinum with the described sonographic signs.

REFERENCES

Bahado-Singh RO, Romero R, Vecchio M, Hobbins JC. 1992. Prenatal diagnosis of congenital hiatal hernia. *J Ultrasound Med* **11**(6): 297–300.

Chacko J, Ford WD, Furness ME. 1998. Antenatal detection of hiatus hernia. *Pediatr Surg Int* **13**(2–3): 163–164.

Ogunyemi D. 2001. Serial sonographic findings in a fetus with congenital hiatal hernia. *Ultrasound Obstet Gynecol* **17**(4): 350–353.

Skinner DB. 1983. Hiatal hernia and gastroesophageal reflux. In *Textbook of Surgery* (13th edn), Sabiston DC Jr (ed.). W.B. Saunders: Philadelphia; 821–840.