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Cystic adenomatoid malformation of the lung associated with trysomy 18

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Abstract

Cystic adenomatoid malformation of the lung (CAML) is a rare lesion with a common incidence of 1/25000 livebirths to 1/33000 livebirths. We present a case of a 22 weeks pregnancy with CAML type III, a hybrid lesion and no other abnormality associated with trisomy 18. In CAML hybrid lesion the feeding blood supply was derived from the systemic circulation mainly aorta, in contrast with the clasical CAML lesion in which the blood supply is derived from pulmonary vessel. Also, CAML lesion do not have a known genetic defect responsible for its appearence, but an early developmental deficiency of an unknown cause. The association between CAML lesion and chromosomal abnormality is very rare and in reports were it was detected a slightly increase minor risc, there were present also some extrapulmonary abnormalities.
Keywords: *cystic adenomatoid malformation, pulmonary sequestration, trysomy 18*

Introduction

In cases of unilateral pulmonary hyperechoic lesions we have three options that can be considered on prenatal ultrasound diagnosis: cystic adenomatoid malformation of the lung (CAML type III) solid, pulmonary sequestration (PS), and congenital diaphragmatic hernia (CDH). The solid type of CAML type III is a hyperechoic lung mass, homogenously, ussualy uniform in appearence[(1)]. The volume of the lesion can be small, so no shift in mediastinum is present, or if the volume of the lesion is large enough the mediastinum is shifted toward the contralateral lung. The PS is also a mass hyperechogenic, homogenously, but with a vessel originating from the aorta and going towards the sequestration. The CDH on right side appear also a hyperechogenic mass generate by the right hepatic lobe arising in the right hemitorax and with displacement of the heart and mediastinum contralateral[(2)].

Congenital cystic adenomatoid malformation (CCAM) is a lesion of the fetal lung consisting of increased cell proliferation in the bronchial structures with lack of differentiation of the alveoli. Pregnancies may be at an increased risk for perinatal loss with type III CAML. When hydrops develop in cases of CAML type III the fetus has a worst prognosis[(3)].

Case Report

Our patient D.A.M, 29 years old gravida 2 para 2 (previous pregancy delivered at 39 weeks), she was refered on 13.08.2015 to our unit at 22 weeks for morphology ultrasound because of a suspected hyperechogenic mass in the right hemythorax and for minimal vaginal bleeding. Her last menstrual period was on 13.03.2015, with irregular menstrual cycle, one previous pregnancy by cesarean section in 2012 for fetal macrosomia (the neonate weight was 4300 g), menarch at 13 years old, and no other medical hystory. She was working since 2013 in a factory using special substances for dilutions of paint used for cars. She was smoker (ten cigaretes per day), drinking occasionally with a weight gain in these pregnancy of 5 Kg. She denied using illicit drugs, she use antispatic medication during pregnancy recomended by general doctor. With the present pregnancy she make the general investigation starting with 10 weeks of pregnancy, the antenatal screening for hepatitis B, venereal disease research laboratory tests, Treponema pallidum hemagluttination, TORCH, human deficiency virus virus, were all negative. First trimester fetal assesment risk for fetal aneuploidy was on low risk. There were no personal or family hystory of an inherited hystory and either no abnormal aneuploidy test.

A detailed fetal ultrasound and fetal echocardiogram at 22 weeks was made on Voluson Expert General Electric ultrasound device using 5 MHz probe. The exam noted fetal biometric measurements appropiate for 22 weeks gestation, with a hyperechogenic homogenously mass with longest height of 3.91 cm and greatest width 2.81cm, with volume of 37.2 cm^3, unilateral located in the right hemithorax, with a contralateral shift of the mediastinum and heart, an extreme levorotation of the heart with an increased cardiac axis (Figure 1). The fetal hydrops was present only with ascites, but no hydrotorax (Figure 2). Because of the presence of ascites it was also determined the CAM volume ratio (CVR ratio) which was more than 1.8.

The main differential diagnosis was between CAML type III with PS. The right sided CDH was excluded because the weak echogenity of the liver is different from the bright appearence of CAML and PS in this case. Also, another differential diagnose was with the rare case of isolated pulmonary agenesis. This diagnose was excluded because it was seen on ultrasound the bifurcation of the main pulmonary artery. The Doppler colour investigation reve-

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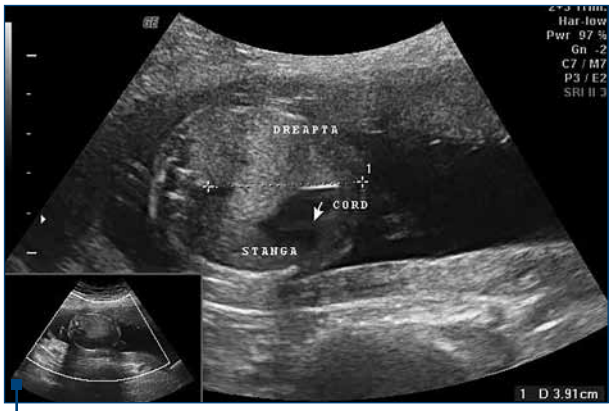

Figure 1. **CAML lesion on right hemytorax**

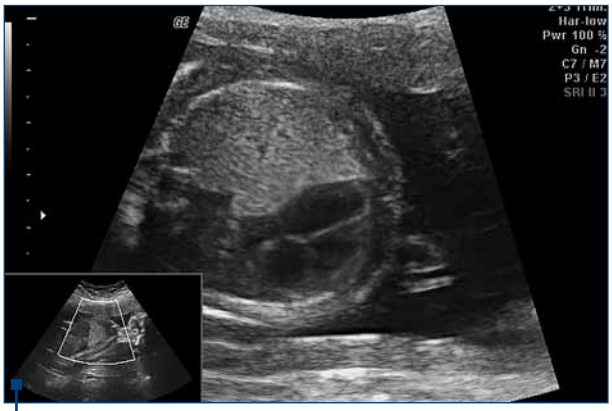

Figure 2. **CAM lesion with absent hydrotorax**

aled that the feeding artery of the hyperechogenic mass is branching from the descending aorta (Figure 3), so the diagnosis of hybrid CAML or pulmonary sequestration was made with a possible bad prognosis because of the CVR was 1.9 and for the presence of ascites. Fetal heart rate was 158 beat/min and a posterior placenta very close to the internal cervical ostium was present with no signs of placenta haematoma.

A prospective diagnosis of CAML type 3 was made and a multidisciplinary counseling with fetal medecine consultant, neonatologist consultant, take place. No other fetal anomalies were present, so a fetal karyotyping was not necessary, but the patient want to be sure of the karyotype, therefore in the same day, an amniocenthesis was performed. The result of karyotype was trisomy 18.

Because of the presence of a minimal vaginal bleeding, the patient was admitted in our unit. The repeated ultrasound made at 24 hours following admission and after amniocenthesis revealed the absence of fetal cardiac activity.

It was performed an cesarean section because the patient after counseling and informed consent refused the risk of uterine rupture and a possible peripartum hysterectomy.

Tha anatomopathologic macroscopic exam revealed pulmonary malformation with three lobes on left lung and

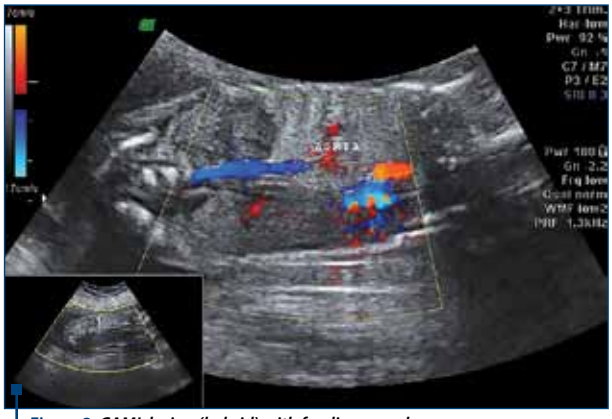

Figure 3. **CAML lesion (hybrid) with feeding vessel**

the histopathologic eaxam of the lungs revealed "pulmonary parenchyma with cystic appearence of bronhioles, variability in dimensions, canalicular structures with adenomatoid aspect deliniated by an cuboidal epithelium, intererstitial thick septum which separate canalicular strctures, malformation of pulmonary parenchyma compatible with CAML type 3", "the feeding artery arise from aorta".

Discussion

CAML is a rare lesion with a common incidence between 1/25.000 to 1/35.000 live births[1,2]. It is produced by a deficient in maturation of the structures of bronhiolar system initiated in the 5th week of gestation[3]. Other opinions suggest the fact that it may appear secondary of the airway obstruction[4].

Prenatal diagnosis of CAML type III which appear as a hyperechogenic mass on the left lung could be challenging because we must take into consideration other similar sonographic appearence with mediastinal shift: congenital diaphragmatic hernia, isolated pulmonary agenesis, pulmonary sequestration. The diagnosis of isolated pulmonary agenesis can be excluded because Doppler investigation revealed the presence of bifurcation of pulmonary artery and the pulmonary veins. The diagnosis of right sided hernia was excluded also because the weak echogenicity of the liver is rather different from the bright appearence of the CAML type III. The pulmonary sequestration or hybrid CAML type III can be take into consideration as prenatal diagnosis, because the feeding artery seen on colour Doppler was from descending aorta. The systemic feeding vessel in hybrid CAML lesions comes directly from descending aorta[5]. Interestingly is the fact that the karyotype was trisomy 18, but without the presence of any other malformation. Ussualy the risk of chromosomal anomalies is extremely low in CAML lesions. The studies of Adzick and contributors identified among the 134 prenatally diagnosed of CAML only one fetus with trisomy 21 with an incidence of 0.7%[6,7]. So amniocentesis could be an option only if fetal treatment is anticipated. Fetal echocardiography should be made in all cases of CAML because of an increased incidence of cardiac anomalies,

but in our case no cardiac anomaly was found although the echocardiography was very difficult because of a mediastinal shift.

The lesion is a large CAML type III with an important shift in mediastinum which can generate compression of ventricles. The compression of ventricles create an elevation of the central filling pressures which can cause the reversal in inferior vena cava flow. This can explain the appearence of ascites as a marker of the development of potential hydrops. The presence of CAM ratio of more than 1.8 could be associated with a bad prognosis. The stillbirth that occured can be produced by the altering of the ventricular function[8].

Also the anatomo-pathological report confirmed the presence of a CAML type III with the feeding vessel from systemic blood supply. Although, the hystopathology confirmed a CAML hybrid lesion we must point out the fact that in some studies there is only in half of cases a correlation between hystopathology and diagnosis of CAML type III, and a very good correlation between PS prenatal diagnosis and hystopathology[9]. This issue can sustain the possibility that the two entities, CAML and PS, can be part of the same disease.

In such cases of CAML type III we have three therapeutic options for fetus. The first one could be percutaneous ultrasound fetal sclerotherapy[10], with the resolution of the fetal mass and of hydrops. The second option is the open fetal surgery which remains the best treatment option for type III CAML especially if it associated with hydrops. In cases that refuse such fetal intervention a course of steroids either dexamethasone or betamethasone could be effective in stoppimg the growth of CAML lesion[11,12]. There are cases in which the size of the lesion remain important with hydrops and mediastinal shift, in such cases delivery by exit-to- resection may be indicated, with a toracostomy for resection of the CAML lesion on placental support. In our case we don't have the opportunity to give steroids because the stillbirth occur.

It is important to discuss the evolution in cases of CAML type III. The worst outcome ussually is seen in fetuses with hydrops associated with CAML type III lesion[7]. The hydrops can be the result of the loss of protein from CCAM into amniotic fluid with the reduction of colloid osmotic pressure. In rare situations there are cases in which fetuses with CAML type III and hydrops survived and appear the resolution of hydrops[11]. The explanation of the resolution of hydrops could be the fact that the lesion have a growth plateau untill 26 weeks and later the fetus grows around the CAML lesion allowing hydrops to resolve[13]. There are also some several reports which describe the dissapearence of the lesion[14]. The regresion of the lesion and hydrops is not well understood, one mecahanism involved could be decompresion of the fluid in tracheobronchial tree.

The lesion of CAML type III do not have a known genetic defect responsible and it is not known to be specifically associated with chromosomal anomalies, in the study reported by Adzick[7], only one case in 134 cases had trisomy 21, but not known untill now the association of trisomy 18 with CAML. In literature there are cases described as concomitence of CAML lesion and PS, suggesting that this can have a common embryological origin. These situation was demonstrated when the prenatal diagnosis was initially CAML but after surgery the diagnosis was the presence of concomitant CAML and PS[15,16].

Conclusions

We present a case of a 29 years old patient working working since 2013 in a factory using special substances for dilutions of paint diagnosed at 22 weeks of gestation with a CAML type III hybrid lesion with ascites and associated with trisomy 18. It is an unusual association of trisomy 18 and CAML type III as the singular malformation, most commonly trisomy 18 is associated with the following anomalies: agenesis corpus callosum, posterior fossa anomalies, migrognathia, cardiac anomalies, exomphalos, renal cystic dysplasia, cystic hygroma, skeletal anomalies. Also ascites can represent the initial marker of developing hydrops. The intrauterine death that occured can be secondary to dysfunction of the heart generated by the mediastinal shift and hydrops. ■

References

1. Laberge JM, Flageole H, Pugash D, Khalife S, Blair G, Filiatrault D, Russo P, Lees G, Wilson RD. Outcome of the prenattaly diagnosed congenital cystic adenomatoid lung malformation –a Canadian experience. Fetal Diag Ther 2001, 16, 178-86.
2. Hsieh CC, Chao AS, Chang YL, Kuo DM, Hsieh TT, Hung HT. Outcome of congenital cystic adenomatoid malformation of the lung after antenatal diagnosis. Int J Gynec Obstetr 2005, 89, 99-102.
3. Shamji FM, Sachs HJ, Perkins DG. Cystic disease of the lungs. Surg Clin North Amer 1988, 68, 581-620.
4. Langston C. New concepts in the pathology of congenital lung malformation. Semin Pediatr Surg 2003, 12, 17-37.
5. Cass DL, Crombleholme TM, Howell LJ, Stafford PW, Ruchelli ED, Adzick NS. Cystic lung lesions with systemic arterial blood supply –a hybrid of congenital cystic adenomatoid malformation and bronchopulmonary sequestration. Journ Pediatr Surg 1997, 32, 986-90.
6. Adzick NS, Harrison MR, Crombleholme TM, Flake AW, Howell LJ. Fetal lung lesions management and outcome. Americ J Obstetr Gynec 1998, 179, 884.
7. Adzick NS, Harrison MR, Flake AW, Howell LJ, Golbus MS, Filly RA. Fetal surgery for cystic adenomatoid malformation of the lung. Journ Pediatr Surg 1993, 179, 884.
8. Mahle WT, Rychik J, Tian ZY, Cohen MS, Howell LJ, Crombleholme TM, Flake AW, Adzick NS. Echocardiographic evaluation of the fetus with congenital cystic adenomatoid malformation. Ultras Obstetrics Gynec 2000, 16, 620-4.
9. Illanes S, Hunter A, Evans M, Cusick E, Soothill P. Prenatal diagnosis of echogenic lung: evolution and outcome. Ultras Obstetr Gynec 2005, 26, 145-9.
10. Bermúdez C, Pérez-Wulff J, Arcadipane M, Bufalino G, Gómez L, Flores L, Sosa C, Bornick PW, Kontopoulos E, Quintero RA. Percutaneous fetal sclerotherapy for congenital cystic adenomatoid malformation of the lung-Fetal Diagn Therapy 2008, 24, 237-40.
11. Tsao K, Hawgood S, Vu L, Hirose S, Sydorak R, Albanese CT, Farmer DL, Harrison MR, Lee H. Resolution of hydrops fetalis in congenital cystic adenomatoid malformation after prenatal steroid therapy. Journ Pediatr Surg 2003, 38, 508-10.
12. Diamond IR1, Wales PW, Smith SD, Fecteau A. A survival after CCAM associated with ascites –a report of a case and review of a literature. J Pediatr Surg 2003, 38(9), E1-3.
13. Crombleholme TM, Coleman B, Hedrick H, Liechty K, Howell L, Flake AW, Johnson M, Adzick NS.Cystic adenomatoid mnalformation volume ratio predicts outcome in prenattaly diagnosed cystic adenomatoid malformation of the lung. J Pediatr Surg 2002, 37(3), pg 331-8.
14. MacGillivray TE, Harrison MR, Goldstein RB, Adzick NS. Dissapearing fetal lung lesions. Journ Pediatr Surg 1993, 26(10), 1321-4.
15. Cavoretto P, Molina F, Poggi S, Davenport M, Nicolaides KH. Prenatal diagnosis and outcome of echogenic fetal lung lesions. Ultras Obstetr Gynec 2008, 32(6), 769-83.
16. Samuel M, Burge DM. Management of antenatally diagnosed pulmonary sequestration associated with cystic adenomatoid malformation.Thorax 1999, 54, 701-6.