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A case report of fetal malignant immature mediastinal teratoma

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Summary

Purpose: Fetal immature mediastinal teratoma is a rare disease. The pressure generated by the tumor mass can cause hydrops fetalis, pulmonary hypoplasia, pleural and peritoneal effusion, and polyhydramnios which cause the death of the fetus. Routine prenatal ultrasound has enabled accurate diagnosis. *Materials and Methods:* The authors report a 26-year-old patient, gravida 4 para 1, who was referred to this hospital, carrying a fetus with immature mediastinal teratoma. *Results:* At 27 weeks of gestation, a routine prenatal ultrasound suggested the fetus had a mass at the anterior mediastinum, accompanied by pulmonary hypoplasia, pleural and peritoneal effusion, subcutaneous edema of head and chest, and polyhydramnios. After the therapeutic abortion, the gross anatomy confirmed the mediastinal mass. The histological examination showed that the mass was a grade 2 immature teratoma. *Conclusions:* The mother of the fetus had been exposed to plaster, paint, and paint-thinner in the first trimester of pregnancy, suggesting that these chemical contacts may be one of the causes of the disorder.

Key words: Immature mediastinal teratoma; Fetus; Prenatal ultrasound; Mediastinal mass.

Introduction

Fetal mediastinal teratomas are tumors growing at the mediastinum of the fetus [1]. The compression of the tumor mass to the fetal lung, heart, and superior vena cava will cause hydrops fetalis, pulmonary hypoplasia, pleural and peritoneal effusion, and polyhydramnios [1]. Therefore, fetal mediastinal teratomas have a poor prognosis [2]. Mediastinal teratomas can be either mature or immature [3]. The fetal immature mediastinal teratoma is a extremely rare prenatal neoplasm and few cases have been reported until now [1-2, 4]. Here, the authors report a case of fetal immature mediastinal teratoma confirmed with ultrasonography and histopathology.

Materials and Methods

This study was approved by He Xian Memorial Hospital of prenatal diagnosis medical Ethics Committee, No. 201224.

A 26-year old patient, gravida 4 para 1, had a history of tuberculosis and had been cured. In the first three months of her pregnancy, she had been exposed to plasters, paint, and paint-thinner. The fetus' father was a painter and had a long-term exposure to paint. The fetus had been diagnosed with hydrops fetalis, pleural and peritoneal effusion, and polyhydramnios by ultrasound at 27 weeks gestation in another hospital. The fetus' mother was referred to the present hospital on February 13, 2014. On the same day, a routine prenatal ultrasound was performed and revealed a heterogeneous, lobulated mass at the upper anterior mediastinum in the fetal chest above the heart (Figure 1A). The size of mass was 40×36×40mm. It had a clear border and a heterogeneous internal echo pattern. The anechoic area varied in size and displayed an irregular, nodular, and patchy pattern (Figure 1B). Some echoic nodules were accompanied with acoustic shadow at their rear parts and surrounded by punctiform blood flow signals detected by color Doppler flow imaging (CDFI) (Figure 1C). Ultrasonography suggested that the fetus had an anterior mediastinal teratoma, which caused pulmonary hypoplasia, pleural and peritoneal effusion, subcutaneous edema of head and chest, and polyhydramnios.

Considering the results of laboratory tests and imaging analysis, the patient decided to terminate the pregnancy. After signing the informed consent on February 15, 2014, she was hospitalized for therapeutic abortion. On February 22, after fetal reduction, the patient was administered with mifepristone and methyl carprost suppository to promote the abortion and delivered a stillborn baby with an incomplete placental membrane. After the surgery, oxytocin and corresponding treatment were given to strengthen uterine contractions and prevent infections. The patient was discharged from the hospital after uterine curettage.

The autopsy of the stillborn showed that the baby was a boy, weighing 1.53 kg, with a height of 41 cm. The head and chest circumferences were 27 and 26 cm, respectively. The gross appearance did not show abnormality. Gross anatomy showed that there was a large amount of pleural effusion. The pulmonary lobes appeared normal, but the volume was small. Behind the thymus and in front of the trachea, there was a visible mass that was 55×43 mm in size, with visible capsule and surrounding arteries and veins (Figures 2A, B). The boundary between the mass capsule and the superior vena cava was not clear. The heart was pushed downward by the mass. After breaking the capsule, pale yellow, serous fluid was found inside the capsule. Histological examination showed that the examined sample contained differentiated, mature glandular structure, striated muscle, cartilage, part of the choroid coat, and cerebrum and cerebellum tissue (Figures 3A−C). Neural tube and immature, darkly-stained nerve cells were also observed. There were also cysts in

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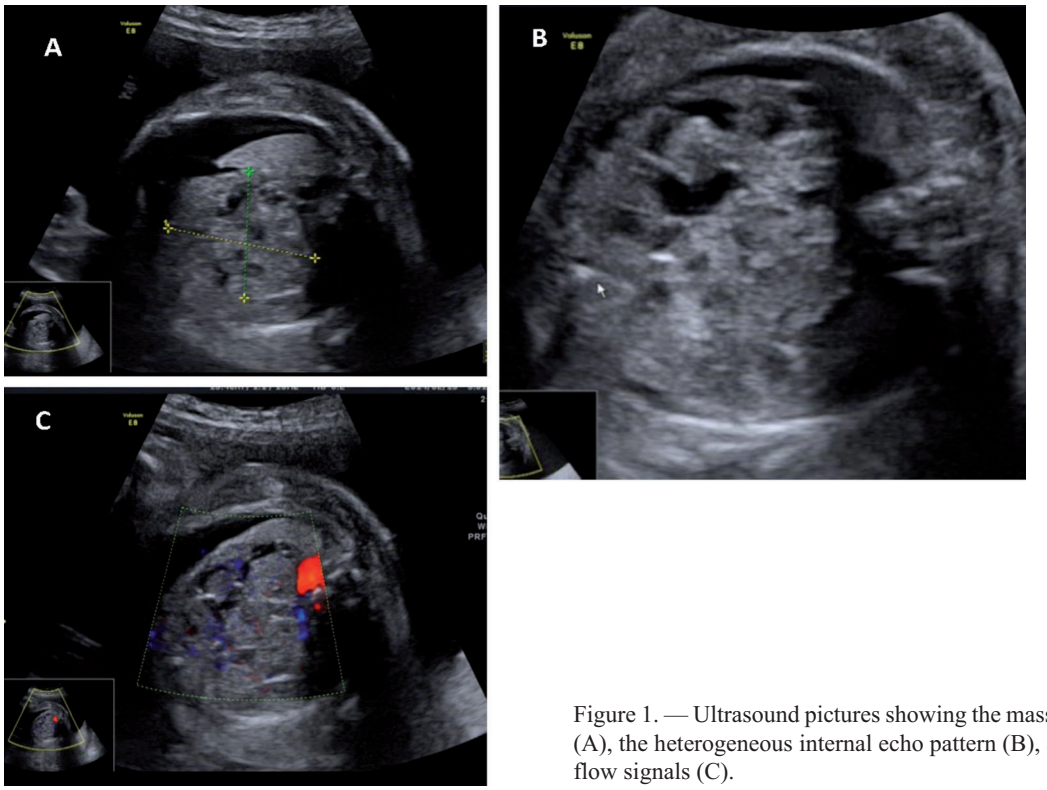

Figure 1. — Ultrasound pictures showing the mass of the fetal mediastinum (A), the heterogeneous internal echo pattern (B), and the punctiform blood flow signals (C).

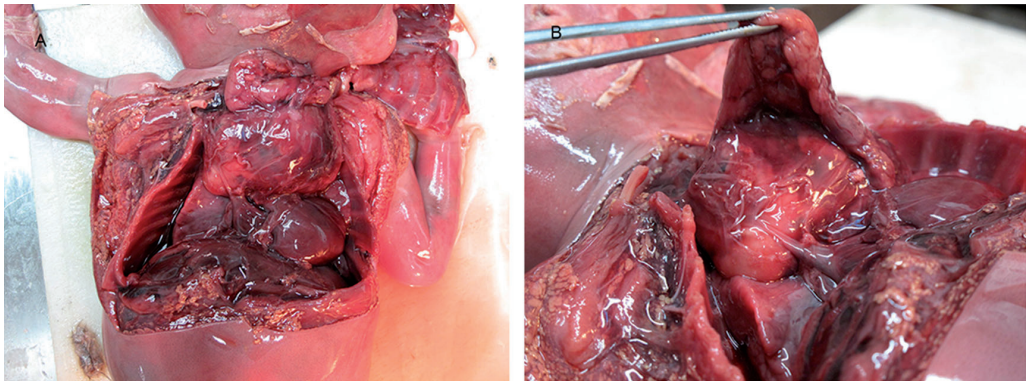

Figure 2. — Gross anatomy showing the mass behind the thymus (A, B) which compress the heart and the superior vena cava (A). An unknown vein and the right subclavian vein are compressed and shunted. Their boundary with the mass is not clear (A).

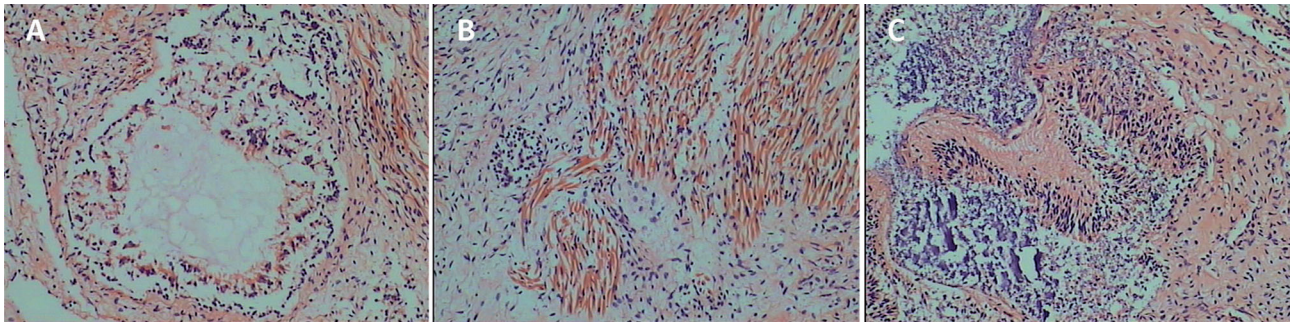

Figure 3. — Pathological examination revealing the mass contained tissues from endoderm, mesoderm, and ectoderm (A–C).

certain areas. The histological diagnosis was that the mass in the upper anterior mediastinum behind the thymus was a grade 2 immature teratoma.

Discussion

Mediastinal tumors include primary thymic carcinomas, neuroendocrine carcinomas, germ cell tumors, and other types of tumors [5]. Approximately 50-60% of mediastinal germ cell tumors are mediastinal teratomas, which can be either mature or immature [6]. All the elements of mature mediastinal teratoma are at a mature level [3]. In contrast, immature teratomas contain not only mature but also immature elements and do not have malignant elements [4]. Immature mediastinal teratoma is a rare tumor, accounting for only 1% of mediastinal teratoma [4]. Fetal immature mediastinal teratoma was even rarer. Here, the authors reported a case of fetal immature teratoma diagnosed in their hospital.

Neonatal teratomas are a common congenital neoplasm. It is life-threatening for the fetus. The most common fetal teratoma is sacrococcygeal teratoma, a tumor at the base of the coccyx, and accounts for 40% of the cases [7]. For sacrococcygeal teratoma, diagnosis time, hydrops, and solid components are the indicators of poor prognosis [7]. When the teratomas occurred in the fetal mediastinum, because the giant tumor mass will compress surrounding tissue, it will affect fetal lung development [1]. The earlier the teratomas occur, the greater the effect will be. When the tumor compresses superior vena cava, it can cause superior vena cava syndrome that will result in edema of face, neck, and upper limbs, and pleural effusion, further affect fetal lung development and the prognosis of the fetus [1]. Routine prenatal ultrasound has enabled accurate diagnosis of mediastinal teratomas [4]. However, the intervention method is limited, especially when the teratomas occur in the early stage of fetal development [1]. There are only a few children with fetal mediastinal teratomas who survived the neonatal stage [1-2, 4, 8]. In the case reported here, the fetus had pleural effusion, subcutaneous edema of the face and chest, pulmonary hypoplasia, and other symptoms caused by teratoma compression. Because of the poor prognosis, the mother of the fetus decided to have a therapeutic abortion, and the diagnosis was confirmed by histopathology.

Teratoma originates from totipotent cells during embryo development [6]. The first three months of pregnancy are the key stage of embryonic development. Embryos in this stage are very sensitive to teratogenic factors. The mother of the fetuses had been exposed to plasters, paint, and paint-thinner in the first trimester of pregnancy, suggesting that these chemical contacts may be one of the causes of the disorder.

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