

A giant placental chorioangioma with a resultant live birth; a discussion of management options

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Introduction: Chorioangiomas are benign, nontrophoblastic tumors of the placenta. Giant chorioangiomas (larger 5 cm) are infrequent and have unfavorable outcomes due to their strong association with maternal and fetal complications. We describe a case of a giant chorioangioma that had a good outcome without complications. **Case report:** A 27-year-old woman, primipara, with a regularly monitored pregnancy was admitted to the hospital at 37 + 5 weeks of gestation due to pain in the lower half of the abdomen, rupture of the amniotic sac and accumulation of thick, green, amniotic fluid. Ultrasonography performed at 33 weeks of gestation indicated the presence of a tumor mass 12.5 × 7.7 cm in diameter that was localized near the chorionic surface. Cardiotocography indicated variable decelerations, which necessitated an emergency cesarean section. A live, healthy, male child was born without complications via Döfler's cesarean section. The encapsulated tumor mass was manually removed from the uterus, and angiomatous chorioangioma of the placenta was diagnosed by pathohistological examination. **Conclusion:** Ultrasonographic monitoring is the choice method for the accurate diagnosis and intervention of chorioangioma, but only pathohistological examination can confirm the diagnosis. This case report demonstrates that giant placental chorioangioma may have a favorable outcome without any medical intervention.

Keywords

Complications; Placental chorioangioma; Prenatal diagnosis; Color Doppler; Placenta; Tumor; Ultrasonography; Immunohistochemistry

1. Introduction

Chorioangiomas are the most common primary tumors of the placenta and are of nontrophoblastic origin, with benign biological behavior similar to that of other tumors of identical histogenesis [1]. Although their pathogenesis is not clear, these tumors can arise from any part of the placenta except trophoblastic tissue [2–4]. This condition is also called angiomyxoma or vascular hamartoma of the placenta.

Chorioangiomas have a prevalence rate of 1% and a perinatal mortality rate of 40.5% when fetal hydrops is present; 31.2% of fetuses are treated in utero, and 11.1% are not treated [5–7]. An increased incidence of these tumors is as-

sociated with maternal age, hypertension, diabetes, female neonates, preterm births, first childbirth, and multiple pregnancies [8, 9]. Most cases are incidentally detected macroscopically and microscopically during pathohistological examination. Chorioangiomas larger than 5 cm are infrequent, defined as giant chorioangiomas and have an unfavorable outcome for the mother and the fetus, with an estimated prevalence ranging from 1 : 9000 to 1 : 50000 pregnancies [10, 11].

Placental chorioangioma causes polyhydramnios, premature uterine contractions, preeclampsia, hemolytic fetal anemia, fetal thrombocytopenia, cardiomegaly, placental abruption, and chronic placental insufficiency, resulting in restricted fetal growth [12]. Using ultrasound and color Doppler, these tumors can be diagnosed during pregnancy [13], and the pregnancy must be monitored regularly.

2. Case report

A 27-year-old woman, healthy, primipara, with a regularly monitored pregnancy, was admitted to the hospital at 37 + 5 weeks of gestation (WG) due to pain in the lower half of the abdomen, rupture of the amniotic sac and accumulation of thick, green, amniotic fluid. Ultrasonography performed at 33 WG indicated the presence of a clearly demarcated, hyperechoic change, 12.5 × 7.7 cm in diameter, localized near the chorionic surface that protruded into the amniotic cavity. The measured and estimated amniotic fluid index (AFI) was approximately 15 cm (Fig. 1). Anatomical assessment of the fetus and color Doppler blood flow through the middle cerebral artery, umbilical artery and ductus venosus correlated with reference values. Until admission, two-week control gynecological and ultrasound examinations were performed, and the AFI was determined to be within normal limits. The weight and height of the mother before pregnancy were 64 kg and 172 cm, respectively, and a weight of 80 kg was recorded at the time of admission. The mother's blood type was O, Rh: (+), positive.

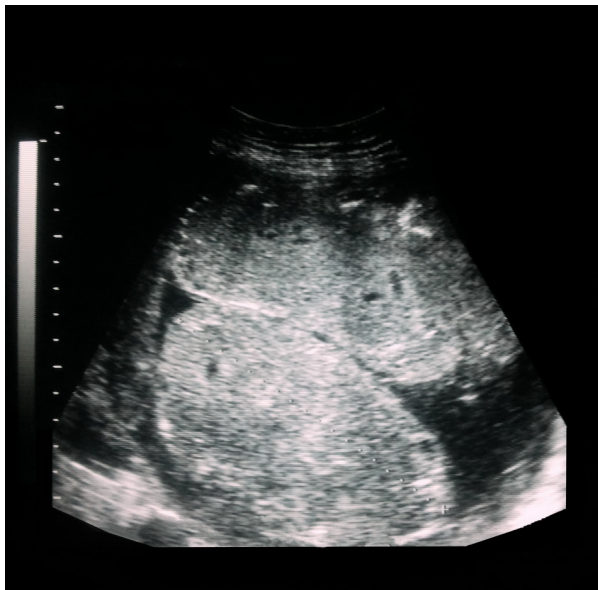


Fig. 1. B-mode ultrasonography performed at 33 WG. The presence of a clearly demarcated, hyperechogenic formation, 12.5 × 7.7 cm in diameter, was localized near the chorionic surface and protruded into the amniotic cavity.

Upon admission, all necessary laboratory and clinical examinations were performed. Laboratory analyses were within the reference values. Physical examination revealed that the cervix was dilated 2 cm and 1.5 cm long and the presence of meconium-stained amniotic fluid. Cardiotocography (CTG) indicated variable decelerations due to fetal distress, which was an indication for an emergency cesarean section.

Intraoperatively, the uterus was centrally positioned and exhibited a size and consistency in accordance with the gestational age, and no macroscopically visible changes were observed in the uterus or adnexa. A live, healthy, male child was born via Dorfler's cesarean section, with a weight of 3300 g, length of 54 cm, and head circumference of 34 cm. The Apgar score was 8 in the first minute and 9 in the fifth minute. Later examinations of the newborn excluded the following complications: anemia, stunted growth, cardiomegaly and/or heart failure, and hydrops. By manual extraction, the encapsulated tumor was removed from the uterus.

Placental tissue with a diameter of 17 × 13 × 4 cm, a paracentral insertion of the umbilical cord 30 cm in length, and a separate irregular tumor mass 14 × 9 × 10 cm in size was submitted for pathohistological analysis. The tumor was smooth and lobulated with a red-yellowish surface and a moderately solid consistency. On cross section, the tumor tissue was brown, embolus-like, and of a soft consistency. According to its macroscopic features, this tumor tissue fragment was separated from the fetal side of the uterus during labor (Fig. 2A).

Microscopic analysis of placental tissue sections revealed normal branching with multiple locally thrombosed blood vessels but without complete occlusion of the vein lumens.

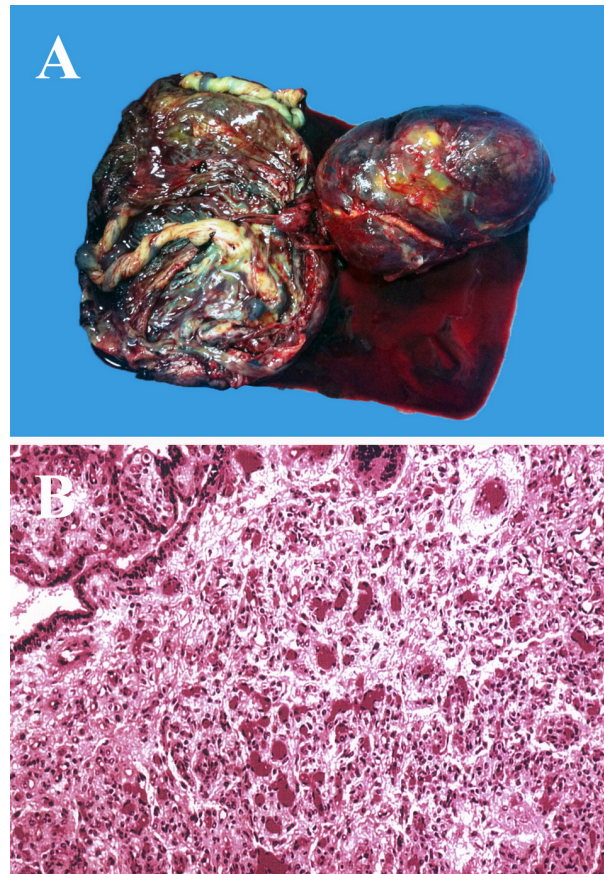


Fig. 2. Macroscopic and histological appearance of the placental chorioangioma. (A) The tumor was 14 × 9 × 10 cm in size, smooth and lobulated, with a red-yellowish surface and a moderately solid consistency; it was separated from the fetal side of the uterus during labor. (B) HE staining technique (200×): the tumor was composed of a network of capillary-type proliferating blood vessels, which were mostly filled with fresh erythrocytes and smaller thromboses.

The chorionic villi were intra- and intervillous, with blood vessels with thickened walls. The tumor was composed of a network of capillary-type proliferating blood vessels, which were mostly filled with fresh erythrocytes and smaller thromboses (Fig. 2B). Immunohistochemically, the tumor cells (endothelial cells) showed immunoreactivity to GLUT1, CD18, Factor VIII, CD31 and CD34 and were simultaneously negative to S100 and pancytokeratin (AE1/AE3). The proliferative activity of the tumor cells was low, and Ki67 was expressed in the nuclei of approximately 10% of tumor cells (Fig. 3A–H). Based on the pathohistological examination and immunophenotype, the diagnosis of angiomatous chorioangioma of the placenta was made, and degenerative changes were present.

During the cesarean section and until the day of discharge, the mother received antibiotic therapy with ceftriaxone at a dose of 1 g per day. The mother and the newborn were released after 7 days in good general condition, and clinical follow-up was not necessary for the mother.

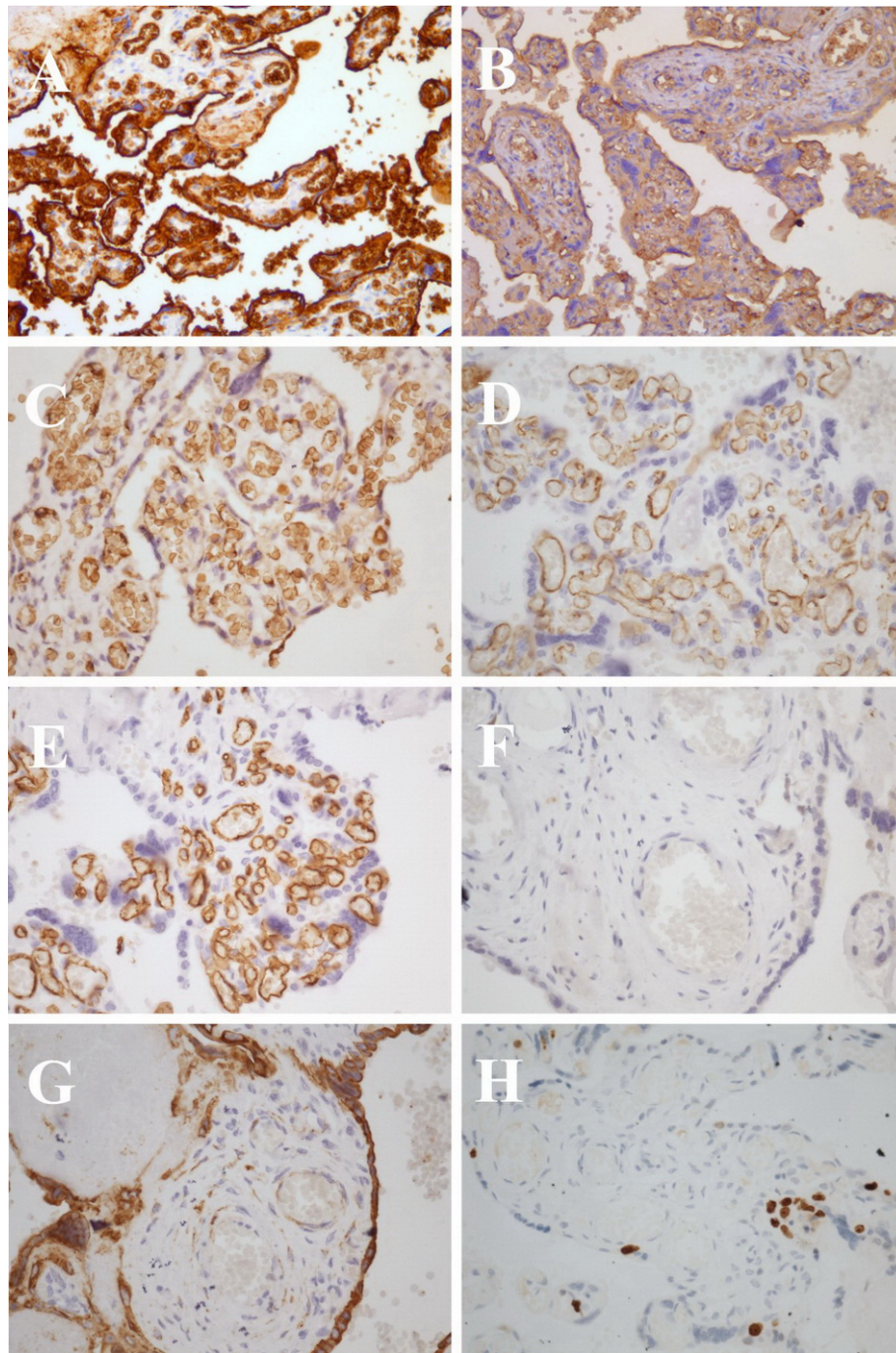


Fig. 3. Immunohistochemical features of the placental chorioangioma. The tumor cells (endothelial cells) expressed the following: (A) GLUT1, 200 \times . (B) CD18, 200 \times . (C) Factor VIII, 400 \times . (D) CD31, 400 \times . (E) CD34, 400 \times . The tumor cells were negative for the following: (F) S100, 400 \times . (G) pancytokeratin (AE1/AE3), 400 \times . (H) The Ki67 index was low, exhibiting nuclear expression in approximately 10% of tumor cells, 400 \times .

3. Discussion

Chorioangiomas, especially those of small size, are usually asymptomatic because they do not cause complications in the mother. However, other disorders may raise the suspicion of structural abnormalities of the placenta, and chorioangiomas are most often diagnosed postnatally [14]. Giant tumors, especially those over 5 cm, are easily diagnosed during ultrasound examination and can cause a number of complications [15]. Complications that occur in the mother include polyhy-

dramnios, which can cause premature uterine contractions, cervical insufficiency, premature birth, placental abruption, malpresentation, increased risk of cesarean section and postpartum hemorrhage [16]. Complications in the fetus include cardiac arrest, thrombocytopenia, nonimmune fetal hydrops, hemolytic anemia, intrauterine growth restriction, cerebral infarction, umbilical vein thrombosis, cerebral embolism and intrauterine and neonatal death [15–21].

The pathophysiological mechanisms of maternal and fetal complications are not completely clear, but the important role of arteriovenous shunting and sequestration of red blood cells and platelets has been emphasized [22]. Polyhydramnios is one of the most common complications that occurs due to the accumulation of transudates on the umbilical vein induced by tumor compression [22, 23]. The tumor is usually located near the site of insertion. Furthermore, excess amniotic fluid can occur as a result of imbalance and increased fetal urine or congestive heart failure. In addition, excess amniotic fluid arises from transudates through the wall of abnormal tumor vessels and then through the fetal plate of the placenta. Polyhydramnios increases the risk of preterm birth, placental abruption and/or postpartum hemorrhage [24]. Fetal anemia is caused by a high percentage of fetal erythrocyte destruction and high levels of lactate dehydrogenase causing intravascular hemolysis [25]. However, the existence of an extracorporeal pool of fetal blood in the intravascular space of the chorioangioma may cause fetal anemia but is most commonly described as the cause of fetal hydrops [22, 25]. In cases of giant chorioangiomas, fetal hypoxia and growth restriction due to vascular shunting result from low pressure and reduced perfusion of chorionic villi [22]. In addition, the increased volume of fetoplacental blood and the increased pressure when returning to the heart cause cardiomegaly and heart failure in the fetus [22], and insufficient fetal heart capacity can cause hydrops and fetal deterioration [26]. Therefore, chorioangiomas can act as an arteriovenous shunt and thus lead to more complications, such as increased fetal cardiac output, cardiomegaly, heart failure, and fetal hydrops [22]. Mirror syndrome has an insufficiently clear etiology and is defined as maternal edema associated with fetal hydrops [27]. Clinical signs and symptoms are associated with the existence of giant chorioangiomas and are manifested by high blood pressure, proteinuria, elevated concentrations of uric acid and creatinine, headache and visual disturbances [22].

Asymptomatic chorioangiomas usually require no specific treatment, and careful monitoring with regular ultrasound examinations is performed to detect and prevent early complications. Intrauterine transfusion and amniodrainage are the most common therapeutic procedures, and amniotic fluid should be drained in cases of polyhydramnios. Ultrasound-guided cordocentesis and fetal transfusion can be performed to correct fetal anemia [28, 29]. Although the results of these two procedures are favorable, they do not affect the correction of arteriovenous shunting, treatments of which include alcohol injection, microembolization, endoscopic laser coagulation, and interstitial laser therapy [10, 30, 31].

Using color Doppler, a well-vascularized tumor can be observed that is clearly differentiated from other lesions, such as placental hematoma, fibroids, teratoma and a dead twin fetus. T2 images obtained by magnetic resonance imaging (MRI) can help in diagnosis and indicate a lesion similar to a hemangioma [32]. However, MRI is not needed, as routine

ultrasonography followed by color Doppler is the gold standard diagnostic method for prenatal women.

The final diagnosis of chorioangioma is always made by pathohistological analysis. Microscopically, these tumors are comprised of solitary or multiple nodules that are localized on the fetal side and/or on the perimeter of the placenta, reddish-yellow, and located at the cross-section of a blood clot; whitish fields are also present in cases of infarction. Microscopically, the tumor is composed of proliferating capillaries resembling a capillary hemangioma that is separated to varying degrees from the surrounding unaltered parenchyma. Capillaries are made up of endothelial cells, pericytes and myofibroblasts, and proliferated trophoblastic tissue may be present in the vicinity of tumor tissue (in up to 40% of cases). Degenerative changes such as hyalinization, necrosis and calcification are often observed.

Three histological types have been described: angiomatous, cellular, and degenerative [33]. Angiomatous chorioangioma is the most common and comprises numerous blood vessels of various degrees of differentiation, from capillaries to caverns, which are surrounded by the placental stroma. Immunohistochemically, tumor cells show immunoreactivity to CD31, CD34, Factor VIII, GLUT1 and CD18, indicating a vascular origin for the chorionic plate and villous tumors [34].

The differential diagnoses include chorangiomas and chorangiosis, which are diffuse or more often focal proliferations of villous angioblastoma with villi that are not present in the chorioangioma. Due to the increased proliferation of trophoblastic tissue near the benign chorioangioma, this tumor may be misinterpreted as chorioangiocarcinoma [35].

4. Conclusions

Prenatal ultrasonography is the method of choice for the accurate diagnosis of chorioangioma. Regular follow-up promotes a timely diagnosis and better intervention. This case report demonstrates that giant placental chorioangioma may have a favorable outcome without any medical intervention. However, due to the high mortality rate and complications in the mother and fetus, early diagnosis and follow-up are crucial.

Author contributions

SR and DK wrote the manuscript. SR, FV and MZM designed the research and were involved in drafting the manuscript. All authors read and approved the final version of the manuscript.

Ethics approval and consent to participate

The subjects gave her informed consent for inclusion before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki.

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Conflict of interest

The authors declare no conflict of interest.

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