Placental Chorioangiomas: A Single Tertiary Center Experience

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Abstract

Background Chorioangiomas are benign vascular placental tumors. Although most of them remain small and are asymptomatic, large tumors (>4 cm) may cause maternal or fetal complications.

Methods We report seven cases of chorioangioma over a span of 8 years in a single tertiary center managed either conservatively or with necessary intervention. All cases were followed up and postnatal outcomes were recorded.

Results Six cases were diagnosed in the second trimester and one in the third trimester by ultrasound. Four were managed conservatively, while three of them required prenatal therapy: one interstitial laser and the other two an intrauterine arterial embolization of the feeder vessel. One underwent a rescue intrauterine fetal transfusion before definitive embolization. Conservatively managed patients developed gestational hypertension and growth restriction. They had low birth weight and needed neonatal intensive care. There was one intrauterine demise (IUD) and two healthy neonates in the cases that needed a fetal intervention.

Conclusion The management of chorioangioma is dynamic and challenging, ranging from conservative to prenatal intervention. Treatment failure can result in serious complications adversely affecting pregnancy outcomes. However, regular monitoring by ultrasound and Doppler surveillance with timely interventions can lead to good neonatal and maternal outcomes.

Keywords
- chorioangioma
- embolization
- prenatal intervention

Introduction

Chorioangioma is the most common nontrophoblastic benign tumor of the placenta. It represents malformed differentiation of the local tissue with excessive proliferation of blood vessels.[1] These vascular tumors are mostly small, single and encapsulated within the placenta. Small sized tumors are generally asymptomatic and do not affect the course of the pregnancy. Large or giant chorioangiomas (>4 cm) with a prevalence of 1/9,000 to 1/50,000 can create complications for the fetus and expectant mothers.[2,3] Prenatal therapy in the form of laser coagulation or interventions like direct injections of various chemicals into the feeding vessels of the tumor is described in the literature.[4,5] In certain circumstances, a conservative approach is also offered. The aim of this case series spanning from 2015 to 2023 is to describe the variable course of chorioangioma in pregnancy, its intrauterine management and postnatal outcomes (►**Table 1**).

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Table 1 Seven cases of placental chorioangioma and their postnatal outcomes

Case no.	POG at diagnosis	Size	Associations	Added findings	Management	Delivery	Neonatal outcome
1	22 wk 35 wk	5.4 × 3.4 cm 8.5 × 5.2 × 6.8 cm	FGR Polyhydramnios	–	Conservative	36 wk and 6 d LSCS 1.9 kg/F	NICU: 6 d Neonatal hyperbilirubinemia, symmetrical SGA, and type 2 RDS
2	21 wk and 2 d 26 wk	3 × 5.7 cm 10.6 × 7.5 × 7.6 cm	– Cardiomegaly, pericardial effusion, polyhydramnios	Umbilical vein varix	Intervention: interstitial laser	IUD	
3	20 wk	5 × 2 cm	Gestational HTN FGR	–	Conservative	37 wk LSCS 2.2 kg/F	NICU: 2 d Phototherapy
4	18 wk	2 × 2.5 cm	Gestational HTN FGR	Unossified nasal bones, left pelviectasis and echogenic intracardiac foci in the left ventricle Amniocentesis: KT normal	Conservative	37 wk LSCS 2.2 kg/M	NICU: 3 da Phototherapy and hypoglycemia
5	34 wk 36 wk and 6 d	6.3 × 4 cm 7.1 × 4 × 4 cm	EFW at the 16th centile	–	Conservative	37 wk LSCS 2.4 kg/F	NICU: 2 d Phototherapy
6	26 wk	7 × 5 cm 5 × 5 cm (postembolization)	Fetal anemia Dilatation of the right atrium	GDM on diet	Intervention: glue embolization	38 wk LSCS 3.1 kg/F	Discharged
7	22 wk: IUT 22 wk and 3 d: embolization	8 × 4.4 × 7.3 cm	Early onset FGR Cardiac hypertrophy Pericardial effusion Dilated umbilical vein Oligohydramnios	Intermediate risk for trisomy 21 (1:875)	Intervention: rescue IUT, followed by glue embolization	37 wk FTND 1.8 kg/F	NICU: 2 wk

Abbreviations: EFW, estimated fetal weight; FGR, fetal growth restriction; FTND, full-term normal delivery; HTN, hypertension; IUT, intrauterine transfusion; KT, karyotype; LSCS, lower segment cesarean section; NICU, neonatal intensive care unit; POG, period of gestation; SGA, small for gestational age.

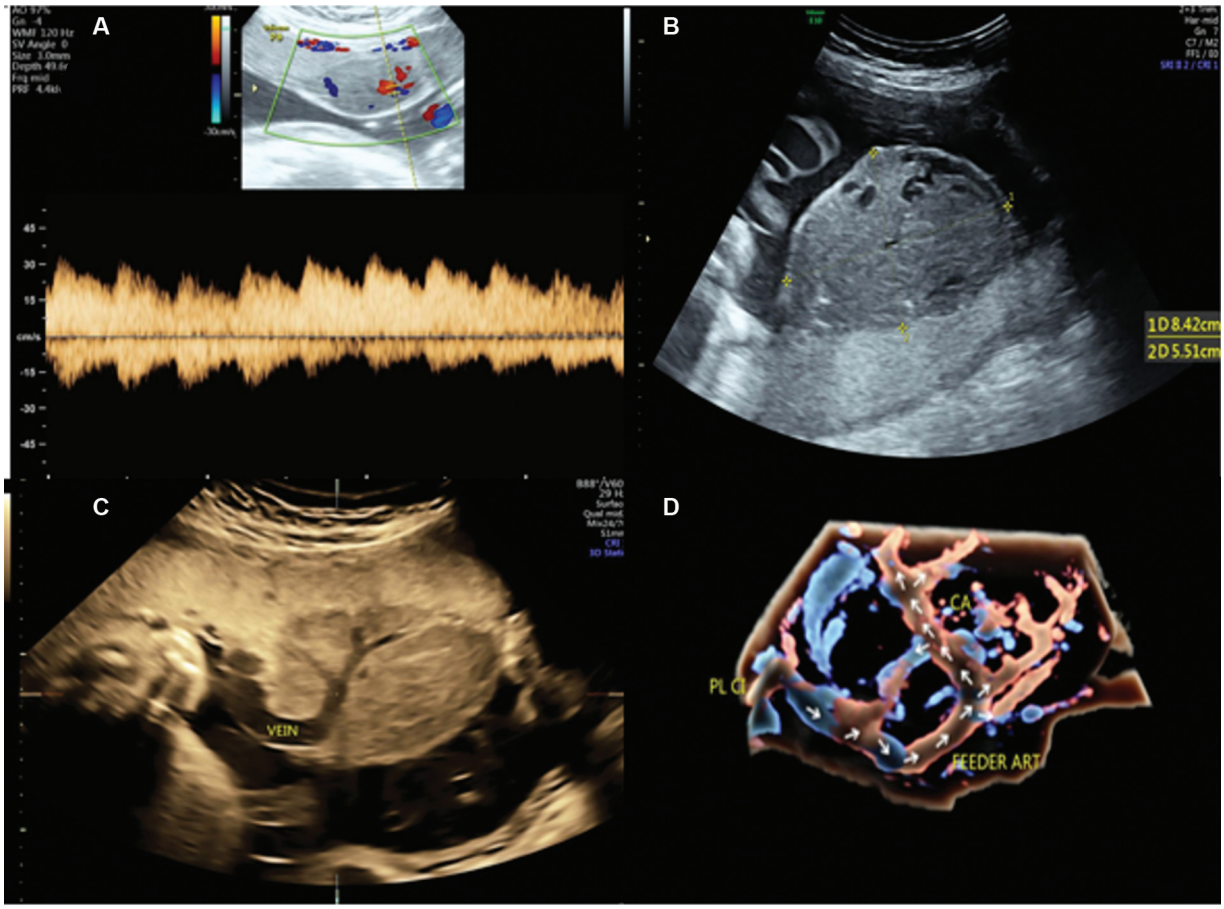

Fig. 1 Case 1: Chorioangioma measuring 8.4 × 5.5 cm in size at 36 weeks of gestation managed conservatively. (**A**) Low flow velocity of the tumor. (**B**) Size of the measured chorioangioma. Case 2: Large chorioangioma measuring 10.6 × 7.5 × 7.6 cm needing intervention in the form of interstitial laser. (**C**) Three-dimensional imaging in sepia mode showing the feeder vessel in the chorioangioma. (**D**) Three-dimensional static high-definition glass body imaging showing the vascular architecture in the chorioangioma with cord insertion site and feeder artery labeled.

Methods

This is a retrospective observational study conducted in a single tertiary care facility. Patients were either referred with chorioangioma or it was detected on our routine scan, where we screened the placenta as a mandatory protocol.

The ultrasound (US) examination was performed using a GE Voluson E10 unit using a transabdominal curvilinear transducer with a frequency of 3.5 to 5 MHz. A detailed evaluation of fetal anatomy was done to rule out associated anomalies. The institutional ethical committee approved the study. All the patient details, including maternal age, obstetric history, gestational age at diagnosis, results of prenatal imaging studies, fetal management and interventions, postnatal course, details of the intervention, and duration of follow up, were obtained from the hospital information system. Additional follow up details were collected from the parents via a telephonic interview.

Case 1

A primiparous lady was referred at 22 weeks of gestation in view of a suspected placental tumor. On evaluation, a well defined hypoechoic mass was noted, adjacent to the chorionic plate and close to the cord insertion site. This measured 5.4 × 3.4 cm across. The head circumference, abdominal circumference, and femur length fell below 2 standard deviations (SDs). The estimated fetal weight was at the 2nd percentile, indicating an early onset fetal growth restriction (FGR). No intervention was needed and the scan done at 36 weeks and 6 days had a chorioangioma mass of 8.5 × 5.2 × 6.8 cm (►**Fig. 1A, B**) with a middle cerebral artery (MCA) peak systolic velocity (PSV) at 1.5 multiples of the median (MoMs) and polyhydramnios. The patient underwent an emergency lower segment cesarean section (LSCS) the same day because of preterm premature rupture of membranes and fetal distress on cardiotocography (CTG). A preterm, live female baby, weighing 1.95 kg, was delivered and handed to the pediatrician. The baby had a Hb of 20g%, neonatal hyperbilirubinemia (total bilirubin: 13.68 g/dL), which was treated with phototherapy, and Respiratory distress syndrome (Type 2 RDS). After 6 days of neonatal intensive care unit (NICU) stay, the neonate was discharged.

Case 2

A multiparous lady, who presented for an anomaly scan at 21 weeks and 2 days, had a hypoechoic well defined mass measuring 3 × 5.7 cm close to the umbilical cord insertion

site. An anterior placental chorioangioma was diagnosed. She came back 6 weeks later when the chorioangioma measured 10.6 × 7.5 × 7.6 cm (►**Fig. 1C, D**). There was cardiomegaly with pericardial effusion and polyhydramnios. Given impending hydrops and cardiac compromise, intervention by interstitial laser was planned. An 18 gauge needle was inserted with its tip lying just short of the feeder artery. Three cycles of interstitial laser at 35 W were delivered till no flow in the feeder vessel was detected (►**Video 1**). The patient was put on tocolysis and antibiotics and observed in the labor room. Unfortunately, intrauterine fetal demise (IUFD) occurred within 24 hours of the procedure.

Video 1

Case 2: An 18-gauge needle was inserted with its tip lying just short of the feeder artery. Three cycles of interstitial laser at 35 W was delivered till no flow in the feeder vessel was detected. Online content including video sequences viewable at: https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0044-1791262.

Case 3

A second gravida, with a previous normal delivery, came for a routine anomaly scan at 20 weeks. A large chorioangioma of 5 × 2 cm diameter was incidentally detected (►**Fig. 2A**). The patient was kept on follow up. She developed gestational hypertension and FGR and was delivered by cesarean section at 37 weeks of gestation. She delivered a female baby of 2.2 kg who needed NICU admission.

Case 4

A 19 year old primigravida presented at 18 weeks and 4 days for a second opinion for placental chorioangioma with multiple soft markers of trisomy 21 (unossified nasal bones, left pelviectasis, and echogenic intracardiac foci in the left ventricle). The scan at our institute confirmed these findings and a placental chorioangioma measuring 2 × 2.3 cm was identified (►**Fig. 2B**). An amniocentesis was done to rule out trisomy 21 (aneuploidy risk 1:33). The karyotype was normal, and the patient was followed up to check for fetal anemia, polyhydramnios, and cardiac compromise. An LSCS was done at 37 weeks in view of FGR. She delivered a 2.2 kg male baby, which needed NICU care postdelivery.

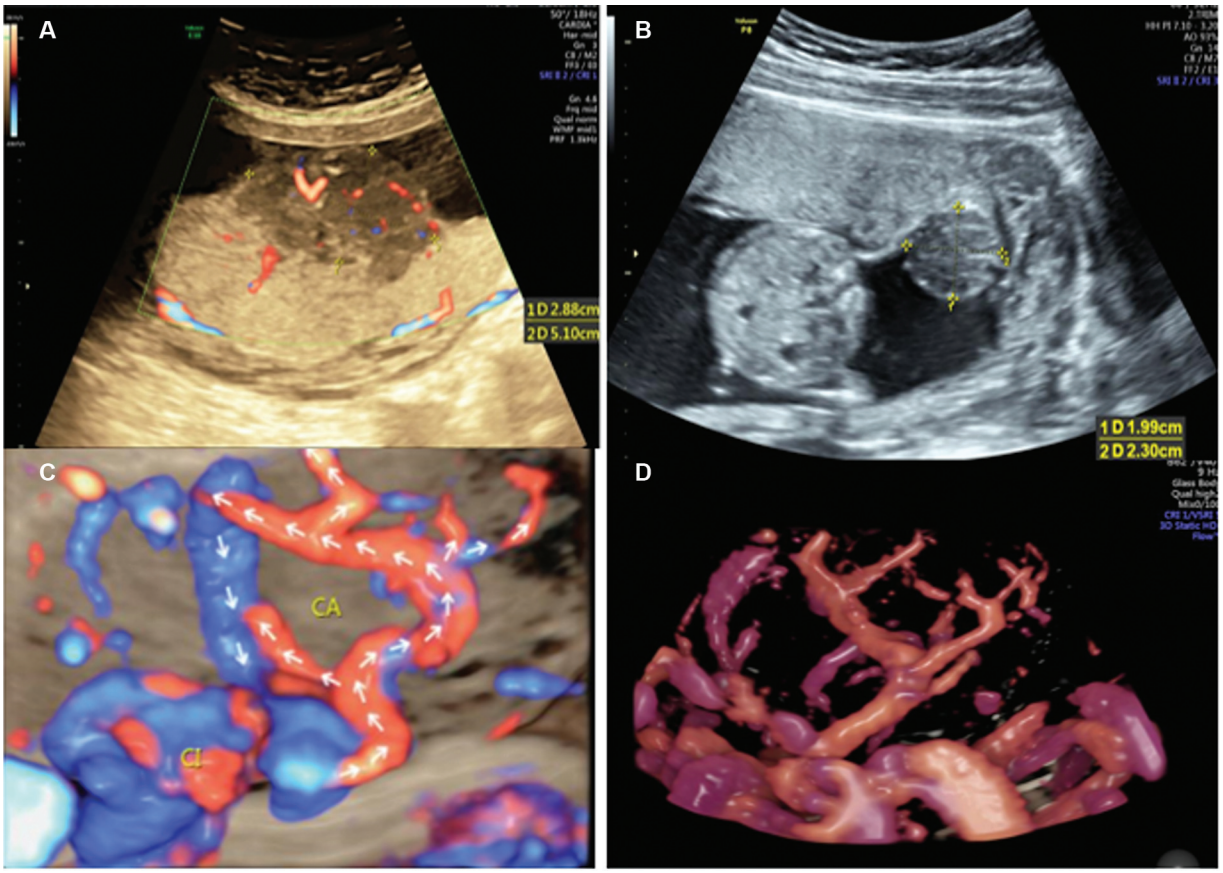

Fig. 2 (**A**) Case 3: Chorioangioma of 5 × 2 cm on posterior placenta managed conservatively. (**B**) Case 4: Small placental chorioangioma measuring 2 × 2.3 cm followed up and managed conservatively. (**C, D**) Case 5: Dimensional static high-definition glass body imaging showing the vascular architecture in the large chorioangioma. Initially, it was 6.3 × 4 cm, which increased to 7.1 × 4 × 4 cm at 36 weeks and was managed conservatively.

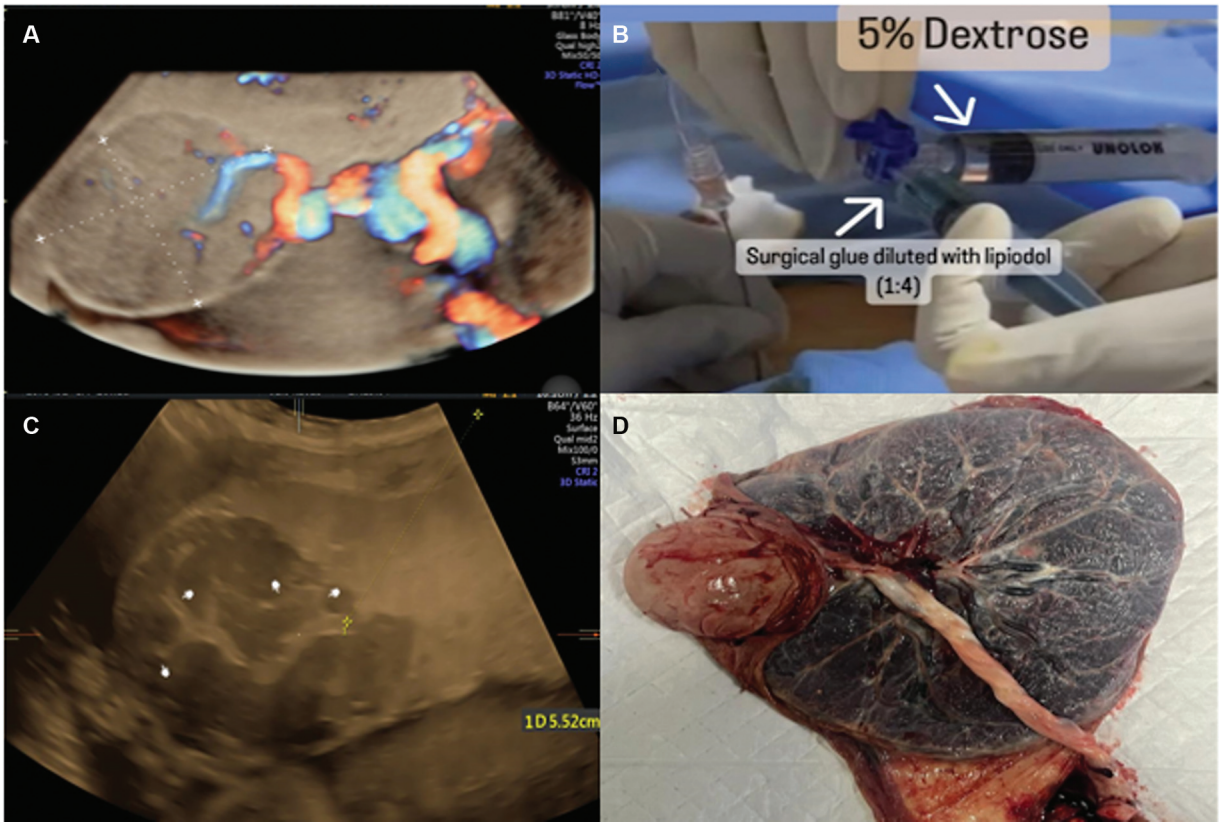

Fig. 3 Fig. 3 Case 6. (**A**) Large tumor measuring 7 × 5 cm adjacent to the chorionic plate and close to the umbilical cord insertion. (**B**) Glue embolization: The needle was flushed with 2 mL of 5% dextrose, followed by an injection of 1 mL embolization mixture (surgical glue) diluted with lipiodol in 1:4 ratio. (**C**) Instantaneous coagulum formation seen in the serpentine-shaped feeder vessel. (**D**) Postdelivery specimen of the placental chorioangioma.

Case 5

A primigravida was referred at 34 weeks with a large chorioangioma measuring 6.3 × 4 cm. Surprisingly, the fetus was hemodynamically stable and she was kept on follow up (►**Fig. 2C, D**). At 36 weeks, the chorioangioma measured 7.1 × 4 × 4 cm. She delivered a 2.4 kg baby by LSCS, which needed admission in NICU for phototherapy.

Case 6

A multigravida presented at 26 weeks with a chorioangioma measuring 7 × 5 cm adjacent to the chorionic plate and close to the umbilical cord insertion (►**Fig. 3A**). MCA PSV was at 1.74 MoMs (anemia range) with dilatation of the umbilical vein and right atrium. In view of polyhydramnios and fetal anemia, the option of an interstitial laser/embolization of the feeder vessel with glue was considered. Considering the complex angioarchitecture and the proximity of the feeder artery to the cord insertion site, laser was considered risky. At 26 weeks and 1 day, embolization of the feeder vessel was performed. A 15 cm 22 gauge needle was introduced into the feeder vessel. The needle was flushed with 2 mL of 5% dextrose, followed by injection of 1 mL embolization mixture (N-butyl cyanoacrylate [surgical glue] diluted with lipiodol in 1:4 ratio; ►**Fig. 3B**). Instantaneously, echogenic coagulum was noted inside the vessel (►**Fig. 3C, D**). Avascularity of the feeder vessel was ensured (►**Video 2**). MCA PSV postprocedure was 43 cm/s (1.2 MoMs). The patient was followed up at 27, 32, and 35 weeks. The embolized mass decreased in size serially. In view of the previous history of cesarean section, a repeat cesarean section was done and a female baby of 3.12 kg was delivered. Postdelivery period was uneventful and the patient and the baby were discharged.

Video 2

Case 6: A 15-cm 22-gauge needle was introduced into the feeder vessel. The needle was flushed with 2 mL of 5% dextrose, followed by injection of 1 surgical glue diluted with lipiodol in 1:4 ratio. Instantaneously echogenic coagulum was noted inside the vessel. Online content including video sequences viewable at: https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0044-1791262.

Case 7

This demonstrated a challenging case of a primigravida with a giant chorioangioma measuring 8 × 4.4 × 7.3 cm (►**Fig. 4A**), presenting with severe fetal anemia (MCA PSV 2.83 MoMs), early onset FGR, cardiac hypertrophy, pericardial effusion, and oligohydramnios at 22 weeks of gestation (►**Fig. 4B, C**).

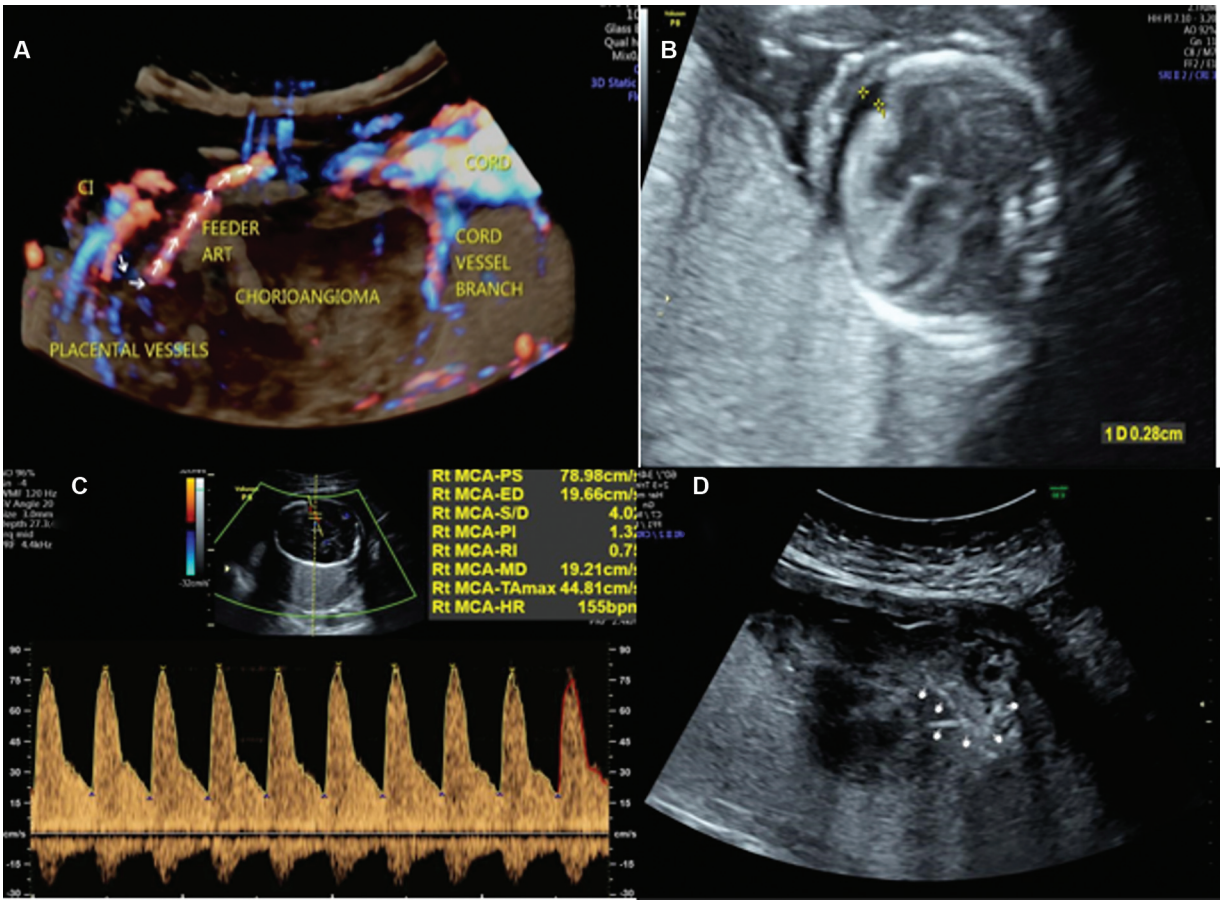

Fig. 4 Case 7. (**A**) Giant chorioangioma measuring 8 × 4.4 × 7.3 cm with tricky insertion of the feeder vessel running around the tumor. (**B, C**) Signs of high-output cardiac failure: pericardial effusion, cardiac hypertrophy, and fetal anemia. (**D**) Postembolization of the feeder vessel with coagulum formation seen.

Emergency intrauterine transfusion (IUT) was planned. O-negative packed cells of 27 mL were transfused to the fetus through the umbilical vein (Hb 4–16.4 g/dL). However, day 1 posttransfusion still showed severe fetal anemia (MCA PSV 2.3 MoMs). A definitive intervention in the form of embolization of the feeder vessel was considered. MCA PSV post-procedure was 40 cm/s (1.5 MoMs). The patient was followed up serially. Signs of cardiac failure subsided and the embolized mass further decreased in size (►**Fig. 4D**). Although there was FGR, the interval growth was maintained. She was induced at 37 weeks and a female baby of 1.8 kg was delivered. NICU stay was needed for 2 weeks and the baby was eventually discharged.

Discussion

Chorioangiomas are well circumscribed, rounded, hypoechoic lesions on the fetal surface of the placenta. On Doppler, peritumoral diffuse vascularization and feeding vessels entering the placental mass are visualized.[6] Signs of high output cardiac failure, polyhydramnios, fetal anemia, cardiomegaly, and fetal hydrops can exist with the tumor. The size, proximity to the cord insertion site, and vascularity correlate with the volume of fetal blood shunted to the mass.[7]

Two cases with small size tumors, managed conservatively, had gestational hypertension and FGR.[8,9] Tumors (>4 cm) can have arteriovenous shunting within the placenta, resulting in vascular steal syndrome blood shunted to the tumor tissue. Sequestration of platelets and damage of red blood cell (RBC) within the mass can cause fetal microangiopathic anemia and thrombocytopenia. Transudation from tumor vessels and increased fetal urine output with a hyperdynamic state results in polyhydramnios.[10] Three cases developed polyhydramnios, anemia with impending hydrops needing intervention.

Chorioangioma (>4 cm) can be managed conservatively if there are no signs of fetal compromise (cases 1 and 5). Temporary management includes amnioreduction and IUT for prolonging pregnancy. Definitive management, like US guided percutaneous alcohol injection, embolization, and laser interstitial therapy, acts by blocking the vascular supply to the tumor.

We had one case managed with an interstitial laser. Postinterstitial laser, the patient developed an IUFD, which could have possibly been due to the proximity of the tumor to the cord insertion, resulting in the laser causing thermal damage to the fetal circulation.[2,5] In the sixth and seventh cases, glue was used for embolization of the feeder vessel.

Case 7 needed a rescue transfusion before a definitive procedure and was technically more challenging. Both had a successful outcome. Glue is a minimally invasive procedure with fewer complications as it sets in within seconds of injection. Further, it can be done in the outpatient department (OPD), avoiding the need for anesthesia. It was, therefore, selected in these cases as a modality of choice.

Our cases saw a higher predilection for female fetuses.[11,12] Like most studies, our cases were managed conservatively, needed NICU admission, and one needed exchange transfusion neonatal anemia.[5,13,14] A fine balance between the period of gestation at diagnosis, fetal maturity, and available neonatal support is needed to assess the decision for delivery/fetal intervention.

Conclusion

Fetal complications mostly occur in the second trimester, at which stage delivery would not be the preferred option. Prenatal intervention has an important role. Hence, case based decision making regarding the appropriate mode of management is the primary factor determining successful prenatal management. Timely intervention by an expert fetal medicine specialist and an institutional delivery would ensure good neonatal outcomes.

Consent to Participate and Consent to Publish

Written informed consent was obtained from the patients for participation and publication of this study.

Ethical Approval

This retrospective study was in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The Institutional Ethics Committee approved this study.

Author Contributions

All the authors contributed to the study's conception and design. All the authors have read and approved the final manuscript.

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None.

Conflict of Interest

None declared.

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References

1 Thresia E, Nurdiati DS, Widodo I. Giant placental chorioangioma: the first case report in Indonesia. Hum Pathol Case Rep. 2021; 23:200472
2 Patidar R, Gowdra Revannasiddappa K, Mestha S. Watchful expectant management of a giant placental chorioangioma with favorable maternal and fetal outcomes: a case report. Cureus 2023;15(05):e39496
3 Zacharis K, Kravvaritis S, Charitos T, Chrysafopoulou E, Fouka A. A rare case of a giant placental chorioangioma with favorable outcome. Pan Afr Med J 2020;36:214
4 Agarwal N, Papanna R, Bergh EP, et al. Management of large placental chorioangioma: two-port laser approach for fetal intervention. Ultrasound Obstet Gynecol 2023;62(06): 882–890
5 Manikandan K, Rajendran J, Rangaraj AM, et al. Prenatal embolisation of giant chorioangioma using *n*-butyl cyanoacrylate: technique, clinical course and perinatal outcome. J Foetal Med 2020; 7:87–93
6 Buca D, Iacovella C, Khalil A, et al. Perinatal outcome of pregnancies complicated by placental chorioangioma: systematic review and meta-analysis. Ultrasound Obstet Gynecol 2020;55(04): 441–449
7 Ma H, Liu Z, Ruan J. Placental chorioangioma and pregnancy outcome: a ten-year retrospective study in a tertiary referral centre. BMC Pregnancy Childbirth 2023;23(01):381
8 Zou J, Ding W, Chen Q, Bai X, Li B. Safety of vaginal delivery in women with placental chorioangiomas diagnosed by prenatal ultrasound: a retrospective cohort study. Medicine (Baltimore) 2022;101(29):e29672
9 Di Massa G, Stabile G, Romano F, et al. CD133 expression in placenta chorioangioma presenting as a giant asymptomatic mass. Medicina (Kaunas) 2021;57(02):162
10 Punjabi L, Ong K, Lee R, Merchant K. A giant placental mass masquerading as an acardiac twin. Hum Pathol Rep 2023; 33:300714
11 Mestha A, Dhanaliwala A, Frangieh A, Mestha SM, Ramaiah SM. Giant chorioangioma of the placenta as a cause of maternal, foetal, and neonatal complications. Cureus 2023;15(07):e42430
12 Vig T, Tirkey RS, Jacob SE, et al. Placental chorioangioma with an emphasis on rare giant placental chorioangioma and associated maternal and perinatal outcome: clinicopathological study in a single centre. J Family Med Prim Care 2022;11 (09):5116–5122
13 Dong T, Sher D, Luo Q. Pregnancy complications and adverse outcomes in placental chorioangioma: a retrospective cohort analysis. J Matern Fetal Neonatal Med 2020;33(13): 2269–2273
14 Castleman J, Gurney L, Kilby M, Morris RK. Identification and management of fetal anaemia: a practical guide. Obstet Gynaecol 2021;23:196–205

