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CLINICAL VIGNETTE

Fetal cardiac function is altered by circumvallate placenta

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One type of abnormal placenta is circumvallating placenta (CP), when edges are covered by a fold of decidua, which reduces the functionally active surface of nutrients exchange. Reduced exchange surface may potentially influence fetal development and would potentially have high input on fetal cardiovascular system.

That was the first pregnancy of a healthy 29-year-old woman. The pregnant woman's sister was delivered prenatally by caesarean section due to fetal growth restriction (at the time of publication with no major complications). She was referred for fetal echocardiography due to fetal growth restriction diagnosed at 22 weeks of gestation. The woman had 8 fetal echocardiography performed during pregnancy. Fetal echocardiography revealed: mild cardiomegaly, abnormal ventricular relaxation, myocardium hypertrophy, increased pulmonary venous return, visible coronary arteries, tricuspid regurgitation, small pericardial effusion, bidirectional foramen ovale flow. She was hospitalised 4 times. During hospitalization steroids were applied (2 x 12 mg of bethametasone I.M., following 1 x 12 mg of bethametasone after 2 weeks at 31 weeks of gestation) and intravenous MgSO₄ infusion for neuroprotection. Preterm birth occurred at 32 weeks by caesarean section due to no increase in growth of fetal mass, fetal growth restriction IV degree by Fetal Medicine

Barcelona, abnormal CTG (short term variation < 3.5 ms) and status post prenatal steroid therapy and MgSO₄ infusion. Progress in perinatology enabled us to monitor fetuses by many techniques, by in our case urgent caesarean section was justified.

The incidence of abnormal placenta has been reported to range between 2 and 4%. CP occurs in about 1% of pregnancies depending on the Authors. In a recent meta-analysis, the incidence of circumvallate placenta was 1.2%. It is worth mentioning that the analysis included only 18 studies. Only 6 original articles examined obstetric outcomes with predisposing to prenatal complications [1].

The pathophysiology of CP implies reduced blood flow to the fetus. CP may be a cause of fetal growth restriction [2]. Unadjusted pooled analysis demonstrated that women with a CP had a similar rate of cesarean delivery as those without a circumvallate placenta [1].

CP could be diagnosed prenatally during ultrasound examination. The sonographer may register the hemispheric shape of the placenta and the raised ring surrounding. Using additional techniques like Power Doppler or 3D imaging may be helpful (Fig. 1).

Because CP is a pathological finding, regular ultrasound examination and fetal echocardiography may be required to monitor fetal well-being or to detect early fetal complications. Fetal echocardiography includes assessment of shortening fraction of ventricles, foramen ovale function, general contractility to state proper diagnosis. As in our case fetal echocardiography was the main tool to monitor the fetus, because it could in detail describe fetal cardiovascular efficacy [3]. We have observed abnormal contractility, hypertrophy of the myocardium, abnormal ventricular filling, hyperkinetic blood flow through coronary arteries. We used Huhta scale during every fetal echocardiography when appropriate to ensure fetal well-being. Due to deterioration of fetal cardiovascular efficacy the following management was introduced (monitoring from ambulatory to hospitalization and pharmacological prevention). Circumvallate placenta may influence fetal condition. Prenatal management should be personalised and fetal echocardiography seems to be a reasonable tool to assess fetal cardiovascular well-being and to detect early deterioration.

Article information and declarations

Ethics statement

The case did not need approval from Ethics Committee. The data of the patient were deidentified. The study is compliant with Helsinki Declaration.

Author contributions

Oskar Sylwestrzak — concept, data analysis, writing manuscript, examination; Katarzyna Zych-Krekora — supervision, editing manuscript; Lukasz Sokolowski — data analysis, writing manuscript, examination; Maciej Ziebakowski — data analysis, writing manuscript, examination; Michal Krekora — supervision, final manuscript.

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Conflict of interest

All authors declare no conflict of interest.

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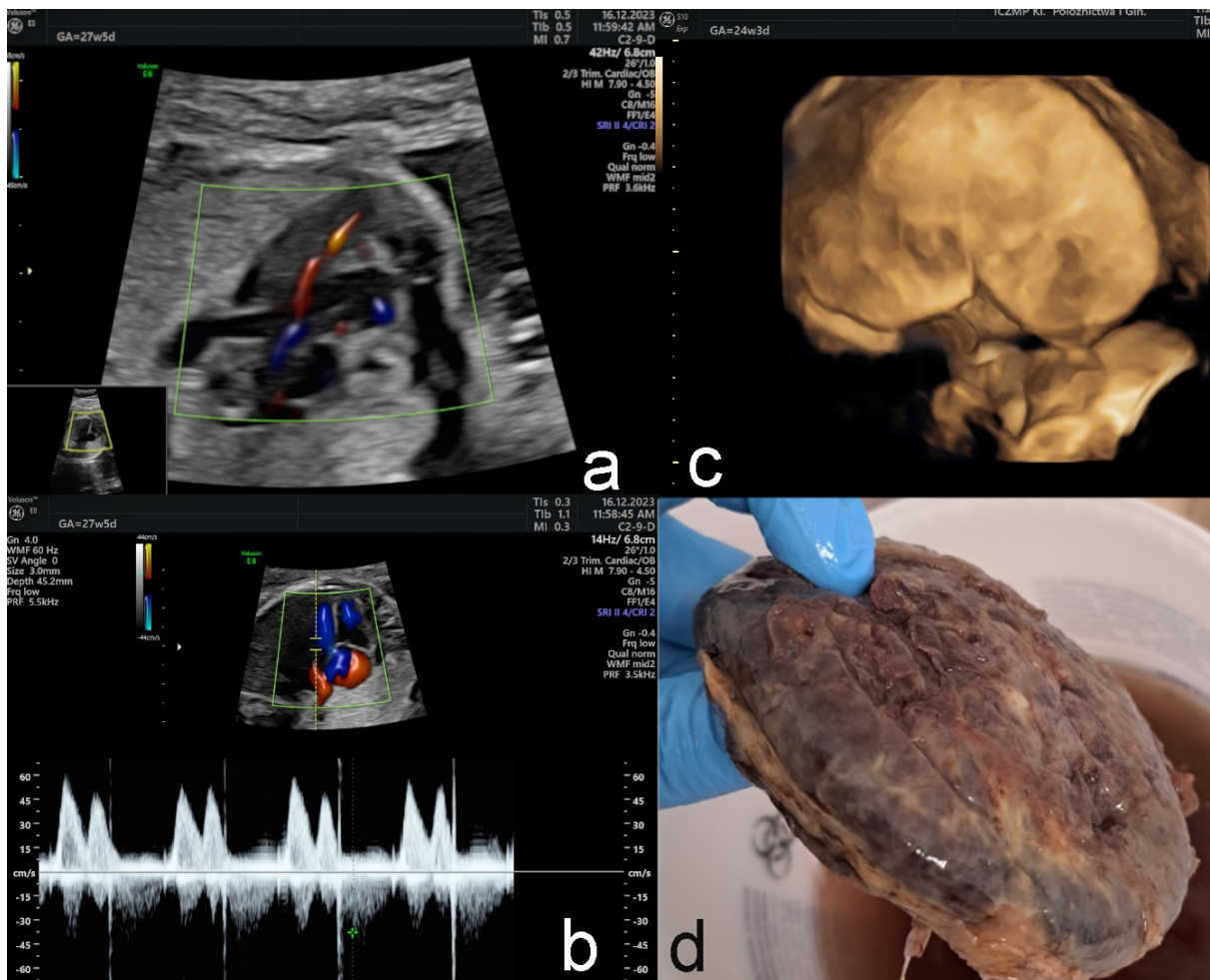


Figure 1. Case of CP. **A.** visible coronary arterie, **B.** abnormal A to E ratio of mitral inflow. **C.** 3D ultrasound presentation of CP; round shape margin and reduced functionally active plate is presented, **D.** CP specimen (material from Department of Obstetrics and Gynecology, Polish Mother's Memorial Hospital Research Institute in Lodz)