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Twin reversed arterial perfusion syndrome (TRAP or acardiac twin) in pregnancy: a case report



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ABSTRACT

Introduction: A type of pregnancy that occurs in monochorionic twin pregnancies which results in the coexistence of normal “pump” twins and cardiac twins is called Twin Reverse Arterial Perfusion Syndrome (TRAP). The low oxygen pressure going to the baby causes many unique changes in the twins’ physiology. These changes can lead to high prenatal mortality.

Case Presentation: We present the case of a 25-year-old woman, primigravida, whose obstetrician referred to Kasih Medika Bali with suspicion of a large placenta. However, upon arrival at 35 weeks and 2 days of gestation, an ultrasound showed a twin pregnancy with suspicion of a TRAP pregnancy. Then, a baby girl was born at Payangan Hospital, Gianyar, Bali by Sectio Caesarea with a birth weight of 3155 grams, an Apgar score of 6-8-9, and a placental weight of 815 grams. The results of the examination of the second fetus that did not develop, weighing 1,705 grams in the placenta did not have an attached umbilical cord. The doctor’s suspicions about the TRAP pregnancy were indeed true according to the conditions at the time of the twins’ birth. The doctor found 1 healthy baby and 1 other like mass with a size large enough on ultrasound at 35 weeks 2 days of gestation.

Conclusion: The incidence of pregnancy like this is very rare and needs further study in order to detect early abnormalities that occur in pregnancy. Thus, we can be aware of the risks for both mother and fetus and even treat them early. Couples can be counseled optimistically that the recurrence rate of TRAP syndrome tends to be low so that they can better plan future pregnancies in all aspects.

Keywords: acardiac twin, twin reversed-arterial-perfusion (TRAP), monochorionic twin.

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INTRODUCTION

A type of pregnancy that occurs in monochorionic twin pregnancies which results in the coexistence of normal “pump” twins and cardiac twins is called Twin Reverse Arterial Perfusion Syndrome (TRAP). Based on research, this rare condition can reach 0.3:10000 births. Acardiac twins rely on normal twins to provide circulation via vascular anastomoses. The low oxygen pressure going to the baby causes many unique changes in the twins’ physiology. These changes can lead to high prenatal

mortality.¹

Acardiac twins are parasitic, putting a pumping fetus at risk for high-output heart failure. Overall only 50% of the pump twins survive. The incidence of pregnancy like this is very rare and needs further study in order to detect early abnormalities that occur in pregnancy. Thus, we can be aware of the risks for both mother and fetus and even treat them early. Couples can be counseled optimistically that the recurrence rate of TRAP syndrome tends to be low so that they can better plan future pregnancies in all aspects.²

CASE REPORT

We reported the case of a 25-year-old pregnant woman. This was the first pregnancy with a gestational age of 35 weeks 2 days and the patient was referred from another doctor to Kasih Medika with suspicion of a large placenta. The results of the examination showed that there were twin pregnancies that did not develop in one fetus. In addition, all examination results were within normal limits. Estimated delivery in October 2021. Doctors suspect that the condition of this mother’s pregnancy showed the diagnosis

of TRAP (Monochorionic Twin) so the doctor assumed that the delivery process was carried out by cesarean section.

On October 7th, 2021, at 37 weeks and 1 day of gestation, the patient went to the Payangan Hospital, Gianyar, Bali with ruptured membranes and an increased baby heart rate. A cito Caesarea was performed, it turned out that the doctor's suspicions were correct that this was a very rare case, namely a pregnancy with TRAP (Monochorionic Twin). The baby girl was born with a birth weight of 3155 grams, an Apgar score of 6-8-9, and a placenta weighing 815 grams. The results of the examination of the second fetus that did not develop weighing 1,705 grams in the placenta did not have an attached umbilical cord.

The following were the results of ultrasound at 35 weeks 2 days of pregnancy and the next picture was when the twins were born.

DISCUSSION

Acardiac recipient twins coexist with normal pump (donor) twins in TRAP syndrome, a rare obstetric disease exclusive to monozygotic monochorionic twin pregnancies. The phrase, which refers to a specific type of twin-to-twin transfusion syndrome, was first defined by Gruenwald in 1942. (TTTS). 1 in 35 000 pregnancies, 1 in 100 sets of monozygotic monochorionic twins, and 1 in 30 sets of monochorionic triplets are affected with TRAP syndrome. Only 8% of cases involve triplets, with twins being the most common. Although this anomaly is common in monochorionic twins, there are differences and morbidity for donor twins. Acardiac twins are classified according to the frequency with which reports of multiple dichorionic twins with fused placenta have this disorder.^{3,4}

Acardiac twins caused twin reversed-arterial-perfusion (TRAP) syndrome in "receiving" twins resulting in fetal cranium hypoxia and subsequent upper body abnormalities. This condition is fatal to the recipient twin and causes a high mortality rate from the failure of head and trunk development. There are 4 types of heart twins, namely: (1) acardiac-acephalus, the fetal head does not develop; (2) acardiac-anceps, the fetus has a head

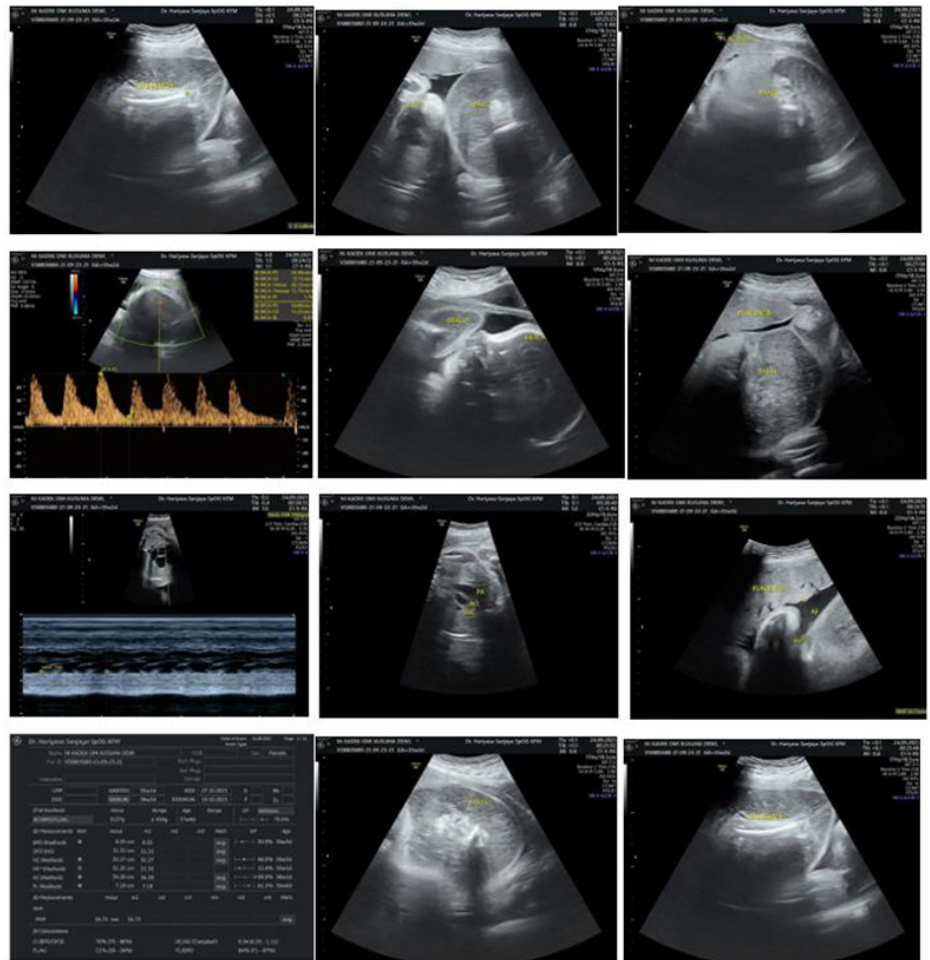


Figure 1. Ultrasound of the fetus at 35 weeks and 2 days



Figure 2. Baby I: Pump Twin

structure and its nervous tissue develops; (3) acardiac-acormus, the fetus has a head structure but limited or undeveloped trunk development; and (4) acardiac-amorphous, a severe malformation of the fetus in which the head and body are almost indistinguishable.^{5,6}

Acardiac twins rely on blood from healthy twins. This is accomplished by turning around the abnormal umbilical artery flow that results from an anastomosis of an umbilical vein or artery between two growing twins at 3–4 weeks gestation. There is no clear understanding of the precise pathology. According to one idea, the early umbilical vascular anastomoses in the fused placenta cause vascular compromise, early tissue hypoxia in one of the twins, and atrophy of other organs including the heart.⁷

A relationship between TRAP and VACTERL in one case report indicated

an early embryogenesis problem. Another idea holds that a TRAP pregnancy develops from one twin's failure to form a heart, which is followed by an anastomosis between the umbilical veins that impairs the affected twin's survival. In 50% of TRAP syndrome instances, a chromosomal defect is present. TRAP syndrome cases have also been documented in vitro fertilization (IVF) triplet pregnancies with dichorionic triamniotics. The risk of TRAP is always highlighted by monochorionicity.¹⁻⁸

In our case, it was monochorionic and monoamniotic twins. Chromosomal analysis was not performed in our case because the gestational age was approaching the term so it was recommended to deliver by Sectio Caesarea. The acardiac twins become dependent on the perfusion of the "Pump" twins. The upper body of the acardiac twin does not develop at all, while the head,

cervical spine and upper limbs are absent. lower limbs are not fully formed. The lower extremities are also not developed so their morphological appearance is like lumps of flesh and skin without the shape of a head, body, or limbs.¹⁻⁸

This acardiac fetus is included in the acardiac-amorphous calcification. Acardiac-amorphous, the fetus has a severe malformation in which the head and body are almost indistinguishable. Prenatal diagnosis by ultrasonography is suspected when multiple pregnancies show discrepancies and odd malformations with retrograde blood flow in the hearts of the twins indicated by pulse/color Doppler. The differential diagnoses to rule out include anencephaly, cystic hygroma, conjoined twins, twin deaths, and intraamniotic placental tumors. In our case, the diagnosis based on ultrasound was suspect of TRAP according to the image which found a large mass, while the other fetuses were growing well, even the placenta was according to gestational age.¹⁻⁸

The perfusion mechanism in cardiac twins involves deoxygenated blood leaving the healthy twin and entering through the abdominal aorta. Thus, the available oxygen and nutrients are taken advantage of, allowing the tail feature to develop to



Figure 3. Baby II: Acardiac Twin



Figure 4. The Placenta

some extent. The heart, head, and upper body cannot develop properly after blood reaches the upper body backward because oxygen saturation is so low. This results in severe deficiencies. Anophthalmia, microphthalmia, cleft lip, cleft palate, absent or rudimentary limbs, diaphragmatic defects, absence of the lungs and heart, oesophageal atresia, ventral wall defect, ascites, absence of the liver and gallbladder, skin edema, and a single umbilical artery are anomalies in acardiac twins (75 percent of cases). Additionally, the patient's umbilical arteries are substantially different in size from their twins', and occasionally, the umbilical arteries retract directly into the superior mesenteric arteries.¹⁻⁸

The prognosis in lethal TRAP syndrome for cardiac twins. The mortality of pump twins is very high (50-75%) due to high-output heart failure. In our case, pump twins were born lifeless whereas cardiac twins were born safe and sound. The recurrence of TRAP syndrome is unknown/not increasing, and tends to be low so couples can be counseled optimistically for the next pregnancy. The doctor's suspicions about the TRAP pregnancy were indeed true according to the conditions at the time of the twins' birth. The doctor found 1 healthy baby and 1 other like mass with a size large enough on ultrasound at 35 weeks 2 days of gestation.¹⁻⁸

Incidence of pregnancy like this is very rare and needs further study in order to detect early abnormalities that occur in pregnancy. Thus, we can be aware of the risks for both mother and fetus and even treat them early.

CONCLUSION

Medical personnel such as doctors and radiologists must be able to detect anomalies like this early on, especially in twin pregnancies. Saving the pump twins can be done with the right actions if there is any hope for him to survive. The pathologist should also be aware of this entity so that a proper autopsy can be performed and explained to parents and family. Thus, couples who want to plan their next pregnancy can prepare themselves better in all aspects.

CONFLICT OF INTEREST

The author declared no conflict of interest in this article

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ETHICAL CONSIDERATION

This study already got patient consent for publication

AUTHOR CONTRIBUTION

All authors contributed equally to this study

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