Pathogenesis and Chronology of events in Twin Reversed Arterial Perfusion (TRAP) sequence

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Introduction

The Twin-Reversed-Arterial-Perfusion-Syndrome (TRAP) is a rare complication of monochytic multiple pregnancies. In TRAP sequence, blood flows from an umbilical artery of the pump twin in a reversed direction into the umbilical artery of the perfused twin, via an arterioarteral anastomosis and usually returns via a venovenous anastomosis back to the pump twin. Two criteria seem to be necessary for the development of a TRAP sequence. The first is the presence of an arterioarteral anastomosis and the second a discordant development or an intrauterine demise of one of the monochorionic twins, allowing for reversal of blood flow.

Case Report

A 31 year old G3P0 was seen at 12 weeks gestational age with a diagnosis of fetal demise in one twin followed by diagnosis of a recurrence of the fetal heart rate in the same twin but with associated hydrops. On assessment, the patient was found to have one twin with normal appearing limbs, spine and cranial structures but second twin had no recognizable cranial, poorly developed limbs, no intracardiac blood flow but blood flow in the umbilical artery towards the abnormal fetus. A diagnosis of TRAP sequence was made and by reassessment at sixteen weeks gestational age, the blood flow towards the abnormal fetus had ceased.

At 19 weeks the surviving fetus showed no evidence of intracranial anomalies but was noted to have a cleft palate with no other anomalies. Unfortunately at 22 weeks the patient presented with incompetent cervix, declined rescue cerclage and delivered at 22 weeks.

Results

Our literature review revealed reports of cases were an initial heartbeat is noted in a twin subsequently found to be a TRAP sequence. Our case documents an initial intrauterine fetal demise followed by recurrence of blood flow towards the demised twin. This finding supports the hypothesis that TRAP sequence is caused by the presence of an arterioarterial anastomosis and an intrauterine demise of one of the monochorionic twins, allowing for reversal of blood flow. In this case the fact that the fetal heart beat was initially seen in the smaller twin who then had cessation of heart beat supports the hypothesis that the abnormal fetus likely had anomalies that led to it’s death FOLLOWED by reversal in blood flow as against reversal of blood flow occurring first.

Review of the literature revealed numerous reports on spontaneous cessation of blood flow to the acardiac twin which in some cases results in improved outcome for these pregnancies however this was not the case in our patient, who still lost the pregnancy.

Conclusion

The above confirms the hypothesis that TRAP sequence is caused by reversal of arterial blood flow towards a demise or discordant monochorionic twin. Care should be taken to watch for development of TRAP sequence in case of co-twin demise in the first trimester in monochorionic twins.

References

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