

CASE REPORT

TRAP Sequence in an IVF Pregnancy Successfully Treated with Laser Coagulation: Case Report

Amol Lunkad¹, Ishita Lunkad², Amit Magdum³

Received on: 16 January 2023; Accepted on: 25 February 2023; Published on: 09 May 2023

ABSTRACT

Aim and background: Twin reversed arterial perfusion (TRAP sequence) is a rare condition of monochorionic twin pregnancies in which one twin does the work of supplying blood for both twins. The twin supplying blood is known as the 'Pump twin', the other twin is known as the 'Acardiac twin' – lacks a heart or has one that is not fully formed. Incidence is 1/35,000 births and 1/100 monochorionic twin pregnancies.

Case presentation: Herein, we report a case of TRAP sequence in an *in-vitro* fertilization (IVF) monochorionic twin pregnancy, which was successfully managed by intrauterine laser coagulation of the umbilical cord of the acardiac twin finally resulting in a live birth at 36 weeks of pregnancy.

Conclusion: Twin reversed arterial perfusion sequence is a complication that is seen in monochorionic twin pregnancy, and it has a poor prognosis.

Clinical significance: Early selection of proper treatment modality by making the diagnosis with ultrasonography is of great importance for a successful pregnancy outcome.

Keywords: Case report, Diamniotic monochorionic twin pregnancy, Intrauterine laser coagulation, Twin pregnancy, Twin reversed arterial perfusion sequence.

Journal of Obstetric and Gynaecological Practices POGS (2023): 10.5005/jogyp-11012-0001

INTRODUCTION

Twin reversed arterial perfusion (TRAP sequence) is a rare condition of monochorionic twin pregnancies in which one twin does the work of supplying blood for both twins.¹ Twin supplying blood is known as 'Pump twin', the other twin is known as 'Acardiac twin' – lacks a heart or has one that is not fully formed.^{1,2} Incidence is 1/35,000 births and 1/100 monochorionic twin pregnancies.¹ A 36-year-old female with a previous history of one *in-vitro* fertilization (IVF) failure with adenomyosis conceived in an IVF cycle diagnosed antenatally with monochorionic diamniotic twin pregnancy with TRAP sequence, successfully treated with LASER coagulation at 14 weeks, delivered a healthy female baby at 36 weeks gestation.

CASE PRESENTATION

The patient is a 36-year-old female with a previous IVF failure and a known history of adenomyosis and primary infertility. She had been married for 10 years; her menses were regular with a history of moderate dysmenorrhea. There was no history of any medical illness. She had a history of myomectomy with a right ovarian endometriotic cystectomy done in 2018.

INVESTIGATION FINDINGS

Investigations in the patient: Hb: 11.4; Blood group: A+ Positive; RBS: 111 gm/dL; TSH: 1.83; PRL: 13.68; AMH: 2.49; USG: Bulky uterus with posterior and fundal wall adenomyosis, endometrial cavity normal, endometrial thickness 8 mm; AFC: Right = 5, Left = 5.

Investigations in the patient's husband: Semen analysis count: 20 million/ml; Total motility: 20%; Morphology: -1%; Normal forms suggestive of Asthenoteratozoospermia.

^{1,2}Department of Reproductive Medicine, Indira IVF Hospital, Pune, Maharashtra, India

³Department to Fetal Medicine, Indira IVF Hospital, Pune, Maharashtra, India

Corresponding Author: Amol Lunkad, Department of Reproductive Medicine, Indira IVF Hospital, Pune, Maharashtra, India, Phone: +91 8237834121, e-mail: dramollunkad@gmail.com

How to cite this article: Lunkad A, Lunkad I, Amit M. TRAP Sequence in an IVF Pregnancy Successfully Treated with Laser Coagulation – Case Report. *J Obstet Gynaecol Pract POGS* 2023;1(1):23–25.

Source of support: Nil

Conflict of interest: None

TREATMENT DETAILS

Tablet Antioxidant with multivitamin 1 OD for 1 month, Tablet folic acid 5 mg 1 OD for 1 month, Antagonist stimulation protocol: Injection rFSH 225 IU for 12 days, Inj. HMG 75 IU for 12 days with Inj. rHCG 250 mcg for a trigger.

Response to Stimulation at Ovum pickup – 10 Oocyte cumulus complex, 9 mature oocytes – 2 Blastocysts 4AA formed. Both blastocysts vitrified on day 5.

Post-ovum pickup – regulation was done with two injections of GnRH agonist depot 3.75 mg given 28 days apart. Frozen embryo transfer is done in a down-regulated HRT cycle. Both Blastocysts were transferred. Beta HCG levels were 2200 mIU/ml. Her sonography at 7 weeks confirmed a diamniotic monochorionic twin pregnancy with a single live fetus.

At 12 weeks sonography a diagnosis of monochorionic twin pregnancy with TRAP sequence was done with one partially

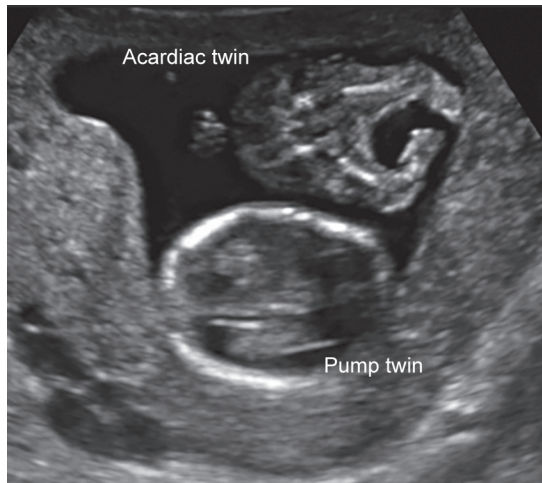


Fig. 1: Ultrasound picture of the monozygotic twin pregnancy with TRAP Sequence showing the acardiac twin and the pump Twin



Fig. 2: Ultrasound picture during the LASER coagulation of the umbilical cord of the acardiac twin in TRAP sequence

developed acardiac fetus and the other normal fetus acting as the pump twin.³⁻⁵ The acardiac fetus had an incompletely formed skeleton, with no head, upper limbs, or heart as shown in [Figure 1](#). On color doppler imaging, the umbilical artery in the abnormal fetus showed a reversal of flow.

This appearance was typical of a TRAP sequence with an acardiac parabolic twin (acardius acephalus/acardius chorioangiopagus parasiticus). The normal fetus that is the pump twin had normal nuchal translucency and nasal bone at 12 weeks of sonography. The couple was counseled and the decision for LASER coagulation of the cord of the acardiac twin was decided.

LASER coagulation (Interstitial LASER) of an umbilical vessel of the acardiac twin was done successfully at 14 weeks under trans-abdominal sonography guidance with aseptic precautions as shown in [Figure 2](#). Amniocentesis with fetal karyotype and microarray was done on the first twin which was normal.

An early anomaly scan was done which was normal. High-risk pregnancy care was given to her during her pregnancy. She was diagnosed with gestational diabetes at 24 weeks and was started on Metformin. Her sugar levels were monitored and well controlled on Metformin 500 mg thrice day. She underwent an elective lower segment cesarean section at 37 weeks and delivered a healthy female baby of 2.6 kg. Baby and mother had an uneventful postpartum course.

DISCUSSION

Twin reversed arterial perfusion sequence represents a variant of conjoined twins in which chorionic circulation is shared.⁵ Organogenesis defect due to anastomosis in the placenta during an early embryonic period is suggested in the pathogenesis of the TRAP sequence.⁵ In acardiac fetus placental blood circulation between the acardiac fetus and donor fetus is provided by artery-artery and vein-vein anastomosis.^{1,2} In the TRAP sequence, the normal twin 'pumps' or 'donates' blood to the abnormal twin, which is called the 'recipient' or 'perfused' twin through abnormal artery-to-artery or venous-to-venous communications in the placenta.^{1,5} There is a reversal of flow in the recipient twin, with relatively oxygenated blood flowing from the abnormal anastomosis to the umbilical artery; the flow then proceeds cranially, leaving the fetus via the umbilical vein; hence the term, TRAP sequence.⁵ This finding can

be confirmed by pulsed doppler of the umbilical artery of the recipient twin, which will reveal a reversal of flow on the spectral waveform. Antenatal diagnosis made by the absence of heart on ultrasonography and revealing placental vascular anastomosis with doppler diagnosis can be made by ultrasound at the end of the first trimester.^{3,4}

Congenital anomalies are present in about 9% of pump twins.² The overall perinatal mortality of pump twins is 50–55%, usually due to either polyhydramnios leading to premature delivery or secondary to congestive cardiac failure. High-output cardiac failure develops due to increased cardiac output secondary to abnormal interfetal circulation.^{1,2} Goal of therapy is to salvage the pump twin.² Invasive methods for eliminating acardiac twin should be selected.^{1,2} Discontinuation of the blood flow to acardiac twins is the treatment method performed by:^{1,2}

- Coagulation of umbilical cord.
- Endoscopic umbilical cord ligation.
- Sclerosis of umbilical cord with alcohol.
- Thermo-coagulation of umbilical cord and Aorta under USG guidance.

Mortality for acardiac twin is 100% and pump twin is 50%.

CONCLUSION

Twin reversed arterial perfusion sequence is a complication that is seen in monozygotic twin pregnancy and it has a poor prognosis. Early selection of proper treatment modality by making the diagnosis with typical ultrasonography and doppler finding is of great importance for a successful pregnancy outcome.

Consent to Publication

Written informed consent was obtained from the patient for the publication of the case details and the accompanying images.

Disclosure

This article is based on a previous article published in "POGS Star Connect The Newsletter" by the authors.⁶ Necessary permissions have been obtained from the editor of "POGS Star Connect The Newsletter" and the editor of this journal to publish the article.

REFERENCES

1. Malinowski W. Twin reversed arterial perfusion syndrome in historical sources. *Ginpol Med Project* 2019;1(51):031–039.
2. Nanthakomon T, Chanthasenanont A, Somprasit C, et al. Twin reversed arterial perfusion (TRAP) sequence: A case report and review of treatment. *J Med Assoc Thai* 2015;98(Suppl 3):S132–S140. PMID: 26387401.
3. Levi CS, Lyons EA, Martel MJ. Sonography of multifetal pregnancy. In: Carol M, Rumack (Eds). *Diagnostic ultrasound – Volume 2*, 3rd edition. Missouri: Elsevier Mosby; 2005. pp. 1207–1209.
4. Monteagudo A, Roman AS. Ultrasound in multiple gestations: Twins and other multifetal pregnancies. *Clin Perinatol* 2005;32(2):329–354. DOI: 10.1016/j.clp.2005.02.006.
5. Chandramouly M, Namitha. Case series: TRAP sequence. *Indian J Radiol Imaging* 2009;19(1):81–83. DOI: 10.4103/0971-3026.45352.
6. Lunkad A, Magdum A, Lunkad I, et al. Trap sequence in an IVF pregnancy successfully treated with laser coagulation – A case report. *Pune Ob Gyn Society* 2021;4:41–43. Available from: https://www.pogs.in/wp-content/uploads/2021/08/POGS_Star-Connect_July-2021_Digital.pdf.