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Case Report

Case Report: Embryo Transfer after Slow Pathway Radiofrequency Ablation in a Paroxysmal Supraventricular Tachycardia Patient

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ABSTRACT

This case report highlights the successful embryo transfer in a patient with a history of paroxysmal supraventricular tachycardia (PSVT) who underwent slow pathway radiofrequency ablation prior to in vitro fertilization (IVF). It emphasizes the importance of multidisciplinary care in managing patients with cardiac arrhythmias during assisted reproductive procedures.

We report the case of a 31-year-old female patient with a history of primary infertility due to polychistic ovarian syndrome (PCOS) and a septate uterus. The patient underwent ovarian stimulation and oocyte retrieval, followed by cryopreservation of all the embryos due to mild ovarian hyperstimulation syndrome. During her fertility treatment, she developed symptomatic paroxysmal supraventricular tachycardia (PSVT), which was managed successfully with slow pathway radiofrequency ablation. Following recovery from the procedure, the patient elected to proceed with thawing of the cryopreserved embryos. A single embryo transfer was performed after uterine septum correction, resulting in a successful singleton pregnancy. The pregnancy progressed without complications, culminating in the delivery at 38 weeks and 5 days pregnancy by c-section of a healthy female infant.

KEYWORDS

Paroxysmal supraventricular tachycardia, Radiofrequency ablation, Embryo transfer, In vitro fertilization, Cardiac arrhythmia, Pregnancy.

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Introduction

Paroxysmal supraventricular tachycardia (PSVT) is a common arrhythmia characterized by episodic rapid heart rates originating above the ventricles. Though generally benign, PSVT can complicate pregnancy and fertility treatments due to hemodynamic instability. Slow pathway radiofrequency ablation is a well-established treatment that offers a potential cure. This case explores the outcome of embryo transfer post-ablation in a patient pursuing IVF.

Background

Infertility is an increasingly prevalent issue among couples. The causes of infertility are multifactorial, with a higher incidence observed particularly in recent years among younger individuals. Female infertility is more frequently encountered, followed by infertility affecting both partners [1].

This case report presents a case of infertility in both partners. The female patient exhibited a predisposition to primary infertility, being diagnosed with PCOS. Elevated androgen levels in the blood created negative feedback that inhibited the maturation of ovarian follicles and monthly ovulation [2]. This type of anovulatory infertility makes fertilization and pregnancy sometimes impossible.

The male partner was diagnosed with asthenozoospermia, characterized by reduced sperm motility, as demonstrated through diagnostic investigations. In this case, the most effective solution for achieving pregnancy was intracytoplasmatic sperm injection (ICSI). Coutton 2015, Roy 2017

Case Presentation

A 31-years-old patient, married for 8 years, who previously underwent surgery for a mammary adenofibroma, presents for consultation and is diagnosed with primary anovulatory infertility, polycystic ovaries, and a septate uterus.

Following blood tests, the hormone level results were registered as follows: (FSH 5,8 mUI/mL, LH 5,5 nmol/L, Prolactin 335µUI/mL AMH 3,86 ng/mL, Estradiol 256pmol/). Her partner, aged 36, denies any pathology and was diagnosed with asthenozoospermia following a sperm analysis. (concentration of 21 million sperm cells/mL, 30% total motility, with less than 25% with rapid progressive motility). Upon reviewing the family medical history, it was noted that both parents of the couple had a history of hypertension with a predisposition to stroke on the paternal side. leading to exitus for the male's father. Additionally, both partner's parents are diagnosed with diabetes. The lady didn't mention any other disease in the past, just some arrhythmia episodes at 28 years old, characterized by palpitations and dizziness, which were previously managed with beta-blockers. Pre-IVF cardiac evaluation confirmed the absence of inducible arrhythmias, and the patient was cleared for assisted reproductive techniques.

Following medical recommendations, the couple decided to proceed with in vitro fertilization via ICSI to achieve pregnancy. Controlled ovarian stimulation proceeded without complications. Starting from the last menstrual period, March 6, 2023, the lady underwent ovarian stimulation for 11 days. The treatment was based on follitropin alfa from days 2-12, 225 units daily, and ganirelix, as gonadotropin-releasing hormone antagonist from days 6-12, 0.25 mg/day. Throughout ovarian stimulation, the patient was monitored with three periodic hormonal assays for estradiol and progesterone, as well as transvaginal ultrasound. The administration of human chorionic gonadotropin (hCG) 36 hours prior to egg retrieval procedure was the trigger for ovulation. After the procedure, 27 oocytes were retrieved, out of which 20 oocytes were mature and 7 haven't yet expelled the first polar body. All mature oocytes were fertilized through ICSI, but only 12 reached the blastocyst stage. Due to slight ovarian hyperstimulation and an elevated progesterone level, it was decided in collaboration with the couple to vitrify all the embryos on day 5, on blastocyst stage. The patient's general condition was reevaluated 2 weeks after the egg retrieval, and it was observed that the ovaries and endometrial lining had returned to normal.

Four months after the egg retrieval procedure, in July 2023, the patient presented for a cardiological evaluation following recurrent episodes of paroxysmal supraventricular tachycardia every 2-3 weeks, lasting a few hours, with no cardiovascular risk factors. The patient has a history of 2 PSVT since adolescence, with a period of relative stability, followed by two episodes of PSVT 4 months post-ovarian stimulation with a ventricular rate of 200-220/min, less than 1 month apart, unresponsive to symptomatic treatment (palpitations and syncope), lasting for several hours, and converted to sinus rhythm with medications, without response to vagal maneuvers. However, due to the frequency and severity of episodes, investigations confirmed the diagnosis and she underwent successful slow pathway radiofrequency ablation six months after IVF.

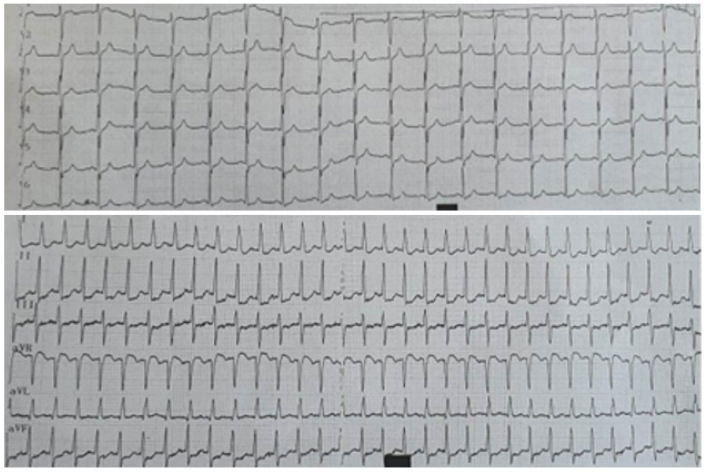

Figure 1: ECG in RS – RS, 113 beats per minute, QRS axis 40 degrees, with no secondary repolarization abnormalities

Given the patient's history of infertility and her pre-existing obstetric risk, radiofrequency ablation was chosen prior to the embryo transfer procedure. Additionally, a minor thrombophilia was discovered. After the ablation, the cardiac condition was resolved. The patient was monitored for 1 year, during which there were no episodes of paroxysmal supraventricular tachycardia.

Following remission, in 2024, an ultrasound and hormonal tests recommended by the gynecologist in our Fertility Clinic were conducted, and together with the doctor, the couple decided to

proceed with a cryo-embryo transfer in a natural cycle, without hormonal treatment. A single, high-quality blastocyst was selected for embryo transfer. The procedure consisted of transferring a 5AA blastocyst (Figure 1) using a medium enriched with hyaluronic acid.

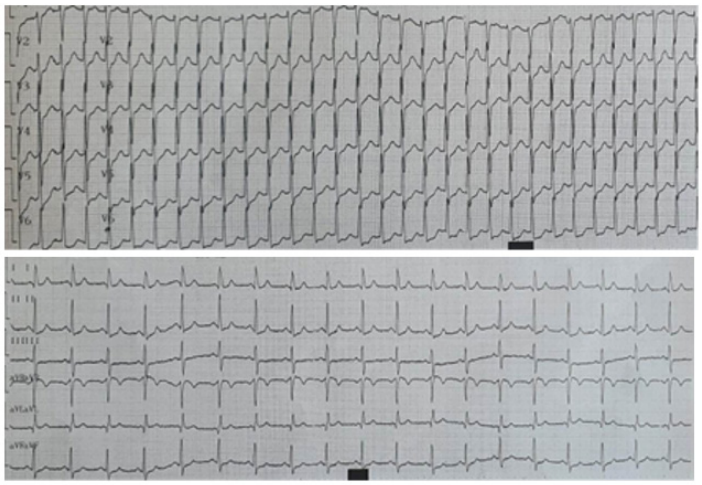

Figure 2: ECG in tachycardia - PSVT, 214 beats per minute, without visible P waves (electrical aspect suggestive of AV nodal re-entrant tachycardia).

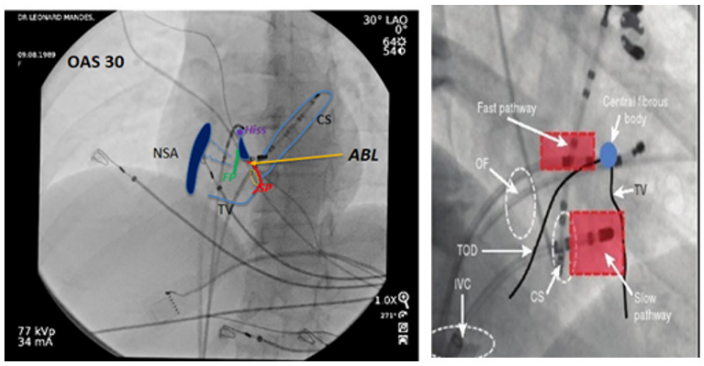

Figure 3: Slow pathway radiofrequency ablation.

Figure 4: Embryo that was transferred successfully in the patient's uterus with the endometrial thickness being 11.8 mm.

In 2 weeks, the pregnancy was confirmed through monitoring the beta hCG levels, indicating a successful transfer.

The patient remained hemodynamically stable with no arrhythmic episodes noted during her pregnancy. The pregnancy progressed uneventfully, with regular cardiology follow-ups ensuring continued cardiac stability.

Throughout the pregnancy, she was monitored and was also prescribed anticoagulant treatment with low molecular weight heparin to prevent potential complications due to thrombophilia. The pregnancy progressed without complications, culminating in the delivery of a healthy female infant, weighting 2850 g and a hight of 50 cm, Apgar 10...

Discussion

Tachyarrhythmias are more common during pregnancy, especially in older patients (>30 years), including Paroxysmal Supraventricular Tachycardia (PSVT) due to reentry in the node, with physiological changes during pregnancy (mild increase in cavity volumes, sympathetic stimulation, and increased progesterone levels, which has a pro-arrhythmic effect) [3].

Pregnant patients with PSVT have an additional higher obstetric maternal-fetal risk (OR 1.54–3.52) compared to patients without a history of arrhythmias [4]. In this context, for patients with symptomatic supraventricular arrhythmias, radiofrequency (RF) ablation prior to pregnancy is recommended (Class I indication, Level of Evidence B) [5]. Patients with PSVT undergoing fertility treatments require careful planning to mitigate arrhythmic risks. Radiofrequency ablation offers a safe, long-term solution, reducing potential complications during pregnancy.

The success rate of RF ablation for PSVT due to reentry in the atrioventricular node (AV node) is 90-95%, with a recurrence rate between 5-10% and a periprocedural risk of major complications <1% (such as fast pathway injury with complete AV block and need for permanent pacemaker, cardiac perforation, etc.). Although some studies suggest there is no direct link between ovarian stimulation associated with IVF and pre-existing heart conditions, the case presented suggests a possible connection between the stimulation treatment and the recurrence of prior heart issues [6] and also a link between ovarian hyperstimulation syndrome and tachycardia as Miller noted in 2008 [7].

This case demonstrates that post-ablation patients can successfully undergo embryo transfer without cardiac complications, provided appropriate pre-procedural evaluation and multidisciplinary management.

Conclusions

This case highlights the multidisciplinary approach required in managing patients with complex infertility due to PCOS, uterine anomalies, and concurrent cardiac conditions. It demonstrates that with appropriate treatment and timing, successful pregnancy

outcomes can be achieved even in the presence of significant medical challenges.

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