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Live birth after transfer of vitrified-warmed blastocyst derived from ICSI with frozen-thawed sperm: case report

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Summary

Objective: A live birth after transfer of vitrified-warmed blastocyst derived from intracytoplasmic sperm injection (ICSI) with frozen-thawed sperm of a male cancer patient is described. *Materials and Methods*: A case report from a tertiary center for assisted reproductive technologies. The 35-year-old male patient had been diagnosed with testicular tumor nine years ago. He had unilateral orchiectomy operation after the diagnosis. Four years after the first operation, he was diagnosed with another testicular tumor in the other testis. He admitted to our center with the demand of sperm preservation before the second surgery. The sperm samples were cryopreserved and stored in liquid nitrogen until required. The patient had no chemotherapy or radiotherapy after the operations. After he completed his oncologic follow up, ICSI was decided with his frozen samples. Although the couple failed to conceive with the fresh cycle, the remaining embryos were frozen and revealed a pregnancy in the subsequent frozen-thawed cycle. *Results*: A healthy female infant with a birth weight of 3,700 g was born by cesarean section at 38th weeks of the gestation. *Conclusion*: Giving detailed information about fertility-saving management in male patients is important in those who wish to bear children. However, both the patients and physicians should be cautious that preservation should be performed before surgery and/or adjuvant therapy. In this respect, assited reproductive technology (ART) and related facilities yield chance of pregnancy in such population.

Key words: Blastocyst; Vitrification; Sperm; Cryopreservation; Testicular cancer; Assisted reproductive techniques.

Introduction

Male cancer patients will be faced with compromised fertility as a result of their cancer treatments. Iatrogenic sterility after chemo/radio therapy in these patients might be avoided by the cryopreservation of sperm cells. Although the studies on the spermatogonial stem cells appear promising, they are still experimental. Nowadays, sperm cryopreservation has become an important part of fertility preservation for those of cancer patients. [1-3].

Cryopreservation of embryos has become a necessary part of assisted reproductive technology (ART) that helps to prevent multiple pregnancies and wastage of supernumerary embryos. This technique may also contribute to increase cumulative pregnancy rates in ART cycles. In this manner, vitrification is a simple technique and gradually replacing slow freezing due to a higher survival rate after thawing. Most infertility units use vitrification technique particularly for oocyte and blastocyst cryopreservation, as both structures did not perform well with slow freezing technique [4].

In the present case, we aim to report the management of a male patient who had been diagnosed with testicular malignancy and demanded to preserve his fertility. Although the couple failed to conceive with the fresh cycle, the remaining embryos were frozen and revealed a pregnancy in the subsequent frozen-thawed cycle.

Case Report

The 35-year-old male patient had been diagnosed with testicular tumor nine years ago. He had unilateral orchiectomy operation after the diagnosis. Four years after the first operation, he was diagnosed with another testicular tumor in the other testis. He admitted to our center with the demand of sperm preservation before the second surgery. His semen sample was frozen in our IVF clinic with freezing medium test yolk buffer with glycerol just before the operation. The sperm samples were preserved in liquid nitrogen until required. After he completed his oncologic follow up intracytoplasmic sperm injection (ICSI) was decided with his frozen samples. His wife patient was a 26-year-old woman. The physical and pelvic examinations were normal. She had nothing significant in her medical history. For controlled ovarian hyperstimulation, recombinant follicle stimulating hormone (FSH) was initiated in the third day of the bleeding with a dose of 225 IU/day. On the fifth day of the induction 0.25 mg/day cetrorelix was administered until the day of human chorionic gonadotropin (hCG). Ovarian response was monitored with frequent serum estradiol (E_2) measurements and transvaginal ultrasonography, as described previously [5]. Oocyte retrieval was carried out under local anesthesia using vaginal ultrasound-

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guided puncture of follicles 36 hours after hCG administration. Twelve oocyte–cumulus complexes were retrieved of which 11 were in metaphase II suitable for ICSI. On the next day, nine of them were fertilized. Eight of the embryos cleaved and a single fresh blastocyst evaluated as 4BB (Gardner's criteria) was transferred four days after oocyte retrieval [6]. A single surplus blastocyst (4CB) was vitrified using cryotip. However the couple failed to conceive in the fresh cycle and a thawed cycle was decided four months later. The patient was prepared using down regulation with leuprolide acetate and artifical preparation of the endometrium using exogenous estrogen and progesterone. A single blastocyst was thawed and transferred following two-hours of incubation. The serum β-hCG test 14 days after the transfer was 265 mIU/ml. A singleton pregnancy with positive fetal heart activity was noted at the seventh week of gestation by transvaginal ultrasonography. Finally, this resulted in a birth of a healthy female infant weighing 3,700 g at 38 weeks of gestation by cesarean section.

Discussion

New technologies in assisted reproductive treatments have created opportunity for fertility preservation in young male cancer patients. Sperm cryopreservation before cancer treatment is the best available way to enable these patients to achieve parenthood. At the same time, ICSI with frozen-thawed sperm is feasible and potentially successful technique in that group of patients. On the other hand, blastocyst culture and transfer is now common in most of the IVF centers. So, this selection process has reduced the number of embryos transferred per cycle and increased implantation rates. As a result of this, embryo cryopreservation has become a routine procedure to increase cumulative pregnancy rates and to prevent wastage of surplus embryos.

Vitrification of human blastocyst is a feasible and viable option to slow freezing method. In recent years, this technique has become superior to slow freezing as it eliminates ice crystals formation and is very easy to perform [7-9].

To our knowledge, a live birth achieved by frozen-thawed blastocyst derived from ICSI with frozen-thawed testicular sperm from a man with non-mosaic Klinefelter's syndrome is reported by Rosenlund *et al.* [10]. In that case, they used slow freezing technique for blastocyst cryopreservation instead of vitrification.

Although Kyono *et al.* [11] were the first to describe a birth of male infant after transfer of vitrified-warmed blastocysts derived from ICSI with vitrified-warmed oocytes and frozen-thawed spermatozoa, donor sperm was used in that study. Differently from the case by Kyono we injected fresh oocytes with frozen-thawed patient's own sperm to achieve a pregnancy.

In conclusion, this is a rare case of a live birth after transfer of vitrified-warmed blastocyst obtained from ICSI with frozen-thawed sperm of male testicular cancer patient. This report highlights the effective use of cryopreservation techniques to overcome infertility problems in young cancer patients.

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