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MD-TESE-ICSI using fresh sperm resulted in a lower rate of miscarriage compared with frozen-thawed sperm

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Summary

Purpose: Frozen-thawed embryo transfer achieves superior pregnancy and miscarriage rates compared with those achieved using fresh embryos, and there is no difference in fertilization rate using fresh versus frozen-thawed sperm collected by microdissection testicular sperm extraction (MD-TESE) when intracytoplasmic sperm injection (ICSI) is performed. However, there are few reports on the miscarriage rate using fresh versus frozen-thawed testicular sperm collected by MD-TESE. *Materials and Methods:* The present patient had been unable to conceive because of her husband's azoospermia. Sperm was successfully collected via MD-TESE. ICSI using fresh or frozen-thawed sperm was performed nine times. *Results:* Two fresh sperm ICSIs resulted in the delivery of two healthy babies. Seven frozen-thawed sperm ICSIs resulted in four pregnancies; however, three of these miscarried, and only one resulted in the delivery of a healthy baby. *Conclusion:* ICSI using fresh sperm decreased the rate of miscarriage compared with ICSI using frozen-thawed sperm in this patient.

Key words: Miscarriage; Fresh sperm; Frozen-thawed sperm; ICSI; MD-TESE.

Introduction

Infertility affects about 15% of couples wishing to have children, and approximately half of these cases involve male factors [1]. One of the most severe problems causing infertility is azoospermia. Microdissection testicular sperm extraction (MD-TESE) followed by intracytoplasmic sperm injection (ICSI) is very effective, and is a popular method for finding and using residual spermatozoa in the testes of men with azoospermia. MD-TESE-ICSI can be undertaken via either of the following two procedures: 1) MD-TESE, follicle aspiration, and oocyte collection performed on the same day with ICSI immediately carried out using fresh sperm; or 2) sperm collected by MD-TESE is frozen until a time when the ovaries are stimulated, and follicle aspiration, oocyte collection, and ICSI using frozen-thawed sperm is performed. The authors report the case of a female who has undergone MD-TESE-ICSI via both methods with varying success.

Materials and Methods

The 23-year-old female patient was referred to a previous hospital because of infertility at the beginning of 2005. She underwent examinations including endocrinologic investigation, tubal patency, and reproductive ultrasonography. The patient's results were normal; however, her husband was diagnosed with azoospermia after seminological examination. The female patient and her husband were then referred to the present hospital for MD-TESE-ICSI.

In April 2005, the authors conducted MD-TESE and collected an adequate amount of sperm. Transvaginal follicle aspiration and ICSI were done on the same day. Ovulation induction was carried out using the long method involving administration of GnRH agonist and gonadotropin, and the remaining sperm was frozen. The authors retrieved 12 oocytes and fertilized five of them. Two of the embryos were cryopreserved, and three of them were transferred into the patient.

A second ICSI was performed using frozen-thawed sperm in June 2008. Ovulation induction was done using the same long protocol, and ten oocytes were collected. Six oocytes were fertilized, and four embryos were cryopreserved the next day. Two embryos were transferred into the patient two days after ICSI. In January 2009, the four frozen embryos were thawed, and two of them were transferred into the patient.

The third ICSI was performed using frozen-thawed sperm in May 2009. Ovulation induction was done using the same long protocol; nine oocytes were collected and only one oocyte was fertilized. One embryo was transferred to the patient.

The fourth ICSI was performed using frozen-thawed sperm in August 2009. Ovulation induction was done using the same long protocol; 19 oocytes were collected and two were fertilized. The two embryos were transferred into the patient.

The fifth ICSI was performed using frozen-thawed sperm via the same protocol in December 2009; 12 oocytes were collected and six were fertilized. Three embryos were frozen, and one of these three embryos was transferred into the patient.

After the fifth ICSI, the authors performed several tests for recurrent pregnancy loss including testing for autoantibodies, blood clotting ability, and chromosome tests of the patient and her husband. In March 2010, two of the three frozen-thawed embryos were transferred into the patient.

The sixth ICSI was performed using frozen-thawed sperm via the same protocol in October 2010; 13 oocytes were collected and two were fertilized. Two embryos were transferred into the patient.

MD-TESE was again performed on the patient's husband in January 2011, and fresh sperm was collected. The seventh ICSI

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was carried out using fresh sperm on the same day as collection.

The eighth ICSI was done using frozen-thawed sperm in August 2013, and the ninth ICSI was done using frozen-thawed sperm in November 2013.

Results

The patient became pregnant after the first ICSI and vaginally delivered a baby at 38 weeks and three days gestation in January 2006. The baby was male and weighed 2,672 grams. The two remaining frozen embryos from the first ICSI were discarded according to the present hospital protocol, as the patient had delivered a healthy baby.

The patient became pregnant after the second ICSI, but miscarried at eight weeks gestation. The patient did not become pregnant after two frozen-thawed embryos were implanted in January 2009. The patient did not become pregnant after the third or the fourth ICSI procedures. After the fifth ICSI, the patient became pregnant, but miscarried at five weeks gestation. All of the results from the recurrent pregnancy loss testing were normal. The patient did not become pregnant after frozen-thawed embryo transfer in March 2010. The patient did not become pregnant after the sixth ICSI. After the seventh ICSI, the patient became pregnant and delivered her second baby at 37 weeks and six days gestation in October 2011. The baby was female and weighed 2,545 grams. The patient did not become pregnant after the eighth ICSI. After the ninth ICSI, the patient became pregnant and delivered her third baby at 40 weeks and six days gestation in August 2014. The baby was male and weighed 2,990 grams.

Discussion

In general, the pregnancy and miscarriage rates associated with transfer of frozen-thawed embryos are superior to those associated with transfer of fresh embryos [2]. In addition, several studies reported no difference in fertilization rate and embryo quality between fresh and frozen-thawed testicular sperm collected by MD-TESE that was then used in ICSI [3-5]. However, few reports have compared the miscarriage rate with fresh versus frozen-thawed testicular sperm collected by MD-TESE. In the present case, the patient successfully became pregnant through MD-TESE-ICSI six times. Both pregnancies resulting from ICSI using fresh sperm resulted in the delivery of a healthy baby. However, only one of the four pregnancies resulting from ICSI using frozen-thawed sperm led to the delivery of a healthy baby; the other three miscarried despite normal screening test results for potential causes of recurrent miscarriage.

Conclusion

ICSI using fresh sperm collected by MD-TESE was superior to that using frozen-thawed sperm in terms of the miscarriage rate in this case. ICSI using fresh sperm could potentially lower the miscarriage rate when sperm is collected from the testes in cases where chromosomal analysis, AZF on the Y chromosome, endocrinological testing, and reproductive ultrasonography are normal before MD-TESE. Further studies involving large sample sizes are needed to compare the miscarriage rate of pregnancies resulting from fresh versus frozen-thawed sperm collected by MD-TESE.

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