Comparing Pregnancy Outcome after Intracytoplasmic Sperm Injection Using Different Sources of Sperm

Milat I.Haje, Hawler Medical University-College of Medicine-PhD in Assisted Reproductive Technology

Abstract:

Background and objectives: To compare the clinical outcome afterintracytoplasmicsperm injection (ICSI) with extracted testicular sperm or ejaculated oligoasthenoteratozoospermic (OAT) sperm. In addition, to compare between fresh and cryopreserved testicular spermatozoa in patients with azoospermia who received combined tamoxifen and L-carnitine therapy.

Methods: Exclusion criteria included cases with known etiology of leukocytospermia, altered testicular volume, varicocele, abnormal FSH level, and couples with combined male and female factors. Ninety two ICSI cycles using extracted testicular sperm from men with azoospermia were compared prospectively with 88 ICSI cycles using fresh ejaculated sperm from men with OAT. Sixty ICSI cycles using TESE sperm were evaluated. Thirty three ICSI cycles using fresh TESE sperm whereas the remaining 27
ICSI cycles using frozen-thawed TESE sperm**.**

Results: The overall pregnancy rate per ICSI cycle was lower when sperms were extracted from azoospermic men (31.5%) than when fresh sperm of OAT men were used (42%), this difference was not significant (P= 0.143)

The clinical pregnancy rate per cycle was 30.3% for fresh and 37% for frozen-thawed TESE sperm (P=0.582), statistically not significant.

Conclusion: No significant difference in pregnancy rate after ICSI with extracted testicular sperm or ejaculated oligoasthenoteratozoospermic (OAT) sperm, and no differences were found in ICSI outcomes between cryopreserved and fresh testicular sperm in OAT patients who received combined tamoxifen and L-carnitine therapy.

Keywords:ICSI, Pregnancy outcome, Sperm, IVF

Introduction:

Many studies have shown conflicting results when ICSI is performed with sperm from different sources.[1-3] It can be reasoned that because spermatozoa were of limited number and good quality sperm were chosen for ICSI, similar results might have been found after ICSI with different semen qualities. [4-6] Study of Tsai[7] compared 126 ICSI cycles using extracted testicular sperm from men with azoospermia and 65 ICSI cycles using fresh ejaculated sperm from men with extreme sever OAT, resulted that clinical pregnancy rate per transfer, chemical pregnancy rate per transfer, implantation rate, live birth rate per transfer, and abortion rate per transfer, were similar between the groups. Sixty live births resulted from 48 extracted testicular sperm cycles and 21 live births from 19 extreme severe OAT. The obstetric and perinatal outcomes were similar between the groups, and children conceived by using ICSI were healthy and without major psychomotor or intellectual development retardation. One case of tetralogy of Fallot occurred in each group.

Intracytoplasmic sperm injection (ICSI) using fresh sperm obtained by testicular sperm extraction (TESE) as a treatment option for obstructive azoospermia is well established, with high fertilization and pregnancy rates reported. [9] In addition, in patients presenting with azoospermia due to testicular failure, TESE with in vitro fertilization (IVF)–ICSI resulted in pregnancy rates comparable to those obtained from testes with normal spermatogenesis.[8, 9] It was demonstrated that cryopreserved TESE sperm from obstructive and non obstructiveazoospermic patients maintain adequate viability post thaw and achieve excellent fertilization and pregnancy rates with IVF-ICSI. [10]

Although the use of cryopreserved testicular sperm for ICSI has several advantages, the data concerning the outcomes of IVF-ICSI procedures using frozen-thawed testicular sperm are still controversial. [11-14]Some investigators claim that fertilization and/or pregnancy rates are lower with frozen-thawed sperm as compared with fresh,[11, 13]whereas others have demonstrated that in obstructive and nonobstructiveazoospermic men, cryopreserved sperm can function as well as fresh sperm. [11, 13, 14] Study of Helga [16]investigated Twenty-nine patients with obstructive and nonobstructiveazoospermia undergoing testicular sperm extraction for a total of 46 IVF-ICSI cycles (12 fresh, 34 frozen). No statistically significant differences were noted in any of the parameters

examined between IVF-ICSI cycles from fresh or frozen-thawed testicular spermatozoa. Fertilization rates were 56% with fresh vs. 61% with frozen-thawed testicular sperm, cleavage rates 92% vs. 95%, implantation rates 26% vs. 17%, clinical pregnancy rates per cycle 33% vs. 41%, and pregnancy rates per embryo transfer 33% vs. 45%, respectively. Delivery rates were 75% with fresh vs. 69.2% with frozen-thawed testicular sperm, and spontaneous abortion rates 25% and 30.8%, respectively.

The adverse effect of freezing and thawing on sperm quality is even more pronounced in the case of poor quality semen. This is the reason why pooling and cryostorage of semen samples from male factor patients before artificial insemination and IVF is not deemed to be useful; to the best of our knowledge there are only limited reports of pregnancy outcomes of ICSI cycles directly comparing fresh and cryopreserved TESE sperm.

This study objectiveswere to compare the clinical outcome after ICSI with extracted testicular sperm or ejaculated oligoasthenoteratozoospermic (OAT) sperm, and to compare the outcomes of intracytoplasmic sperm injection with fresh and cryopreserved testicular spermatozoa in patients with azoospermia.

Material and methods:

Exclusion criteria included cases with known etiology of leukocytospermia, altered testicular volume, varicocele, abnormal FSH level, and couples with combined male and female factors. Ninety two ICSI cycles using extracted testicular sperm from men with azoospermia were compared prospectively with 88 ICSI cycles using fresh ejaculated sperm from men with OAT. Sixty ICSI cycles using TESE sperm were evaluated. Thirty three ICSI cycles using fresh TESE sperm whereas the remaining 27 ICSI cycles using frozen-thawed TESE spermat Fertility and IVF Center of Maternity Teaching Hospital in Erbil, Iraq from Jan 2013- June 2014. Inclusion criteria consisted of repeated exhibition of OA without detectable cause (idiopathic OA). Exclusion criteria included cases with known etiology of leukocytospermia, altered testicular volume of a minimum of 20 ml as depicted by ultrasonography[17], varicocele as detected by clinical examination and ultrasonography, abnormal FSH levels, and/or couples with combined male and female factors. Patients underwent a clinical evaluation including history taking, general examination, genital examination for possible causes of infertility, and semen analyses according to WHO

(1999).Testicular biopsy was performed for diagnostic and therapeutic reasons; a diagnostic testicular biopsy was performed in men with azoospermia, normal testicular volume and normal reproductive hormones to differentiate between obstructive and nonobstructiveazoospermia and for diagnosis of carcinoma in situ. In whom testicular spermatozoa were used for ICSI, therefore, testicular cryopreservation of testicular tissue from testicular sperm extraction (TESE) for future ICSI was done, if spermatozoa were available.

This study was approved by the local committee of the College of Medicine- Hawler Medical University and funded by Hawler Medical University. All Patients signed informed consents, which explained the nature of this study.

Results:

In the present study, 180 ICSI cycles were analyzed prospectively Table 1 in 92 cycles using sperm extracted from men with azoospermia and 88 cycles using fresh sperm from OAT patients. The overall pregnancy rate per ICSI cycle was lower when sperm were extracted from azoospermic men (31.5%) than when fresh sperm of OAT men were used (42%), this difference was not significant (P= 0.143)

Out of 60 ICSI cycles were performed for azoospermic men, 33 using fresh extracted sperm and 27 using frozen-thawed spermatozoa. The outcome of ICSI with fresh and frozen-thawed TESE sperm is listed in Table 2 The clinical pregnancy rate per cycle was 30.3% for fresh and 37% for frozen-thawed TESE sperm (P=0.582), statistically not significant.

Table (1) The comparison of ICSI using TESE sperm from men with azoospermia vs. fresh ejaculate sperm from men with OAT.

	Pregnancy		Total according to groups
	Negative	positive	
Azospermia	63	29	92
	68.50%	31.50%	100%
OAT	51	37	88
	58.00%	42.00%	100.00%
Total	114	66	180
	63.30%	36.70%	100%

P =0.143

Table (2) Thecomparison of ICSI using TESE sperm from men with azoospermia frozen sperm vs. Fresh sperm.

		Pregnancy		Total according to groups
		Negative	positive	
TESE	Fresh	23	10	33
		69.70%	30.30%	100%
	Frozen	17	10	27
		63.00%	37.00%	100%
Total		40	20	60
		66.70%	33.30%	100%

P =0.582

Discussion:

This study showed no significant difference in pregnancy outcome after ICSI with extracted testicular sperm or ejaculated OAT sperm, and this is not unexpected because ICSI uses a limited number of spermatozoa, and choosing good quality sperm is always of the highest priority. This study suggests that outcomes of ICSI are not affected by sperm from different origins. So the importance of selecting good quality sperm for oocyte injection especially in cases involving sever OAT must be emphasized. Result of this study agreed with study of Tsay[7]resulted that number of top-quility embryos transferred, clinical pregnancy rate, zygote grade 1 score distribution, chemical pregnancy rate, implantation rat, live birth rate and abortion rate were similar between cycles using extracted testicular sperm from men with azoospermia and ICSI cycles using fresh ejaculated sperm from men with extreme sever OAT.

A prerequisite for the routine cryopreservation of TESE sperm is the demonstration of clinical outcomes comparable to fresh TESE sperm. In a study of Prins[10]evaluated TESE sperm quality before and after cryopreservation and determined that post thaw recovery of viable sperm was adequate for subsequent use with IVF-ICSI. Additionally, the IVF-ICSI outcomes with frozen TESE sperm from men with either obstructive or non obstructiveazoospermia were excellent, suggesting that cryopreservation does not adversely affect this procedure.

In the present study compared ICSI outcomes of frozen-thawed TESE sperm with those of fresh TESE sperm by analyzing 60 ICSI cycles in which either fresh or frozen-thawed TESE sperm were used for ICSI, no difference was found in pregnancy outcomes between the two groups. The present findings are in agreement with the studies of [13, 14, 16] reported no difference in fertilization and pregnancy rates for fresh and frozen-thawed testicular sperm from men with obstructive and nonobstructiveazoospermia. However, Friedler[13]reported a trend in the superiority of fresh over frozen-thawed testicular sperm when considering delivery or ongoing pregnancy rates, although the reported groups were too small to reach statistical significance. These results contrast with other reports that indicate that superior results are obtained with fresh TESE sperm and recommend against the use of TESE sperm cryopreservation[18, 19]. One possibility to account for these discrepancies is that the cryopreservation methods are variable between these centers and that freeze-thaw techniques for TESE sperm can significantly affect ICSI outcomes. Although, Maier *et al* reported no differences in embryo transfer rates for fresh and frozen-thawed microsurgical epididymal sperm aspiration (MESA) and TESE/ICSI cycles, the delivery rates were significantly higher when fresh sperm were used.

This result, in correlation with Friedler and coworkers [13], Palermo*et al*[14], and Helga Habermann*et al*[16]. Indicated that the cryopreservation of sperm for future IVF-ICSI procedures at the time of diagnostic testicular biopsy or reconstructive surgery should be routinely considered. Freezing of testicular spermatozoa provides several advantages. First, in 36%–64%
of patients with nonobstructiveazoospermia, no sperm can be obtained from testicular specimens[14]. Second, repeated testicular biopsies may cause damage to the testicles and a significant loss of testicular tissue in patients with small testes. Since cryopreservation of TESE specimens allows for storage of multiple vials, multiple attempts at IVF-ICSI can be achieved from a single biopsy procedure. Third, no coordination of two surgical procedures, testicular sperm and oocyte retrieval, for concomitant IVF-ICSI procedures is necessary when frozen-thawed TESE sperm are used. Finally, men scheduled for secondary radical orchiectomy of a solitary testis because of cancer often present with azoospermia or with severely impaired semen quality.

Conclusions:

No significant difference in pregnancy rate after ICSI with extracted testicular sperm or ejaculated oligoasthenoteratozoospermic (OAT) sperm, and no differences were found in IVF-ICSI outcomes between cryopreserved and fresh testicular sperm.

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