Testicular sperm retrieval by percutaneous fine needle sperm aspiration compared with testicular sperm extraction by open biopsy in men with non-obstructive azoospermia

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The efficiency of testicular sperm retrieval by testicular fine needle aspiration (TEFNA) was compared with open biopsy and testicular sperm extraction (TESE), in 37 rigorously selected patients with non-obstructive azoospermia. All patients underwent TEFNA and TESE consecutively. Thus, each patient served as his own control. The case was regarded as successful if at least one testicular spermatozoan was found allowing intracytoplasmic sperm injection (ICSI) of at least one oocyte. The mean age of the male patients was 32.7 years (range 24–47). Whereas by TEFNA spermatozoa enabling performance of ICSI were found in only four patients out of 37 (11%), open biopsy and TESE yielded spermatozoa in 16 cases (43%). The negative predictive value of high serum follicle stimulating hormone (FSH) concentrations (10 IU/l) (predicting failure to find spermatozoa for ICSI) was low (38.4%). The positive predictive value (predicting the chance to find spermatozoa for ICSI) of normal-sized testicle was not different from that of small-sized (<15 ml) testicle (50%). Complications included one case of testicular bleeding following fine needle aspiration, treated locally, and two cases of extratunical haematoma following TESE requiring no intervention. In patients with non-obstructive azoospermia, TEFNA has a significantly lower yield compared to TESE. Performance of ICSI with testicular sperm in these cases resulted in satisfactory fertilization and high embryo transfer rates. The implantation and pregnancy rates per embryo transfer were 13 and 29% respectively. Neither serum FSH values nor testicular size were predictive of the chances to find spermatozoa for ICSI. Some complications may occur even following TEFNA.

Key words: ICSI/non-obstructive azoospermia/testicular fine needle aspiration/testicular sperm extraction

Introduction

The ability to use only a few spermatozoa from the ejaculate for intracytoplasmic sperm injection (ICSI) in order to achieve high fertilization and pregnancy rates (Palermo et al., 1992) along with the concept of using testicular sperm to achieve fertilization and pregnancies (Schoysman et al., 1993) has revolutionized the potential to treat patients suffering from azoospermia. The first to be treated were patients with obstructive azoospermia, where viable spermatozoa aspirated from the epididymis (Tournaye et al., 1994) or testis (Craft et al., 1993), permitted the achievement of high pregnancy rates following ICSI (Silber et al., 1995a,b). The surgical sperm retrieval methods introduced include open surgery aimed at the epididymis, by micro-epididymal sperm aspiration (MESA) (Temple-Smith et al., 1985; Tournaye et al., 1994; Silber et al., 1994) or testicular biopsy with testicular sperm extraction (TESE) (Schoysman et al., 1993; Devroey et al., 1994; Nagy et al., 1995; Silber et al., 1995a,b,c; Abuzeid et al., 1995). Following the remarkable results in patients with obstructive azoospermia, success has been reported using a less invasive method of sperm retrieval, the percutaneous aspiration by fine needle, aiming at the epididymis (percutaneous epididymal sperm aspiration, PESA) (Craft and Shrivastav, 1994; Shrivastav et al., 1994; Craft et al., 1995a,b) or testis (testicular sperm aspiration, TESA) (Tsirigotis and Craft, 1995; Craft and Tsirigotis, 1995). Alternatively, in obstructive azoospermia, efficient retrieval of testicular spermatozoa by closed percutaneous testicular biopsy was reported, using a modified 20-gauge Menghini testicular biopsy needle (Bourne et al., 1995) or a Biopyt gun (Hovatta et al., 1995).

While in obstructive cases spermatozoa are abundant in the epididymal or testicular tubuli, permitting a high rate of retrieval success, in the non-obstructive cases the epididymis is devoid of spermatozoa and only a few foci with spermatogenesis may be found in the testicles. Publication of successful sperm retrieval by testicular open biopsy in a case of partial tubular atrophy and severely reduced spermatogenesis, but normal gonadotrophins (Yemini et al., 1995), and another case with Sertoli cell-only syndrome and markedly elevated gonadotrophins (Gil-Salom et al., 1995), was complemented almost simultaneously by a report on a series of successful attempts in extraction of spermatozoa from testicular tissue by multiple open biopsies in non-obstructive azoospermic patients (Devroey et al., 1995). Since then, more experience has been reported concerning the use of TESE and ICSI in non-obstructive azoospermia (Tournaye et al., 1995, 1996; Kahraman et al., 1996; Devroey et al., 1996; Silber et al., 1996). Recently, the alternative sperm aspiration methodology of testicular fine needle aspiration (TEFNA) performed in a patient with maturation arrest and elevated gonadotrophins has been published (Lewin et al., 1996). Still, experience in applying fine needle aspiration in cases with non-obstructive azoospermia is limited. To evaluate the possible clinical advantages of TEFNA over open biopsy in non-obstructive azoospermic patients, a prospective study was undertaken, performing TEFNA prior to the open biopsies in all cases with
Materials and methods

Study population

The study population included 37 couples with non-obstructive azoospermic male partners treated at Assaf Harofeh Medical Center’s IVF unit, during the period of November 1995 to August 1996. The mean age of the patients was 32.7 years (range 24–47). The patients underwent physical examination of their genitalia, testicular and transrectal sonography, assessment of their hormonal profile, cytogenetic consultation (including karyotyping and genetic family history) and extensive work-up of several ejaculates prior to their surgical sperm aspiration. No spermatozoa could be seen in any ejaculate provided. Diagnosis of non-obstructive azoospermia based upon the classification by Levin (1979) was made from the histological report, taken previously or during the current procedure. The histological findings according to Levin (1979) may include germ cell aplasia (Sertoli cell-only syndrome), maturation arrest, germ cell hypoplasia (severe hypospermatogenesis) or tubular sclerosis or even a combination of these histological findings. Chromosomal analysis was normal in all patients.

All 37 consecutive patients were candidates for TESE, but consented to undergo TEFNA prior to the open biopsy in order to compare in the same patient the efficiency of the two procedures. The patients’ serum follicle stimulating hormone (FSH) values and testicular volumes were recorded as well and correlated with the outcome of the testicular sperm retrieval.

Sperm retrieval and preparation

TEFNA and TESE were performed under general anaesthesia. On the day of the oocyte retrieval, the male partners were asked to produce fresh ejaculates, and by extended sperm preparation (Ron-El et al., 1996) the absence of spermatozoa in the specimen was verified.

Methodology of TEFNA procedure

All patients underwent TEFNA, using 21-gauge butterfly needles attached to a 20 ml plastic syringe serving as an aspiration device. The butterfly needle was passed directly through the scrotal skin, into the testis, moved up and down at various sites, directing the needle into the rete testis. While holding the testicle between the index finger and the thumb, six different entries were made in each testicle, sampling various locations. Before retrieving the needle from the testis, a small artery forceps was used to clamp the butterfly’s microtubing. Following each aspiration, the needle was flushed with Earle’s balanced salt solution (EBSS) (Gibco BRL, Life Technologies, Paisley, UK) with heparin (Sigma Chemical Co., St Louis, MO, USA) into one well of a 4-well plate (Nunc, Copenhagen, Denmark). For each puncture, a new butterfly needle was used. The aspirates were immediately examined under an inverted microscope (Diaphot 300; Nikon Corp., Tokyo, Japan) at ×200 and ×400 magnification to detect presence of any spermatozoa. The aspirate was then collected and transferred to a 6 ml conical tube (Falcon; Becton Dickinson Labware, NJ, USA) and centrifuged at 300 g for 10 min. Purification of the cell suspensions was executed by lysis of erythrocytes (by a 5 min suspension in erythrocyte-lysing buffer, containing 155 mM NH₄Cl, 10 mM KHCO₃, 2 mM EDTA, pH 7.2). Cell separation after red cell lysis, by discontinuous Percoll gradient, was not performed in all cases. However, occasionally, when a lot of cell debris was seen, the resuspended pellet was layered on a mini-Percoll gradient (90–45%) (Sigma) and centrifuged at 300 g for 20 min. The original pellet after red cell lysis or the sperm-containing fraction following Percoll separation (90% Percoll) was washed twice, by addition of 6 ml of human tubal fluid (HTF–HEPES–albumin medium supplemented with 7.5% synthetic serum (Irvine Scientific, Santa Ana, CA, USA) and centrifuged at 250 g for 5 min. The final pellet was incubated until the sperm injection (between 3 and 6 h). Prior to the injection, the final pellet was examined under the inverted microscope for the presence of spermatozoa using a Petri dish containing multiple droplets (up to 50) of 10 µl each. If spermatozoa were identified, they were transferred to drops of 10% polyvinyl-pyrrolidone (Irvine) covered by pre-equilibrated embryo-tested paraffin oil (Sigma).

Methodology of TESE procedure

In all cases, irrespective of the result of TEFNA, up to three open biopsies were performed in each testicle yielding tissue upon which sperm extraction was executed. TESE was performed according to the technique published by Silber et al. (1996). After stabilization of the testicle, a small incision in the testicle’s mid-portion was performed, cutting through the scrotal skin, unica vaginals and the unica albignea. A substantial piece of the extruding testicular tissue was cut with small scissors, washed by medium to remove blood traces and placed in a Petri dish containing ~1–3 ml EBSS with heparin (Gibco). In the laboratory, a wet preparation was carried out (Jow et al., 1993) for examination. Testicular tissue was vigorously fragmented and minced using two glass slides and immediately examined under the inverted microscope for the presence of spermatozoa. Once spermatozoa were found the surgical procedure was terminated. If spermatozoa were not observed, up to three biopsies were taken, from different areas of the same testicle and also from the contralateral testicle. The testicle was closed by layers using 3-0 vicryl or plane stitches. Part of the testicular specimen was sent for histological analysis. Following vigorous tissue shredding, HTF–HEPES–albumin medium supplemented with 7.5% synthetic serum was added to the suspension obtained and incubated in 6 ml Falcon tubes, for 2 h (5% CO₂ in air) at 37°C. The overlying pellet was then collected and centrifuged (300 g for 10 min). The remaining pellet was isolated, processed and finally examined in multiple droplets under oil, according to the procedures described above. Also, the remains of the underlying pellet were processed and examined in multiple droplets, as described above.

Ovulation induction and oocyte retrieval was performed as described elsewhere (Ron-El et al., 1991), using a protocol of gonadotropin releasing hormone agonist (Gn-RH, Decapeptyl 3.75 mg i.m.; Ferring, Malmö, Sweden) suppression with human menopausal gonadotrophins (HMG) (Pergonal; Teva, Petah Tikva, Israel) for ovarian stimulation. Oocytes were retrieved 36 h after administration of 10 000 IU of human chorionic gonadotrophin (HCG) (Chorigon; Teva), by vaginal ultrasound-guided follicle puncture.

Sperm collection and ICSI procedure

When spermatozoa could be identified and isolated, ICSI was performed as described by Van Steirteghem et al. (1993). Following removal of the oocyte’s surrounding cumulus and corona cells, nuclear maturation assessment was performed using an inverted microscope, to ensure injection of metaphase II oocytes only. Fertilization was assessed on the following day, 16–18 h post sperm injection, and confirmed if two distinct pronuclei could be observed.

Embryo transfer, luteal support and pregnancy evaluation

After assessment of fertilization, embryonic cleavage and morphological quality ~24 h later, embryo transfer was performed, using a
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Wallace catheter. Luteal support included i.m injections of HCG, 2500 IU, on days of embryo transfer +3, +6, +9 or of progesterone in oil (50 mg/day, Gestone; Paines and Byrne, Surrey, UK), from day +1 until serum βHCG measurement 14 days following embryo transfer. Only clinical pregnancies indicated by sonographic demonstration of a gestational sac were counted.

Results

Of the 37 patients with non-obstructive azoospermia, testicular spermatozoa were retrieved in 16 (43%), to enable the performance of ICSI. A significant difference (P = 0.02, Fisher’s exact test) was found using the two methodologies of sperm retrieval. Whereas TEFNA yielded spermatozoa in 11% (4/37) of the patients or 25% (4/16) of the patients in whom testicular spermatozoa were available, with TESE, testicular spermatozoa were found in 16 out of the 37 patients (43%). No significant difference was observed in the mean ± SD age (years) between the males in whom testicular spermatozoa were available (32.5 ± 5.9, range 24–43) or where sperm retrieval failed (33.4 ± 5.8, range 24–47), nor between those with successful retrieval by TEFNA (32.5 ± 7.4, range 24–42) or TESE (32.5 ± 6.0, range 24–43) (P > 0.05, Fisher’s exact test).

The distribution of the variable histological entities among the patients in our study group was correlated with presence of spermatozoa following sperm retrieval, according to the two methodologies used (Table I). Five patients refused transfer of any piece of tissue from the testicular biopsy for histological examination, on religious grounds. Testicular spermatozoa were found in half of the males with germ cell aplasia (45%, 5/11) or hypoplasia (57%, 4/7). The chances of finding spermatozoa in cases of maturation arrest were almost half that of the previous pathologies (28%, 4/14). As shown in Table I, spermatozoa could be aspirated by TEFNA in any of the three histological categories.

Regarding the total number of testicular spermatozoa harvested with the two methods, although not having quantitative data, our experience is that only few spermatozoa were available following TEFNA. Consequently, no spermatozoa were left for freezing following TEFNA, whereas in six patients following TESE, spermatozoa were available for freezing from the remaining testicular tissue.

The mean ± SD values of serum FSH values in the TEFNA+ group and TESE+ group were 25 ± 13.8 and 17 ± 9.6 IU/l respectively (P > 0.5, Student’s t-test). Three of the four TEFNA+ patients had testicular volume of ≤15 ml compared with five (42%) of the 12 TESE+ patients (P = 0.28, Fisher’s exact test).

Correlation between testicular volume and the presence of spermatozoa for ICSI following TESE is presented in Table II. No statistically significant difference was found in the number of patients with small testicles between patients with successful or unsuccessful TESE. The positive predictive value (PPV) of normal testicular volume (>15 ml), predicting the chance of finding spermatozoa, was 57%, disappointingly similar to the negative predictive value (NPV) of small testicles (≤15 ml), predicting failure to find spermatozoa, in 65% of the cases. That means that even in men with small testicles, in eight out of 23 (35%) spermatozoa could be identified. The calculated sensitivity of small testicular volume was 50% and specificity 71%.

There was no statistically significant difference in the mean serum FSH values comparing patients yielding testicular spermatozoa for ICSI following TESE (22 ± 10.8 IU/l), and those in whom no testicular spermatozoa were found (19 ± 10.9 IU/l) (Table III). Positive and negative predictive values were calculated, classifying the patients for cut-off points of 10 and 20 IU/l FSH. The NPV of obviously elevated serum FSH values, predicting failure to find spermatozoa for ICSI, was insufficient (for a limit of ≤10 IU/l, 61%; for a limit of ≤20 IU/l, 53%). The PPV of normal serum FSH values (≤10 IU/l), predicting the chance of finding spermatozoa for ICSI, was also disappointing (67%). The specificity and sensitivity of FSH are listed in Table III.

Complications following TEFNA included one case of bleeding, necessitating haemostatic suturing. Otherwise, bluish

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**Table I. Correlation between testicular histology and sperm presence for intracytoplasmic sperm injection, following testicular sperm extraction (TESE) and testicular fine needle aspiration (TEFNA)**

<table>
<thead>
<tr>
<th>Testicular histology</th>
<th>n</th>
<th>No spermatozoa found by TEFNA (%)</th>
<th>Spermatozoa found by TESE (%)</th>
<th>Spermatozoa found by TEFNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germ cell aplasia</td>
<td>11</td>
<td>6 (45.4%)</td>
<td>5 (45.4%)</td>
<td>1</td>
</tr>
<tr>
<td>Maturation arrest</td>
<td>14</td>
<td>10 (71.4%)</td>
<td>4 (28.6%)</td>
<td>2</td>
</tr>
<tr>
<td>Germ cell hypoplasia</td>
<td>7</td>
<td>3 (42.9%)</td>
<td>4 (57.1%)</td>
<td>2</td>
</tr>
<tr>
<td>Not available</td>
<td>5</td>
<td>2 (60.0%)</td>
<td>3 (60.0%)</td>
<td></td>
</tr>
</tbody>
</table>

a In five cases histology was not performed due to patients’ objections on religious grounds.

**Table II. Correlation between testicular size and sperm presence, following testicular sperm extraction**

<table>
<thead>
<tr>
<th>Testicular volume</th>
<th>Spermatozoa</th>
<th>PPV</th>
<th>NPV</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not found</td>
<td>Found</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥15 ml (small)</td>
<td>23</td>
<td>15</td>
<td>8</td>
<td>57%</td>
<td>65%</td>
</tr>
<tr>
<td>&gt;15 ml (normal)</td>
<td>14</td>
<td>6</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PPV = positive predictive value; NPV = negative predictive value.

**Table III. Correlation between serum follicle stimulating hormone (FSH) levels and sperm presence, following testicular sperm extraction**

<table>
<thead>
<tr>
<th>Serum FSH (IU/l)</th>
<th>Spermatozoa</th>
<th>PPV</th>
<th>NPV</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤10</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>66%</td>
<td>61%</td>
</tr>
<tr>
<td>&gt;10</td>
<td>31</td>
<td>19</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤20</td>
<td>18</td>
<td>11</td>
<td>7</td>
<td>39%</td>
<td>53%</td>
</tr>
<tr>
<td>&gt;20</td>
<td>19</td>
<td>10</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean ± SD serum FSH (IU/l) = 22 ± 0.8a, 19 ± 10.9a

PPV = positive predictive value; NPV = negative predictive value.

a No significant difference, Student’s t-test.
spots indicating small focal bleeding on the tunica and in the testis were observed once the testicles were opened following TEFNA. Following the biopsies, two cases of small haematoma outside the tunica albuginea were observed. In one patient the testis reached a volume of 30 ml, and resided spontaneously after 4 weeks following the procedure. In the second patient the haematoma was of 20–25 ml and absorbed spontaneously within 10 days.

The outcomes of the cycles performing TEFNA with testicular spermatozoa from patients with non-obstructive azoospermia in our study are presented in Table IV. The 2-pronuclear fertilization rate was 49%, leading to an embryo transfer in 91% of the cycles. The implantation rate was 13% and the clinical pregnancy rate per embryo transfer 29.0%.

### Discussion

The patients included in our study group were diagnosed as non-obstructive azoospermic males with testicular failure. This diagnosis was not based on their hypergonadotrophic status or size of testicles but on the histology of their testicular biopsies performed during the same procedure in which spermatozoa were retrieved for ICSI. Therefore testicular sperm retrieval success or failure correlated in our study with the actual histopathological evaluation of the same piece of testicular tissue. Furthermore, ‘pseudo-azoospermia’ was also excluded, as all patients underwent extensive examination of their ejaculates for existence of any spermatozoa, prior to any surgical intervention (Ron-El et al., 1996). Considering that in non-obstructive azoospermia eventual foci of normal spermatogenesis may exist in the testicles (Silber, 1995; Silber et al., 1995c; Devroey et al., 1995; Tournaye et al., 1995), it is natural to assume a positive correlation between the amount of testicular tissue retrieved and the chance of finding spermatozoa for ICSI. Use of TEFNA for assessment of testicular cytology has been reported (Foresta et al., 1992; Mallidis and Baker, 1994) but being efficient mainly in showing evidence of complete spermatogenesis. The use of this technique for diagnosis of testicular failure (Gottschalk-Sabbag et al., 1995) has yet to be proven. In the original series implementing TESE for non-obstructive azoospermia (Devroey et al., 1995; Silber et al., 1996) up to four or five testicular biopsies were taken per testicle to maximize the chances of finding spermatozoa. Therefore, our methodology included up to six fine needle punctures in each testicle, allowing sampling of several regions of the testicle.

Our results show that sperm retrieval by TEFNA is a less efficient method for sperm retrieval in non-obstructive azoospermia, compared with TESE. Hovatta et al. (1995), in her report focusing on obstructive azoospermia, included six patients in whom no spermatozoa could be retrieved by testicular needle biopsy, whose histology showed spermatogenic arrest (one case) and hypospermatogenesis (five cases). Only in one of the latter groups were spermatozoa found on the open biopsy.

Jow et al. (1993) reported finding motile spermatozoa in wet testicular tissue preparations. Their failure rates to find spermatozoa in cases of germ cell aplasia, maturation arrest or germ cell hypoplasia were 100, 77 and 36%, respectively (overall 20/29 = 68.9%). Our failure rates, according to the respective histologies, were 55, 75 and 50% (overall 57%). In the series reported by Tournaye et al. (1996), concerning 54 TESE procedures performed in non-obstructive azoospermic patients, only in 10 patients (18.5%) were spermatozoa not found for ICSI. However, 27 of these patients had ‘virtual azoospermia’, meaning that they had had at least one sperm cell present in a previous ejaculate, indicating some foci of spermatogenesis. In contrast, our group included patients with absolute azoospermia, with absence of spermatozoa previously verified in many ejaculates. Therefore, the observed lower success rate may be partially explained by the difference in the patient population and our rigorous inclusion criteria in this study. According to Tournaye et al. (1996), patients with germ cell aplasia or maturation arrest needed significantly more (up to 20) biopsies to be taken in order to find spermatozoa. Patients with germ cell hypoplasia, similarly to those with normal histology, required significantly fewer biopsies to be taken (up to three) and had significantly more spermatozoa recovered. Our failure rate of 56% may express not only the difference in the patient population and the rigorous inclusion criteria but also the fact that, after taking three substantial pieces of tissue, the testicular biopsy procedure was concluded to avoid extensive irreversible testicular damage. For the time being, it seems that these patients should be offered open testicular biopsy as the optimal testicular sperm retrieval procedure, allowing examination of a relatively large amount of tissue in order to recruit sufficient number of spermatozoa for ICSI. In many testicles, variable histological pictures may coexist, including areas of Sertoli cell only, maturation arrest and normal focal spermatogenesis (Silber et al., 1995c), all different expressions of the same genetic disturbance involving deletions in specific regions of the Y chromosome (Reijo et al., 1995, 1996). Therefore, evaluation of the results by histological finding has questionable biological meaning in our opinion.

Neither serum FSH values nor testicular size were predictive of the chances of finding spermatozoa for ICSI, supporting previous reports (Tournaye et al., 1995). In fact, testicular failure may exist in conjunction with fairly normal testicles and normal serum FSH values (De Kretser et al., 1995). Testicular parenchymal damage may perpetuate elevation of FSH, without necessarily presenting in all patients as total damage in the germinal epithelium (Martin-du-Pan and Bischof, 1995). Therefore, the serum value of FSH cannot be used as an indicator for absolute absence of spermatogenesis.

<table>
<thead>
<tr>
<th>Table IV. Outcome of testicular sperm extraction + intracytoplasmic sperm injection (ICSI) in patients with non-obstructive azoospermia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. of cycles with sperm for ICSI</strong></td>
</tr>
<tr>
<td><strong>No. of injected oocytes</strong></td>
</tr>
<tr>
<td><strong>No. of oocytes fertilized</strong></td>
</tr>
<tr>
<td><strong>No. of embryos cleaved</strong></td>
</tr>
<tr>
<td><strong>No. of embryos transferred</strong></td>
</tr>
<tr>
<td><strong>No. of embryos cryopreserved</strong></td>
</tr>
<tr>
<td><strong>Implantation rate</strong></td>
</tr>
<tr>
<td><strong>No. of embryo transfers</strong></td>
</tr>
<tr>
<td><strong>Pregnancy rate/transfer</strong></td>
</tr>
</tbody>
</table>
In fact, the inability of FSH concentrations to predict the presence of spermatozoa available for ICSI emphasizes the need to find efficient prospective parameters that can predict the chances for success in finding spermatozoa in the testicles of patients suffering from non-obstructive azoosperma and save an unnecessary and hopeless procedure for half of the patients. Furthermore, a prospective follow-up of the possible complications after testicular sperm retrieval should be recommended, to investigate whether fewer complications follow TEFNA compared to open biopsies.

Previous experience showed that, by using testicular spermatozoa for ICSI, in comparison to ejaculated spermatozoa, lower rates of fertilization were achieved (Nagy et al., 1995). Following ICSI with testicular spermatozoa, the fertilization rate of 49% in our group is comparable with the fertilization rates of 34, 45.2 and 58% in cases with non-obstructive azoosperma published previously [Kahraman et al., 1996; Tournaye et al., 1996 (normal histology excluded); and Devroey et al., 1996, respectively].

However, the implantation rate of 13% in our group of patients was lower than the 26.6, 18.4 and 19% reported by others [Kahraman et al., 1996, Tournaye et al., 1996 (normal histology excluded); and Devroey et al., 1996, respectively]. The low implantation rate and pregnancy rate of 29% per embryo transfer may be best explained by the rigorous preselection of these cases, probably reflecting their genetic potential.

In conclusion, azoospermic men suffering from non-obstructive testicular failure should be offered testicular sperm retrieval by TESE, rather than by TEFNA. TESE seems to be a significantly more efficient method to obtain testicular spermatozoa gives rise to significantly more efficient method to obtain testicular spermatozoa and cryopreservation of testicular spermatozoa. However, the numbers of patients were small in these studies, and therefore, the results should be interpreted with caution.

References


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