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Comparison of Pregnancy Rate Following IUI between the use of Husband's Sperm and Donor's Sperm in Siriraj Hospital

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ABSTRACT

Objectives: To compare pregnancy rate resulting from IUI between the use of husband's sperm and donor's sperm.

Materials and Methods: Data on 306 cycles per groups of IUI using husband's sperm (IUI-H) and IUI using donor's sperm (IUI-D) were collected from couples attending Infertility Unit at Siriraj Hospital. Baseline data, as semen analysis parameters were retrieved. Pregnancy rate was compared between groups.

Results: Mean age of the women was younger among IUI-D than IUI-H group (33.6±5.3 vs. 34.4±3.4 years, p=0.025). And their husbands were older among IUI-D than IUI-H group (38.0±8.1 vs. 35.4±3.8 years, p<0.001). Women in IUI-H group were more likely to be nulliparous than IUI-D group (97.1% vs. 92.5%, p=0.011). Anovulation in IUI-D is higher than IUI-H (13.1% vs. 8.5%, p<0.001). Ovulation induction regimen and number of follicles were comparable both groups. IUI-D group were significantly likely to have endometrial thickness ≥ 8 mm (79.7% vs. 65.4%, p<0.001). Post wash semen concentration and progressive sperm motility were significantly higher among IUI-H than IUI-D group (70.8±21.6 vs. 42.5±6.7x 106/mL, p<0.001, and 88.9±5.0 vs. 83.6+8.1%, p<0.001, respectively). Overall pregnancy rate was significantly higher among IUI-D than IUI-H group (9.8% vs. 5.6%, p=0.048). Logistic regression analysis demonstrated that the use of donor's sperm and follicles of ≥2 independently increased pregnancy rate (adjusted OR 2.2, 95%CI 1.2-4.3, p=0.018; and 3.5 95%CI 1.7-6.9, p<0.001).

Conclusion: Pregnancy rate was significantly higher among IUI cycle using donor's sperm.

Keywords: intrauterine insemination, donor's sperm, pregnancy rate

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เปรียบเทียบอัตราการตั้งครรภ์จากการฉีดน้ำเชื้ออสุจิเข้าโพรงมดลูก ระหว่างน้ำเชื้ออสุจิของสามีและน้ำเชื้ออสุจิของผู้บริจาคในโรงพยาบาลศิริราช

อัจจิมา ตันกุล, จปรัฐ ปรีชาพานิช

วัตถุประสงค์: *เปรียบเทียบอัตราการตั้งครรภ์จากการฉีดน้ำเชื้ออสุจิเข้าโพรงมดลูก ระหว่างน้ำเชื้ออสุจิของสามีและน้ำเชื้ออสุจิของผู้บริจาค*

วิธีการ: *ศึกษาข้อมูล 306 รอบ ในแต่ละกลุ่มของการฉีดน้ำเชื้ออสุจิเข้าโพรงมดลูกระหว่างน้ำเชื้ออสุจิของสามีและน้ำเชื้ออสุจิของผู้บริจาคจากหน่วยผู้มีบุตรยากโรงพยาบาลศิริราช โดยศึกษาข้อมูลทั่วไป การตรวจวิเคราะห์น้ำเชื้ออสุจิและเปรียบเทียบอัตราการตั้งครรภ์ระหว่างกลุ่ม*

ผลการศึกษา: *อายุเฉลี่ยของผู้หญิงในกลุ่มใช้น้ำเชื้อบริจาคน้อยกว่ากลุ่มใช้น้ำเชื้อของสามี (33.6±5.3 กับ 34.4±3.4 ปี, p=0.025) อายุเฉลี่ยของผู้ชายในกลุ่มใช้น้ำเชื้อบริจาคมากกว่ากลุ่มใช้น้ำเชื้อของสามี (38.0±8.1 กับ 35.4±3.8 ปี, p<0.001) ผู้หญิงในกลุ่มใช้น้ำเชื้อบริจาคส่วนใหญ่ยังไม่เคยตั้งครรภ์เมื่อเทียบกับกลุ่มใช้น้ำเชื้อของสามี (97.1% กับ 92.5%, p=0.011) ภาวะไม่มีไข่ตกในกลุ่มใช้น้ำเชื้อบริจาคพบมากกว่ากลุ่มใช้น้ำเชื้อสามี (13.1% กับ 8.5%, p<0.001) วิธีที่ใช้ชักนำการตกไข่และจำนวนไข่ระหว่างสองกลุ่มไม่แตกต่างกัน กลุ่มใช้น้ำเชื้อบริจาคมีเยื่อบุโพรงมดลูกหนา ≥8 มม. มากกว่า (79.7% กับ 65.4%, p<0.001) จำนวนความเข้มข้นของอสุจิหลังเตรียมและจำนวนอสุจิที่เคลื่อนที่อย่างรวดเร็วในกลุ่มใช้น้ำเชื้อสามีมากกว่ากลุ่มใช้น้ำเชื้อบริจาคอย่างมีนัยสำคัญ (70.8±21.6 กับ 42.5±6.7 x 106/มล, p<0.001 และ 88.9±5.0 กับ 83.6±8.1%, p<0.001 ตามลำดับ) อัตราการตั้งครรภ์ในกลุ่มใช้น้ำเชื้อบริจาคสูงกว่ากลุ่มใช้น้ำเชื้อสามีอย่างมีนัยสำคัญทางสถิติ (9.8% กับ 5.6%, p=0.048) การวิเคราะห์การถดถอยโลจิสติกพบว่ากลุ่มใช้น้ำเชื้อบริจาคและจำนวนไข่ ≥2 ใบ จะเพิ่มอัตราการตั้งครรภ์ (adjusted OR 2.2, 95%CI 1.2-4.3, p=0.018; และ 3.5 95%CI 1.7-6.9, p<0.001)*

สรุป: *อัตราการตั้งครรภ์ในกลุ่มการใช้น้ำเชื้ออสุจิของผู้บริจาคฉีดเข้าโพรงมดลูกสูงกว่าอย่างมีนัยสำคัญ*

Introduction

Infertility is one of the factors reducing quality of life and hindering the completeness of family life. The main causes of infertility could be from male condition, female condition or even unexplained factors. Performing basic physical examination on both man and woman to highlight potential problem is thus required before starting any infertility treatment. The methods for treatment of infertile couples have both intrauterine insemination (IUI) and other assisted reproductive techniques (ART)[1]. Ovarian stimulation and intrauterine insemination are infertility treatment which is less expensive, less invasive methods and less complication compared with other assisted reproductive techniques. The pregnancy rate per IUI cycle is 10-14% and can be up to 40-90% after 3-10 IUI treatment cycles [1-3].

Etiologic male factors are male sterilization, varicocele, infection and others cause of abnormal semen analysis. Sperm concentration can predict the success rate of pregnancy outcomes. Couples with post wash total motile sperm concentration of <10 million, pregnancy rates per cycle was 1.7%, which is significantly lower than the one with TMSC ≥10 million, 7.7%[4]. The increment of the pregnancy rate for the couples with post wash TMSC of ≥10 million is also higher than the one with TMSC <10 million (adjusted OR 4.60, 95%CI 1.85–11.46)[5]. Men with adequate number of sperm count should be advised for the IUI treatment. Men with oligospermia or azoospermia, should be advised for the ART treatment. Since ART is an expensive treatment, therapeutic donor insemination is an effective alternative.

For men with therapeutic donor insemination offers an effective option. Semen donors were firstly screened for HIV infection, hepatitis B, and syphilis. The quarantine of all cryopreserved samples for 6 months and the result of donor's HIV status were retested before using the specimen. After cryopreservation, the motility (frozen 35±5% and fresh 62±9.8%), viability (frozen 47.3±8.8% and fresh 83±8.8%), and DNA integrity (frozen 62.8±10% and fresh 77.8±12.2%) of spermatozoa were significantly decrease compared with the fresh semen[6,7]. However, no significant difference of cryopreservation on DNA fragmentation of neat semen (80.6%±11.3%) and prepared sperm (77.8% ±12.2%) has been reported[7]. Several studies on the pregnancy rate per cycle from normal semen analysis is 7.0%[1]. The comparison of pregnancy outcome resulted by IUI using husband's sperm (IUI-H) and donor's sperm (IUI-D) reveals the delivery rate in IUI-H at 8.3-9.1% was lower than IUI-D at 13.4–13.8%[8-10]. Furthermore, the multiple deliveries rate after IUI-H is reported at 10.4-10.6% for twins and at 0.7% for triplets while the rate after IUI-D is marked at 9.4–10.3% for twins and 0.3–0.5% for triples[9, 10].

In Asia, There is insufficient information of semen analysis from several studies on the comparison of pregnancy rate between IUI-H and IUI-D treatments.

The objective of this study is tocompare pregnancy rate resulting from IUI between the use of husband's sperm and donor's sperm.

Materials and Methods

Institutional Approval and Informed Consent

This study was approved by the Siriraj Institutional Review Board which operates with international standards, no. SiEC108/2557(EC1). Given the retrospective nature of the work, no specific consent was required from the patients.

Patient population

This study was designed as retrospective comparative study at Siriraj Hospital, Thailand. The data were collected from medical records of IUI cycles from January 2006 to December 2012. The study population for female was focused on those who needed treatment of infertility problems with 1st treatment of IUI cycle, aged between 20 to 40 years old, and had at least one tubal patent. For the male population for this study, divided 2 groups; in the donor's group those who have sperm concentration < 10 x 106 per mL, normal morphology <14% from semen analysis[11] and desire for therapeutic donor insemination were selected and the husband's group those who have sperm concentration ≥15x106 per mL. and

progressive motility ≥32% according to World Health Organization specifications[12]. After screening, female who have bilateral tubal obstruction, severe pelvic adhesion and severe pelvic endometriosis were excluded from the study. Sample size was calculated based on reviewed medical records of IUI cycles from January 2013 to December 2013, the results of pregnancy rate of donor's sperm was 14% and husband's sperm was 7%. 300 IUI cycles were randomly selected by computer each year for the same proportion between the two groups. All patients' charts were reviewed based upon age, parity, number of mature follicle, type of ovulation stimulation and outcome of pregnancy.

Initial assessment of infertile couple

All couples were screened by employing basic investigations such as blood group, Rh factor, VDRL, HBsAg, Anti HIV, CBC and Hb typed.

The semen was analyzed including semen volume, sperm concentration, sperm motility, and sperm morphology. Seminal fluid was collected by masturbation, ejaculated into a clean, wide – mouthed container. The container must be made of material like glass or plastic and be certified to be non-toxic for spermatozoa after 2 – 5 days of abstinence. It must be marked with the time of collection, and the man's name and identification number. Sperm parameters were then recorded[12].

The investigation on female was carried out by obtaining the blood for ovarian reserve on day 3 of the cycle and determining FSH, LH, and estradiol. In order to identify the tubal patency condition, two testing methods were conducted as hysterosalpingography (HSG) test or laparoscopic chromopertubation.

Ovarian stimulation

The objective of ovarian stimulation was to adequate follicles and predicted date of ovulation. There were various clomiphene citrate with or without gonadotropin stimulation protocols according to physician's decision.

This study also included the step of performing transvaginal ultrasonography in order to record the development of dominant follicles. At least one follicles with 16 mm or larger in diameter and had record endometrial thickness. Then, human chorionic gonadotropin (hCG) was administrated to induce final follicle maturation with ovulation occurring approximately 36 to 48 hours.

Semen insemination

The man should pass urine, wash and dry hands and penis before collection. Semen specimens were collected by masturbation and ejaculated into a clean cup after 2 – 5 days of abstinence. It must be marked with the time of collection, and the man's name and identification number. Semen analysis is recommended to start with a simple inspection immediately after the liquefaction, preferably at 30 minutes. However, it should be within 1 hour after ejaculation in order to avoid dehydration or any changing temperature from affecting semen quality[12].

Washed sperm to clean seminal factors and isolated pure sperm, processed and concentrated into the intrauterine cavity by transcervical catheterization. Patients should then rest for 15 minutes after procedure. Once the screening had been accomplished, cryopreservation of donor's spermatozoa was cooled and slowly frozen on dry ice before it was put in liquid nitrogen. The cryopreserved samples were kept and quarantined for 6 months while the retest of HIV on the donor. Before using, it was required to remove as many straws as possible and placed them on tissue paper or in a rack to slowly adjust them to reach room temperature[13]. Post-thaw semen analysis was checked again before artificial insemination.

Pregnancy

In the case that menstruation was delayed for 1 week, urine pregnancy test or serum beta-hCG was performed. If the result turned out as pregnant, transvaginal ultrasonography was conducted and followed by the intrauterine pregnancy and the first trimester complications, abortion or ectopic pregnancy.

The intrauterine pregnant was defined by the intrauterine gestational sac, which is usually visible between 4½ to 5 weeks. The yolk sac normally appears

between 5 to 6 weeks while a fetal pole with cardiac activity is first detected around 5½ to 6 weeks[14].

Statistical analysis

Statistical analysis was performed using SPSS software for window, version 19. Results were expressed as means ± SD. The Chi-square test was used to compare the categorical variables. For continuous variables, the unpaired student's t-test was used for analyzing in case of normally distributed and Mann Whitney U test was used for analyzing in case of not normally distributed. If P value is less than 0.05, the statistical was considered significant. The associations between variables and the pregnancy were analyzed by multivariate logistic regression.

Results

The total of 306 IUI cycles in each group was included in this study. The demographic and clinical characteristics for all subjects were presented in Table 1. The mean female age in IUI-D group 33.6±5.3 years old was younger than 34.4±3.4 years old in IUI-H group and the mean male age in IUI-D group 38.0±8.2 years old was older than 35.4±3.8 years old in IUI-H group (P<0.05). Women in IUI-H group were more likely to be nulliparous than IUI-D group (97.1% vs. 92.5%, P<0.05).

Table 1. Demographic and clinical characteristics of patients.

Characteristics	Donor (N =306)	Husband (N =306)	P
Female age	33.6 ± 5.3	34.4 ± 3.4	0.025
Nulliparous	92.5%	97.1%	0.011
Etiology			
Anovulation	13.07%	8.50%	<0.001
Endometrial polyp	3.92%	3.27%	0.67
Submucous myoma	1.96%	2.29%	0.78
Endometriosis	5.23%	7.52%	0.25
Hormone level			
Female FSH (mIU/mL)	6.32 ± 2.52	7.11 ± 2.70	<0.001
Female LH (mIU/mL)	5.10 ± 3.68	5.39 ± 2.50	0.245
Female Estradiol (pg/mL)	49.02 ± 53.89	50.71 ± 45.73	0.68
Female Prolactin (mIU/mL)	19.24 ± 9.82	19.11 ± 9.45	0.87
Male age	38.0 ± 8.2	35.4 ± 3.8	<0.001
Etiology			
Leukocytospermia	2.94%	11.11%	<0.001
Hormone level			
Male FSH (mIU/mL)	22.11 ± 16.18	4.81 ± 2.39	<0.001
Male Testosterone (ng/mL)	3.13 ± 1.63	3.96 ± 1.51	<0.001
Baseline Quality of semen			
Semen volume (mL)	2.28 ± 2.09	2.76 ± 0.99	<0.001
Semen concentration (106)/mL	0.78 ± 2.07	51.28 ± 41.36	<0.001
Sperm progressive motility	5.53 ± 13.00	55.37 ± 12.63	<0.001
Normal form	2.07 ± 6.19	19.91 ± 18.90	<0.001

Etiologic female factor was anovulation, significant higher in IUI-D 13.07% than IUI-H 8.50% (P<0.05). Other factors included endometrial polyp (IUI-D 3.92%, IUI-H 3.27%), submucous myoma (IUI-D 1.96%, IUI-H 2.29%) and endometriosis (IUI-D 5.23%, IUI-H 7.52%), which were no significant difference. A study compared female hormonal level of LH, estradiol and prolactin had no significant difference on IUI-D and in IUI-H. Exception female FSH in IUI-D was lower than IUI-H. Etiology male factor is severe oligoasthenoteratozoospermia, significantly lower in IUI-D than IUI-H (P<0.05). Other factors included the average male FSH level in IUI-D 22.11± 16.18 mIU/mL recording higher values than in IUI-H 4.81±2.39 mIU/mL (P< 0.05). Furthermore, the mean testosterone level of IUI-D 3.13±1.63 ng/mL and IUI-H 3.96±1.51 ng/mL, indicated significant difference. However, leukocytospermia was significantly lower in IUI-D 2.94% than IUI-H 11.11% (P<0.05).

For initial semen analysis, in adequate semen volume of both groups, the husband sperm in IUI-D was significantly lower in quality. More specifically, the semen concentration was significant lower in IUI-D 0.78±2.07 x 10^6/mL than IUI-H 51.28±41.36 x 10^6/mL. The sperm progressive motility was significant lower in IUI-D 5.53±13.00% than IUI-H 55.37±12.63%. The last, normal sperm morphology was significant lower in IUI-D 2.07±6.19% than IUI-H 19.91±18.90% (P<0.05). Table 2. During IUI treatment, the prewash semen volume was significant lower in IUI-D 1.87±0.29 mL. than IUI-H 2.59±0.84mL. The pre and post wash sperm progressive motile was in IUI-D significant lesser than IUI-H. And decreases in the post wash semen concentration in IUI-D 42.52±14.28 x 10^6/mL compared with IUI-H70.83±21.66 x 10^6/mL. But the average of prewash semen concentration and number of cases that total motile sperm concentration > 10 x 10^6 were not significant difference.

Table 2. During IUI treatment.

Characteristics	Donor (N =306)	Husband (N =306)	P
Quality of semen for IUI			0.025
Prewash semen volume	1.87 ± 0.29	2.59 ± 0.84	<0.001
Prewash semen conc. (10^6)/mL	41.72 ± 13.84	43.82 ± 19.78	0.127
Prewash sperm progressive motile	42.50 ± 6.74	52.17 ± 10.10	<0.001
Postwash semen conc. (10^6)/mL	42.52 ± 14.28	70.83 ± 21.66	<0.001
Postwash sperm progressive motile	83.56 ± 8.15	88.88 ± 5.00	<0.001
Number of cases that total motile sperm conc. ≥ 10 x 10^6 mL (%)	99.3	98	0.155
Ovarian stimulation	100%	100%	
FSH use	20%	6.7%	0.543
Number of dominant follicles (≥ 16 mm.)	1.15 ± 0.45	1.19 ± 0.47	0.22
Number of dominant follicles			
1 (%)	88.6%	83.7%	0.08
≥ 2 (%)	11.4%	16.3%	
Endometrial stimulation	27.45%	38.56%	0.003
Endometrial thickness ≥ 8 mm.	79.70%	65.40%	<0.001
Difficult for IUI	0.65%	0.00%	0.157
Luteal support	0.98%	2.94%	0.08

This study also included the step of performing transvaginal ultrasonography in order to monitor the development of dominant follicles. Regardless the method of ovarian stimulation was difference between IUI-D and IUI-H, also FSH use for ovarian stimulation in IUI-D 20% was higher than IUI-H 6.7% but no statistical significant difference. The number of dominant follicles greater than or equal to 16 mm. was not statistically significant difference in both groups. After that the endometrial stimulation was performed in case of thin endometrium. The method of endometrial stimulation, estrogen administration, in IUI-D had 27.45% lower than IUI-H 38.56%, P<0.05. The endometrial thickness ≥8 mm. in IUI-D had 79.7% more thickness than IUI-H 65.4%, P<0.05. Consistently, the difficulty for IUI was lower in IUI-D than IUI-H.

As shown in Table 3, the result of pregnancy rate was statically significant difference between IUI-D and IUI-H, which was 9.80% and 5.56% respectively (P<0.05).

Table 4. summarizes the predictive factors associated with the pregnancy rate in a multivariate analysis. The use of donor's sperm and dominant follicles ≥2 independently increased pregnancy rate (adjusted OR 2.2, 95%CI 1.2-4.3, p=0.018; and 3.5 95%CI 1.7-6.9, p<0.001).

Table 3. Pregnancy rate resulting from IUI-D and IUI-H.

	Treatment cycle	Pregnancy	Pregnancy rate per cycle	P
IUI-D	306	30	9.80%	0.048
IUI-H	306	17	5.56%	

Table 4. Associated factors for the pregnancy rate (multivariate analysis).

Factor	OR	95% CI	P
Anovulation	3.08	0.95 - 9.96	0.06
FSH use	1.91	0.53 - 6.87	0.325
Dominant Follicle ≥ 2	3.46	1.72 - 6.94	<0.001
Donor's sperm	2.22	1.15 - 4.30	0.018
Endometrial Thickness ≥ 8 mm	1.40	0.67 - 2.92	0.372

Discussion

Sperm donation has been performed in our institution for more than 10 years. In this study, we collected data of sperm donation with IUI method for prediction of pregnancy. The result of pregnancy rate was significantly higher for IUI-D than IUI-H. Similar to several studies assisted by reproductive technology in Europe, ESHRE 2007-2010 showed the delivery rate in IUI-D was 13.8% and IUI-H 8.9%, however, pregnancy rates were not shown in the studies. Although result of delivery rate in IUI-D was higher than IUI-H but the result of pregnancy rate in both groups of this study was lesser than ESHRE study[5, 8, 9, 15]. This study did not record the delivery rate; however the delivery rate in IUI-D tended to be higher than IUI-H.

Even though anovulation was a factor for etiologic female, women in both groups receive clomiphene citrate for ovarian stimulation at least one dominant follicle. Thus the pregnancy rate might increase in these cases of anovulation problem. The methods of endometrial stimulation, estrogen administration, in IUI-D were lower than IUI-H. The cases of endometrial thickness ≥8 mm. in IUI-D were greater than IUI-H. And the result of pregnancy rate was statistically significant

greater IUI-D than IUI-H. Leal Almeida M. et al., found that in case of a frozen embryo transfer, the measurement of the endometrial thickness that was more than 8 mm had a predictor value for pregnancy rate[16]. Jeon Y. E. et al., reported that the women who have thin endometrium in the preovulatory phase tended to have unfavorable outcomes during the first four IUI cycles[17]. Furthermore Dinelli L. et al., found that one of the impact on IUI outcome was endometrial thickness. More specifically, the highest pregnancy rate was obtained only when the endometrial thickness was ranged from 10 to 11 mm[14].

Sperm concentration can predict the success rate of pregnancy outcomes. Specifically the post wash semen concentration of IUI-D was lower than IUI-H but pregnancy rate in IUI-D was significantly more than IUI-H. Differing from studies of Dorjpurev U. et al., it was reported that there was no difference in pregnancy outcome of number of semen concentration[1]. There was significant statistical difference between groups IUI-D and IUI-H in postwash sperm progressive motile recorded a lower percentage in IUI-D with cryopreservation and thaw. According to Donnelly ET. et al., cryopreservation of raw semen resulted in progressive motility was decreased 50%[6]. Also Gianaroli L. et al., claimed that the viability, motility, and DNA integrity of spermatozoa were significantly decreased after cryopreservation with liquid nitrogen when they were compared with the fresh samples[10].

Couples with postwash total motile sperm concentration of <10 million, pregnancy rates per cycle was 1.7% while the one of ≥10 million was 7.7%, causing the significant differences[4]. But in this study, the number of cases that total motile sperm concentration > 10 x 10^6 /mL in IUI-D 99.3% was not significant difference in IUI- H 98%. It was not the factor causing the difference in pregnancy rate. The reason that pregnancy rate in IUI-D was greater than IUI-H could be from immunologic factor including antisperm antibodies. This was recommended to define that each antibody binding to surface antigen of sperms affect on sperm function[18].

The predictive factors associated with the pregnancy rate in a multivariate analysis were the use of donor's sperm and dominant follicles ≥ 2 independently increased pregnancy rate. Also, van Rumste MM. et al., concluded multiple dominant follicles were associated with increased pregnancy rates in IUI[19]. The pregnancy rate comparison in factors of anovulation and endometrial thickness ≥8 mm were showing an increasing trend, but not significant as the number of sample size was not calculated for studies that predict pregnancy rates.

Strengths and Limitations

In this study, we compared the pregnancy rate in groups of IUI-D and normal semen of IUI-H at same time of treatment. Moreover, the result in this study was analyzed by using multiple logistic regression and also taking various factors into consideration.

Thus, there were some limitations in our study, the retrospective method limit collection for further data such as regimen for ovarian stimulation, subjected upon the physician's decision and the several of sperm preparation, which might affects successful pregnancy. To analyze and correct these confounding factors, further prospective study should be performed.

Conclusion

Pregnancy rate was significantly higher among IUI cycle using donor's sperm than husband's sperm. The data reassured the quality of donor's sperm for couple who needed therapeutic donor insemination.

References

1. Dorjpurev U, Kuwahara A, Yano Y, Taniguchi T, Yamamoto Y, Suto A, et al. Effect of semen characteristics on pregnancy rate following intrauterine insemination. J Med Invest 2011;58:127-33.
2. Williams RS, Alderman J. Predictors of success with the use of donor sperm. Am J Obstet Gynecol 2001;185:332-7.
3. Andersen AN, Gianaroli L, Felberbaum R, de Mouzon J, Nygren KG. Assisted reproductive technology in Europe, 2002. Results generated from European registers by ESHRE. Hum Reprod 2006;21:1680-97.
4. Asumpinwong C, Prechapanich J. Intrauterine insemination: relationship of postwash total motile sperm count to pregnancy rates per cycle in Siriraj Hospital. Thai J Obstet Gynaecol 2009;17:237-43.
5. de Mouzon J, Goossens V, Bhattacharya S, Castilla JA,

Ferraretti AP, Korsak V, et al. Assisted reproductive technology in Europe, 2007: results generated from European registers by ESHRE. Hum Reprod 2012;27:954-66.
6. Donnelly ET, McClure N, Lewis SE. Cryopreservation of human semen and prepared sperm: effects on motility parameters and DNA integrity. Fertil Steril 2001;76:892-900.
7. Barraud-Lange V, Pont JC, Pocate K, Kunstmann JM, Chalas-Boissonas C, Ducot B, et al. Seminal leukocytes and clinical outcomes with donor sperm insemination. Fertil Steril 2011;96:1320-4.
8. Ferraretti AP, Goossens V, de Mouzon J, Bhattacharya S, Castilla JA, Korsak V, et al. Assisted reproductive technology in Europe, 2008: results generated from European registers by ESHRE. Hum Reprod 2012;27:2571-84.
9. Ferraretti AP, Goossens V, Kupka M, Bhattacharya S, de Mouzon J, Castilla JA, et al. Assisted reproductive technology in Europe, 2009: results generated from European registers by ESHRE. Hum Reprod 2013;28:2318-31.
10. Gianaroli L, Magli MC, Stanghellini I, Crippa A, Crivello AM, Pescatori ES, et al. DNA integrity is maintained after freeze-drying of human spermatozoa. Fertil Steril 2012;97:1067-73.
11. Fritz MA, Speroff L. Assisted reproductive technologies. In: Fritz MA, Speroff L, editors. Clinical gynecologic endocrinology and infertility. 8 ed. Philadelphia: Lippincott Williams & Wilkins 2011. p. 1331-82.
12. Lu JC, Huang YF, Lu NQ. [WHO Laboratory Manual for the Examination and Processing of Human Semen: its applicability to andrology laboratories in China]. Zhonghua Nan Ke Xue 2010;16:867-71.
13. Committee on Gynecologic P. Committee opinion no. 618: Ovarian reserve testing. Obstet Gynecol 2015;125:268-73.
14. Dinelli L, Courbiere B, Achard V, Jouve E, Deveze C, Gnisci A, et al. Prognosis factors of pregnancy after intrauterine insemination with the husband's sperm: conclusions of an analysis of 2,019 cycles. Fertil Steril 2014;101:994-1000.
15. Kupka MS, Ferraretti AP, de Mouzon J, Erb K, D'Hooghe T, Castilla JA, et al. Assisted reproductive technology in Europe, 2010: results generated from European registers by ESHREdagger. Hum Reprod 2014;29:2099-113.
16. Leal Almeida M, Saucedo de la Llata E, Batiza Resendiz V, Santos Haliscak R, Galache Vega P, Hernandez Ayup S. [Endometrial thickness. Prognostic factor in assisted reproduction?]. Ginecol Obstet Mex 2004;72:116-9.
17. Jeon YE, Jung JA, Kim HY, Seo SK, Cho S, Choi YS, et al. Predictive factors for pregnancy during the first four intrauterine insemination cycles using gonadotropin. Gynecol Endocrinol 2013;29:834-8.
18. Bohring C, Krause W. Immune infertility: towards a better understanding of sperm (auto)-immunity. The value of proteomic analysis. Hum Reprod 2003;18:915-24.
19. van Rumste MM, Custers IM, van der Veen F, van Wely M, Evers JL, Mol BW. The influence of the number of follicles on pregnancy rates in intrauterine insemination with ovarian stimulation: a meta-analysis. Hum Reprod Update 2008;14:563-70.