The Correlation between Semen Parameters in Processed and Unprocessed Semen with Pregnancy Rate in Intrauterine Insemination in the Treatment of Male Factor Infertility

DADKHAH F*†, NAHABIDIAN A, AHMADI GH

Department of Urology, Shaheed Modarress Hospital, Shaheed Beheshti University of Medical Sciences, Tehran, Iran and Royan Institute, Tehran, Iran

ABSTRACT

Purpose: Our aims were to determine the relation of semen parameters in processed and unprocessed semen samples with pregnancy rate in intrauterine insemination (IUI) in the treatment of male factor infertility.

Materials and Methods: In a quasi experimental study, 412 couples with male factor infertility were studied. To treat male factor infertility, 561 IUI cycles were done.

Results: Total pregnancy rate was 7.84% (44 in 561) per cycle. There was an inverse relationship between pregnancy rate and duration of infertility. Total sperm count after processing was higher in pregnant cycles than in non-pregnant ones (P <0.05). The mean total motile sperms after processing for pregnant and non-pregnant cycles was 72.2 ± 78.8 and 53.2 ± 54.3, respectively (P <0.05).

Conclusion: IUI is a valuable method for the treatment of male factor infertility. The higher number of sperms, total motile sperms and IUI sessions, and lower duration of infertility, all have a positive relationship with pregnancy rate.

KEY WORDS: male factor infertility, intrauterine insemination, pregnancy rate

Introduction

About 15% of couples are infertile, of which 40% are infertile because of male factor infertility and 40% are because of female factor infertility, and in the remainder, both factors are implicated.[1] There are several methods for treatment of infertility, one of which is intrauterine insemination (IUI). IUI, as a cost-effective and noninvasive method, is used in treatment of infertility with various etiologies. In this method, the number of motile sperms in distal segment of fallopian tubes increases.[2] For prevention of backward movement of sperm suspension, insemination is done with 0.3 to 0.5 ml volume. When the size of dominant follicle reaches 18 to 20 mm, ovulation induction with 1000 to 5000 IU of HCG is done.

Thereafter, insemination is done within 38 to 40 hours.[3] Of the contributory factors in a successful IUI are semen parameters in semen analysis. We studied the relationship between semen parameters in semen analysis and successful IUI in male factor infertility.

Materials and Methods

All of the patients who underwent IUI in Royan institute, in 2000, were enrolled in this quasi-experimental study. Physical exam and hormonal evaluation were done in all. The husbands were normal anatomically and had normal hormonal milieu. The wives had normal pelvic ultrasonography and normal hysterosalpingography. Normal laparoscopy was our inclusion criteria, but it was not mandatory. For IUI accomplishment, ovulation induction was done using one of the three standard methods. As the ovulation was an inclusion criterion, the method used was a confounding factor. Using vaginal ultrasonogropy, follicles

were studied and when they reached 20 mm in size, 5000 IU of human chorionic gonadotropin (HCG) was injected intramuscularly. Afterwards, within maximum 48 hours, we performed IUI and used percoll concentration gradient method for processing all the semen samples. The method of insemination and the team work were the same for all. SPSS 10 was used for statistical analysis and for comparison of dichotomous and continuous variables, chi-square and t tests were used, respectively.

Results

Overall, 561 IUI treatment cycles were eligible for this study. The overall results with regard to positive and negative pregnancy are shown in table 1.

Total sperm count after processing was higher in pregnant cycles than in non-pregnant ones (P <0.05). There was no significant difference in the mean percent of motile sperms after processing between pregnant and non-pregnant cycles. However, the mean total motile sperms after processing for pregnant and non-pregnant cycles was 72.2 ± 78.8 and 53.2 ± 54.3, respectively (P <0.05). In addition, the mean percent of normal sperms before processing and the mean percent of motile sperms were not different in the two groups.

Ovulation induction method was not regarded as a confounding factor; however, the rate of pregnancy was calculated for each method. The pregnancy rate in induction with clomiphene cit-

TABLE 1. *Demographic characteristic and semen analysis, shown as mean ± SD*

Variables	Total IUI Cycles	Conceived group	Pregnancy failure group	P value
Husband's age (years)	32.33 ± 4.94	31.1 ± 4.1	32.4 ± 5	NS**
Wife's age (years)	27.49 ± 4.99	26.4 ± 4.7	27.6 ± 5	NS
Infertility duration (year)	5.57 ± 3.63	4.3 ± 2.9	5.7 ± 3.7	NS
The number of IUI accomplishment	1.57 ± 0.8	4.3 ± 2.9	5.7 ± 3.7	NS
Sperm count after processing ($10^6 \times$ HPF)	62.7 ± 55.43	83.9 ± 92.2	60.9 ± 50.8	S*
Total motile sperm after processing (10^6)	54.7 ± 48.88	72.2 ± 78.8	53.2 ± 54.3	S
Motile sperm after processing (%)	85.78 ± 12.97	87 ± 9.2	85.7 ± 13.2	NS
Sperm count before processing ($10^6 \times$ ml)	89.53 ± 53.88	93 ± 49.8	89.2 ± 54.3	NS
Total motile sperm before processing (10^6)	93.06 ± 73.71	106.2 ± 75.9	91.9 ± 73.5	NS
Motile sperm before processing (%)	33.95 ± 8.39	35.9 ± 7.6	33.8 ± 8.5	NS
Sperm with normal morphology before processing (%)	23.27 ± 9.22	25.3 ± 9.5	23.1 ± 9.2	NS

*S = Significant, P <0.05
**NS = Non-Significant P > 0.05

rate, clomiphene citrate and human menopausal gonadotropin (HMG), and HMG alone was 8.75%, 7.2%, and 7.2%, respectively (P = NS).

Overall, 561 treatment cycles were done in 412 patients (1.3 cycles per patients). In 59.2% of cases, IUI was done for the first time, and the remainder (40.8%) have had undergone at least one previous IUI. The mean number of IUIs was not different in pregnant and non-pregnant cycles.

The two groups were not different, regarding the mean age of husbands and wives and duration of infertility.

Discussion

Pregnancy rate per cycle in male factor infertility in our study was 7.84%. This is between 8 and 16% in the literature[4] and it seems that our result is acceptable. This also agrees with two other studies in our center. In a study that was done on oligoasthenospermic patients, the pregnancy rate was 6% and 8% in suspension and percoll methods of sperm processing, respectively.[5] In another study, pregnancy rate in male factor infertility was 8.2%.[6] Our sample size is significant, but in comparison with other studies, the number of IUI cycles per patient was low. For example, in a study by Hauser, the mean treatment cycles was 2.4 per patient.[7] This explains the lower pregnancy rate in our study. The difference in pregnancy rate with IUI in various studies is somewhat due to the number of IUIs. One of our aims in this study was to clarify the relationship between semen parameters in semen analysis and pregnancy rate. The sperm count and the total motile sperm count after processing, both had significant relationship with pregnancy rate. Brasch[8] and Campana[9] showed significant relationship between total motile sperms and pregnancy rate. Also, the pregnancy rate with total motile sperms greater than 20×10^6 was higher than those with less than 20×10^6 total motile sperms.

We recommend the semen processing methods with higher rate of sperm preservation and higher rate of motility improvement to be used. In this study, there was not any significant relationship between pregnancy rate and percent of normal sperms. This agrees with other studies. Karabinus and Gelety reported that there is not any relationship between sperm morphology and the result of IUI.[10] Burr reported that in samples with less than 10% normal morphology the

probability of pregnancy rate is low and in these cases IVF and ICSTI are recommended.[11] This is 14% in Toner's study.[12]

Also, in our study, there was not a significant relationship between husbands' age and pregnancy rate. This agrees with the results of Campana's study.[9] However, in patients older than 40 years, there was not any pregnancy.

Pregnancy rate in patients undergoing the fourth or fifth IUI session was 17.6% and this was 4.9% in the first cycle of IUI. Therefore the patients must not be discouraged with the first failed IUI. Maximum number of IUI cycles in our study was 6. Therefore, we can not recommend the ideal number of IUI cycles. But, Berg et al reported that the pregnancy rate reach a plateau after 4 cycles of IUI, and thereafter, it is constant till the tenth IUI, and then it decreases to zero.[13]

Conclusion

IUI is a valuable treatment modality for male factor infertility. However, it does not lead to pregnancy in patients older than 40 years; therefore, alternative methods must be considered in these patients. The probability of pregnancy increases by the following factors: higher sperm count and total motile sperms in processed sample, repetitive treatment cycles, and lower duration of infertility. Hence, improvement in sperm processing methods that yields to increased sperm count and total motile sperm count, cause higher pregnancy rate with IUI.

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