Original Research Article

Intrauterine Insemination: A Retrospective Review on Determinants of Success

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Conflict of interest: Nil

Abstract

Aim: The aim of the present study was to determine the prognostic factors such as female patient's characteristics and of semen parameters on the pregnancy rate following intrauterine insemination.

Methods: In this retrospective study, we reviewed the medical records of women who underwent IUI at Indira Gandhi Institute of Medical Sciences, Sheikhpura Patna for one year. Records of 100 women who had undergone 100 IUI cycles using sperm from their partners were reviewed. Patients were excluded based on the lack of sufficient treatment data.

Results: A total of 100 IUI cycles were analysed. The overall pregnancy rate per cycle and per couple was 4.6% (15/320) and 16% (16/100) respectively. The average female and male age was $25.5 + 5.30$ years and 32.8 ± 4.6 years respectively in the participants with positive IUI result. Both were not statistically significant. Duration of infertility, type of infertility, endometrial thickness, number of follicles, size of follicles, sperm count, sperm motility and single/double IUI did not significantly affect the outcome of IUI. However, logistic regression analysis showed significant relationship between pregnancy occurrence and number of follicles and number of IUI cycles.

Conclusion: The findings of this study showed that age of the couple, duration of infertility, endometrial thickness, size of the follicles, sperm count and sperm motility did not correlate with pregnancy occurrence in an IUI cycle but number of follicles and total IUI cycles correlated with the occurrence of pregnancy.

Keywords: Infertility, Intrauterine insemination, Predictive factors.

Introduction

At present, 16% of prospective parents seek medical advice for infertility. [1] Intrauterine insemination (IUI) is a simple technique of assisted reproductive medicine, treating infertility by artificial insemination and helping to overcome male subfertility. [2] IUI is less invasive, cost effective and an intermediate step before the application of sophisticated assisted reproductive technologies (ART) such as invitro fertilization (IVF) with or without intracytoplasmic sperm injection (ICSI). [3] This method of assisted reproductive technology is indicated in cases of cervical infertility, relative male factor infertility, anovulation, endometriosis with a healthy fallopian tube, and, lastly, unexplained infertility.1 In vitro fertilization (IVF) is generally used for severe male factor infertility. [4] A combination of controlled ovarian hyperstimulation (COH) with IUI remains an important option available to an infertility specialist and is a widely used treatment modality for a broad range of indications. [5]

Generally, four cycles of COH/IUI are recommended depending on the female age prior to moving on to assisted reproductive technology (ART) – in vitro fertilization (IVF). [6-9] In all variations of preparation and technique the pregnancy rate ranges between 3 and 26%. [10] The influencing pregnancy rates after IUI: the woman's age, the length of infertility, indications (type of infertility), the sperm count in the initial analysis or in the catheter, the number of mature

follicles, the E2 concentration on the day of hCG administration, and the type of catheter used. [11] Several prognostic factors with regard to IUI treatment outcome have been identified, and include factors such as patient profile, duration of infertility, type of infertility, stimulation protocol, follicular response, endometrial thickness, timing of IUI, and semen parameters, like post wash motility, morphology, and total motile fraction (TMF). [12-14]

Many factors affect IUI outcomes, including infertility diagnosis, semen parameters, and stimulation regimens. The aim of the present study was to determine the prognostic factors such as female patient's characteristics and of semen parameters on the pregnancy rate following intrauterine insemination.

Materials and Methods

In this retrospective study, we reviewed the medical records of women who underwent IUI at Indira Gandhi Institute of Medical Sciences, Sheikhpura Patna for one year. Records of 100 women who had undergone 100 IUI cycles using sperm from their partners were reviewed. Patients were excluded based on the lack of sufficient treatment data.

All subjects were couples for therapeutic IUI for the treatment of unexplained infertility, mild sperm dysfunction and anovulation. The study couples with at least one year of infertility underwent a basic infertility evaluation consisting of precise history taking, detailed clinical examination, laboratory test (prolactin and thyroid hormone concentration), tubal patency tests with hysterosalpingography (HSG)/ laparoscopy and uterine cavity evaluation with HSG/ hysteroscopy. Among women with infertility of less than two years or intrauterine pregnancy in the immediate past and no history suggestive of tuboperitoneal disease, tubal and uterine cavity evaluation was not always carried out before the first IUI treatment. However, tubal patency test was done if pregnancy did not occur after 2-3 cycles of IUI. The couples with tubal and severe male factor infertility (progressive motile sperm count <1million/ml) and endocrine diseases were excluded from the study.

Male factor infertility was defined as: (i) a sperm count of <20 million/ml; (ii) normal morphology <30% or (iii) progressive motility (grade A+B) <40% before sperm preparation modifying World Health Organisation guidelines (1989)

The two methods of ovarian stimulation used in our study were:

(i) letrozole 5 mg daily from day 2 to day 6;

(ii) letrozole +HMG : 5 mg letrozole from day 2 to 6 or day 3 to 7 with 75 IU HMG on day 7 and day 8.

Ovarian and endometrial responses were monitored using transvaginal sonography on day 9 to 13. All subjects were given intramuscular injection of 5000 IU human chorionic gonadotrophin (HCG) when atleast one dominant follicle was >17mm. IUI was performed 36 hours after administration of HCG using a simple IUI catheter under ultrasound guidance. IUI was repeated the next day if the follicle had not ruptured. A standard inseminate volume of one ml prepared using swim up method was used. The patients were advised to rest for 20 min following IUI. Micronised progesterone vaginal pessaries (400mg bd) were prescribed for luteal phase support for 14 days post IUI.

The descriptive variables recorded were couple's age, duration of infertility, number of follicles, size of follicles, endometrial thickness, single/double IUI, number of IUI cycles, sperm concentration and sperm motility. The statistical analysis was done using SPSS statistical software (version 12). A logistic regression analysis method was used to identify significant variable that contribute to the success of IUI and to predict the probability of pregnancy for each cycle. P value <0.05 was considered to be of statistical significance.

Results

Table 1: IUI result according to female characteristic and sperm parameters

Characteristic	Pregnancypositive	Pregnancynegative	P value
Female age (years)	25.5+5.30	27.3+4.13	0.236
Male age (years)	32.8+4.6	33.7+4.64	0.450
Duration of infertility (years)	6.4+2.56	7.5+4.26	0.540
Endometrial thickness(mm)	8.2+1.40	8.6+2.60	0.8212
Number of follicles	3.5+2.60	2.0+1.18	0.010
Size of follicles(mm)	18.2+1.04	19.1+7.63	0.632
Sperm count (million/ml)	36.54+12.18	38.12+24.26	0.60
Sperm motility (%)	42.00+12.00	48.10+18.68	0.372
Number of IUI cycles	2.00+1.05	3.4+1.90	0.003

A total of 100 IUI cycles were analysed. The overall pregnancy rate per cycle and per couple was 4.6% (15/320) and 16% (16/100) respectively. The average female and male age was 25.5 + 5.30 years and 32.8 ± 4.6 years respectively in the participants with positive IUI result. Both were not statistically significant.

Table 2: Logistic regression analysis

Variables	x^2	SE	Beta	'p' value
Age of wife	1.422	0.088	0.100	0.240
Age of husband	0.584	0.086	0.058	0.442
Duration of infertility	0.360	0.092	0.054	0.540
Endometrial thickness	0.058	0.138	0.036	0.820
Number of follicle	4.925	-0.430	0.230	0.032
Size of follicles	0.220	0.382	0.062	0.687
Sperm motility	0.236	0.019	0.004	0.643
Sperm motility	1.102	0.028	0.022	0.320
Total IUI cycles	9.128	0.314	0.757	0.019

Duration of infertility, type of infertility, endometrial thickness, number of follicles, size of follicles, sperm count, sperm motility and single/double IUI did not significantly affect the outcome of IUI. However, logistic regression analysis showed significant relationship between pregnancy occurrence and number of follicles and number of IUI cycles.

Discussion

Most couples seeking infertility treatment are sub fertile and IUI is the first effective treatment chosen for suitably selected patients. IUI is the mode of treatment in infertility due to cervical factor, ovulatory dysfunction, endometriosis, immunological causes, male factor and unexplained infertility. [15-17] IUI is less invasive, cost effective and an intermediate step before the application of sophisticated assisted reproductive technologies (ART) such as invitro fertilization (IVF) with or without intracytoplasmic sperm injection (ICSI). [3]

A total of 100 IUI cycles were analysed. The overall pregnancy rate per cycle and per couple was 4.6% (15/320) and 16% (16/100) respectively. The average female and male age was 25.5 + 5.30 years and 32.8 ± 4.6 years respectively in the participants with positive IUI result. Both were not statistically significant. Duration of infertility, type of infertility, endometrial thickness, number of follicles, size of follicles, sperm count, sperm motility and single/double IUI did not significantly affect the outcome of IUI. However, logistic regression analysis showed significant relationship between pregnancy occurrence and number of follicles and number of IUI cycles.

In Houmard et al [18] study, the lower clinical pregnancy was attributed to higher maternal age and lower ovulatory disorder cases. These differences between other studies and ours are probably due to different causes of infertility, type of treatment and younger women seeking infertility treatment in our country.

In this study, the average female and male age did not show any influence on IUI results. The advancing maternal age decreases female fecundity

[19] and this is due to reduced uterine receptivity [20] and/ or decreased oocyte quality. However, the prognostic value of woman's age was not significant in studies undertaken by Brzechffa et al [21] and Tomlinson et al [22] which was similar to our study. In our study, the number of follicles was a prognostic predictor of IUI outcome, which is similar to that found in earlier studies. [23,24] The positive relationship between follicle count and IUI success could be due to increased chances of fertilization and implantation. Sperm count and progressive motility after preparation was not indicator of IUI success. This is due to sperm screening prior to IUI and exclusion of couples with a progressively motile sperm count of <1 million/ml.

Conclusion

Letrozole and letrozole + HMG are useful and cost effective treatment option for infertility. We find that two variables have significant prognostic value with regard to IUI success: number of follicles and number of treatment cycles. Careful patient selection criteria along with successful ovarian stimulation enhance the treatment outcome. This information will help us in counseling infertile couple and make it possible to carry out more precise patient selection, preventing any wasteful and unnecessary treatment and increase the cost-effectiveness of IUI therapy.

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