Original Article

Predictive Variables For Pregnancy After Intrauterine Insemination: A Prospective Investigation Of Outcome Factors

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DOI: 10.47750/pnr.2022.13.S02.54

Abstract

Aim: The aim of this study to determine the predictive variables for pregnancy after intrauterine insemination.

Material and methods: It is a prospective observation study of couples who come to our institution for therapeutic IUI. Indications included unexplained infertility after three years of marriage, minor sperm malfunction and anovulation, spouse travelling and only visited for a brief time. Inclusion criteria also included being between the ages of 20 and 45, having a BMI of 30kg/m2, having a normal uterine cavity, and having patent tubes confirmed by HSG or laparoscopy.

Results: Total 100 individuals were enrolled in all, and they underwent 120 cycles over the research time. In terms of etiological causes, anovulation was the most common (16%), followed by unexplained infertility and male factor (13.33% and 8%, respectively). Endometriosis was present in 0% of the cycles. Pregnancy rates following ovulation inducement were 11.67% and 13.33% in cases with unexplained infertility. overall pregnancy rates per cycle was 11.67% of these 8.33% were live births while 2 resulted in miscarriage and 2 ended as ectopic pregnancy. There were no multiple pregnancies.

Conclusion: we concluded that the age, infertility length 5 years, and increasing days of stimulation to >7 days by adding gonadotropins to CC or aromatase inhibitors appeared as important variables in this research. More prognostic variables might be found with a large-scale investigation.

Keywords: Intrauterine insemination, preovulatory follicles, stimulation

INTRODUCTION

Infertility specialists often use the treatment strategy of combining controlled ovarian hyperstimulation (COH) with intrauterine insemination (IUI) for a wide variety of cases. cervical factor, minor endometriosis, mild to moderate male factor, ovulatory dysfunction, and unexplained infertility are common signs.[1] Pregnancy rates each cycle have been recorded between 8 and 22 percent.[2-4] Variations in infertility prevalence and length, ovarian stimulation use, sperm preparation methods, treatment cycles, and the total number of IUI attempts all contribute to wide ranges in reported pregnancy rates per IUI cycle in the scientific literature (single or double). [1-4] According to the studies, the cumulative pregnancy rates for COH with IUI range from 20-33%.[4,5] Depending on the age of the woman, it is advised that four cycles of COH/IUI be attempted before going on to the next stage of assisted reproductive technology (ART): in vitro fertilisation (IVF).[3,6] Patient characteristics, infertility diagnosis, infertility duration, infertility type, stimulation protocol, follicular response, endometrial thickness, IUI timing, and several semen parameters (postwash motility, morphology, and total motile fraction) have all been identified as prognostic factors for IUI treatment success (TMF).[4,7-9] COH/IUI is a less complicated and less costly treatment option than ART-IVF, but it still needs close monitoring and supervision by a professional. Attempting a COH/IUI cycle may be difficult if the couple is aware of the low per-cycle pregnancy rates and the time, effort, and cost consequences of such therapy. Many couples would prefer try IVF once than go through three or four COH/IUI rounds. This is particularly the case for couples who must travel great distances to reach alternative treatment facilities. The purpose of this research was to evaluate the role of potential prognostic markers such as maternal age, previous pregnancies, infertility length, in vitro fertilisation (IVF), ovulation inducement, and sperm characteristics in predicting the success or failure of a clinical pregnancy.

MATERIAL AND METHODS

This research was conducted at the department of..... It is a prospective observation study of couples who come to our institution for therapeutic IUI. Indications included unexplained infertility after three years of marriage, minor sperm malfunction and anovulation, spouse travelling and only visited for a brief time. Inclusion

criteria also included being between the ages of 20 and 45, having a BMI of 30kg/m2, having a normal uterine cavity, and having patent tubes confirmed by HSG or laparoscopy. Blocked tubes, stage II-IV endometriosis, and severe males with 1 million TMF post wash were eliminated. According to WHO guidelines 2010, moderate male factor is defined as sperm count 15 million/ml, motility (G1+G2) 40%, and morphology 4%; post processed motile sperms for insemination should be between 5 and 10 million/ml, with morphology 4%, according to Kruger's criteria.[10] If the motile sperm count is more than 20 million and the sample is not viscous, the swim up technique may be employed; otherwise, the density gradient method is utilised if pus-cells, immature cells, or spherical cells are present. Unexplained infertility occurs when all of a couple's conventional reproductive testing, including sperm analysis, tubal status, and ovulatory cycles, are normal.

By new AFS standards, minimal endometriosis is scored 1-5, while moderate endometriosis is scored 6-15. Clomiphene citrate or Aromataseinhibitor were used for ovulation induction for 5 days, depending on response, and on cycle day 10 of stimulation ultrasonography was performed. If necessary, injectable gonadotropin HMG was added until 1-2 follicles of 18-19mm were achieved and endometrium of >6mm was present. IUI was cancelled if follicles were 3 of 16mm. Ovulation was triggered with 5000 iu of human chronic gonadotropin when follicles were 18- 19mm, and the couple was encouraged to abstain from intercourse before being admitted to the hospital for sperm preparation and insemination 36 hours after the trigger was administered. The patient was instructed to take 10 minutes of bed rest and to have intercourse on the same day. Luteal support was supplied by natural micronized pessary (cyclogest 400mg) at night for 14 days, followed by serum Bhcg testing on the 15th day. The existence of an intrauterine gestational sac verified by ultrasonography was considered clinical pregnancy.

Continuous data are reported as mean and standard deviation, while categorical variables are provided as percentages. The SPSS version 25.0 was used. P value 0.05 was considered significant.

RESULTS

In this research, 116 patients who met the IUI inclusion criteria were included. Seven patients were dropped owing to inability to achieve target follicular induction, and four had three preovulatory follicles. The operation was not performed in three couples because the male partner failed to generate sperm on the day, and two had sperm counts of one million/ml in the post-wash sample. So 100 individuals were enrolled in all, and they underwent 120 cycles over the research time.

Table 1 demonstrates the many factors influencing IUI pregnancy rates, including aetiology and ovulation induction. In terms of etiological causes, anovulation was the most common (16%), followed by unexplained infertility and male factor (13.33% and 8%, respectively). Endometriosis was present in 0% of the cycles. Pregnancy rates following ovulation inducement were 11.67% and 13.33% in cases with unexplained infertility. Only 4% of males conceived with a post-wash semen fraction of 10 million, whereas 13.16% and 14.03% conceived with a post-wash semen fraction of 20 and 50 million/ml, respectively. When just one preovulatory follicle was introduced, 12.86% of patients conceived, and 10% conceived when two follicles were inducted. Pregnancy is more likely when the endometrium is thicker than 6mm. There were 15.38% more pregnancies when the endometrial was thicker than 6mm. There were 90 cases of primary infertility and 30 cases of secondary infertility.

Table 1: Factors Related To Ovulation Induction An Etiology

Parameters	Pregnancy/ Cycle	%age pregnancy
Infertility etiology		
Annovulation	8/50	16%
Male factor	2/25	8%
Endometriosis	0/15	0%
Unexplained	4/30	13.33%
Total motile fraction million/m		
5-10	1/25	4%
10-20	5/38	13.16%
20-50	8/57	14.03%
Number of preovulatory follicles		
1	9/70	12.86%
2	5/50	10%
Enometril thickness		
<6mm	4/55	7.27%
>6mm	10/65	15.38%
Type of infertility		
Primary	11/90	12.22%
Secondary	3/30	10%

Table 2 depicts basic characteristics of study population affecting the success of IUI. The patients who achieved pregnancy had 28.78±4.85 mean age as compared to unsuccessful one`s with mean age of 35.74±4.71. P value (0.04) which is significantly higher.
Mean BMI was 29.02±2.69 and 29.88±3.21 in each group respectively which is not significantly different. Successful group had duration of infertility <5 yrs. as compared to unsuccessful group of 7.58±1.34 which was significant. P value (0.02). Number of days of stimulation had significantly higher impact on success. P value (.000) when stimulation was done for 7.8±1.02. Table 3 overall pregnancy rates per cycle was 11.67% of these 8.33% were live births while 2 resulted in miscarriage and 2 ended as ectopic pregnancy. There were no multiple pregnancies.

Table 2: Factors Related To Basic Characteristic In Study Populate

Parameters	**Pregnancy**		**P value**
	Yes	**No**	
Age (yrs)	28.78±4.85	35.74±4.71	0.04
BMI Kg/m^2	29.02±2.69	29.88±3.21	0.17
Duration of infertility (yrs)	4.74±1.22	7.58±1.34	0.02
Days of stimulation	7.8±1.02	4.9±1.03	0.000

Table 3: Pregnancy Outcome Of Intrauterine Insemination

Parameters	**Outcome/ cycle**	**%age Pregnancy**
Pregnancy/Cycle	14/120	11.67%
Line birth rate	10/120	8.33%
Miscarriage	2/14	14.28%
Ectopic pregnancy	2/14	14.28%
Multiple pregnancy	0	0

DISCUSSION

In our research, we attempted to identify the parameters that influence the effectiveness of IUI. Patient characteristics such as age, length of infertility, patient weight, and reason of infertility were all influenced, as were metrics associated to ovulation induction such as number of dominant follicles, endometrial thickness, and number of days of stimulation. It also measured the effect of total motile fraction (TMF). Female age emerged as a significant factor among patient parameters. It is a well-documented factor that affects oocyte quality; even more effective treatments, such as IVF, cannot overcome the negative impact of age. [11] In our research, patients younger than 30 years old had a substantially greater P (0.04) pregnancy rate than those 35 years or older. Other studies have shown a low pregnancy rate in women aged 35 and above. [12] Women over the age of 35 should investigate alternative choices instead of IUI, while women over the age of 40 should avoid it.
Another crucial factor that has emerged as a predictor of success is the length of infertility. When the duration of infertility was less than 5 years, pregnancy rates were significantly higher P (0.01) than when it was 7-8 years. An previous research came to the same conclusion: a shorter history of infertility leads to a much greater pregnancy rate. [13] BMI in both groups did not reach a statistically significant difference. The success rate was considerably greater (P 0.000) when clomiphene citrate was paired with gonadotropins for 2-3 days, raising the days of stimulation to >7 days compared to 5 days stimulation with CC alone. Fecundity is only increased when gonadotropins are used for COH, especially in male subfertility. [14]
Another research (Guzick et al)15 found that in a gonadotropin-stimulated region of study, the pregnancy rate was close to 12%. In our investigation, all clinical pregnancies were single, and no occurrence of over stimulation was seen. There was a mono follicular response in 68.28% of cycles and two preovulatory follicles in 35.7% of periods.
Although the clinical pregnancy rate with mono follicular stimulation is poor, if the mean number of follicles is 2.1±1.1, the outcomes improve.[15] However, the likelihood of early LH surge rises when two or more follicles are recruited, resulting in endometrial receptivity desynchronization. As a consequence, GnRH antagonists are now used in controlled ovarian hyper stimulation for IUI when more than one follicle is present, with better clinical pregnancy rates. [16,17]
Among the elements impacting the cycles, the success rate in anovulatory and unexplained infertility patients was 16% and 13.33%, respectively, when compared to endometriosis and male factor infertility. In our research, 15.38% of cycles had mild to moderate endometriosis, and none of the patients were able to conceive. The similar outcome has been confirmed in a meta-analysis, where the pregnancy rate in endometriosis was lowered by half. [18]
Total motile fraction (TMF) is an essential component influencing success. In this research, only 4% of males conceived when the post wash semen fraction was between 10 million and 13.16% and 14.03% conceived when the post wash semen fraction was between 20 and 50 million/ml, respectively. When just one preovulatory follicle was introduced, 12.86% of patients conceived, and 10% conceived when two follicles were inducted. In our investigation, no patients had TMF levels more than 5 million/ml. The authors attempted to establish a lower limit of TMF at which IUI may be regarded as a therapy option in the male factor. A TMF of one million is linked to a low conception rate. [19] Counseling about the possibility of IVF/ICSI should be explored with couples with TMF 5 million. When endometrial thickness was more than 6mm, the pregnancy rate increased from 15.38% to 7.27%. There was no difference in attaining clinical

pregnancy based on the type of infertility. 12.22% of primary infertility couples and 10% of secondary infertility couples were successful. We found that the total pregnancy rate each cycle was 11.67%, with 8.33% being live births, two miscarriages, and two ectopic pregnancies. There were no multiple births. There were no multiple pregnancies, however one of the neonates was born with congenital adrenal hyperplasia. The cumulative pregnancy rate with COH/IUI is fairly diverse; it varies with indication; 10-20% cycle is an acceptable range for all etiologies. [20]

CONCLUSION

Finding out what elements are most indicative of successful IUI was the driving force for our research. Age, infertility length 5 years, and increasing days of stimulation to >7 days by adding gonadotropins to CC or aromatase inhibitors appeared as important variables in this research. More prognostic variables might be found with a large-scale investigation. If a couple knows the prognostic variables determining the success of IUI, they may skip it if the results are not promising and instead move straight to IVF, saving both time and energy.

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