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Indian Journal of Obstetrics and Gynecology Research

Journal homepage: www.ijogr.org

Original Research Article

High BMI causing poor outcome of intrauterine insemination method

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ARTICLE INFO

Article history:

Received 28-01-2022

Accepted 12-07-2022

Available online 08-11-2022

Keywords:

Body mass index (BMI)

Intrauterine insemination (IUI)

ABSTRACT

Objective: To assess whether high BMI of >30kg/m² affects outcome of Intrauterine Insemination method(IUI).**Materials and Methods:** We conducted a retrospective study of 140 infertile couples. Out of these 71 women had BMI <30 (Group A) and 69 women had BMI of >30 (Group B). All these 140 women had undergone Intrauterine Insemination (IUI) using the agonist/antagonist with stimulation by gonadotrophins protocol.

Statistical analysis was done by Student t test for parametric data and Chi-square test for p value significance.

Results: We found that success of Intrauterine Insemination (IUI) was higher in women with BMI < 30. We had 16 pregnancies (22.54%) with 3 patients having twin pregnancy (4.23%) in Group A and only 3 patients (4.34%) were pregnant in the group B.**Conclusion:** There was a significant (p = 0.002) decrease in pregnancy rate in women with BMI of >30 who underwent Intrauterine Insemination(IUI).This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.For reprints contact: reprint@ipinnovative.com

1. Introduction

Obesity is a pandemic of today's era. The World Health Organization (WHO) defines "overweight" as BMI of 25.0 kg/m²- 29 kg/m² and "obesity" as BMI of 30.0 kg/m² or more.¹ Due to changing lifestyle patterns leading to increase in obesity & increasing infertile couples approaching for assisted reproductive techniques (ART), the use of Intrauterine Insemination (IUI) & Intracytoplasmic Sperm Injection (ICSI) has increased tremendously.² Most obese women have anovulation which may lead to infertility.^{3,4}

2. Materials and Methods

We included all PCOS infertile couples between January 2020 to May 2021, in a retrospective study. The study was

SS Baldawa Neurosciences and Womens Care Hospital, Solapur, Maharashtra, India. The BMI was calculated as the weight in kilograms divided by the square of the height in meters.

2.1. Fertility work-up of the female partner

Female partner fertility work-up consisted of their fertility history, including details about height and weight, waist to hip ratio, ovarian volume, antral follicular count, day 2 hormonal assay including Serum FSH, LH, TSH, prolactin, estradiol & Serum AMH levels. Ovulation was assessed sonographically by monitoring of follicular development.

2.2. Fertility work-up of the male partner

Semen analysis was conducted including semen volume, concentration, morphology and motility.

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2.3. Follow-up

After the basic fertility work-up, these couples were started on ovulation induction drugs using the Follicle Stimulating Hormone (FSH) or Human Menopausal Gonadotropin (HMG) with the agonist or antagonist protocol. Pituitary suppression was achieved by gonadotrophin releasing hormone agonist by subcutaneous injection of 500 micrograms (20 units) of Injection Leupride for approximately 8 days from midluteal phase of previous cycle. On day 2 of menses adequate downregulation was confirmed if serum estradiol was less than 50 pg/ml, serum LH was less than 2.0, serum progesterone was less than 1, and then controlled ovarian stimulation was initiated with 150 IU or 300IU of recombinant FSH/ urinary FSH {if day 2 LH levels were between 1.2- 2} or 300IU (2 amp) of human menopausal gonadotropin {if day 2 LH levels were less than 1.2} and further dosages were adjusted according to patient's response which was regularly assessed by folliculometry (transvaginal ultrasound). Dose of Inj. Leupride was reduced to 250 micrograms (10 units) from day of gonadotrophin stimulation to the day before human chorionic gonadotrophin (HCG) injection. 10000IU of HCG was given intramuscularly when 3 or more follicles reached 18mm in diameter.

Intrauterine Insemination (IUI) was performed 36-40 hours after HCG injection.

Pregnancy was first confirmed by a serum beta HCG concentration at 14 days after Intrauterine Insemination (IUI). Values of serum Bhcg >25IU/ml were considered as pregnancy positive and serum Bhcg was repeated > 48 hrs to confirm its doubling values which was suggestive of viable intrauterine pregnancy. Ultrasound was done. Only viable clinical pregnancies with cardiac activity at 7 weeks of gestation on transvaginal scan were taken as positive pregnancy outcome of IUI for this study.

Thus, all biochemical pregnancies (when a previously positive pregnancy test became negative before ultrasonographic detection of an embryonic sac in the fifth week of pregnancy or later), and preclinical losses (if the loss occurred after the gestational sac is seen but before fetal cardiac activity was seen) were excluded.

2.4. Statistics

Patients were divided into two groups : Group A (n=71) included overweight women with BMI < 30 kg/m²; Group B (n=69) included obese women with BMI >30 kg/m². Clinical pregnancy per started cycle was used as the primary outcome. Secondary outcomes included duration and dose of stimulation, cycle cancellation rate due to ovarian hyperstimulation.

The cycle cancellation was either due to poor ovarian response to gonadotropin stimulation (no dominant follicles development) or increased risk of ovarian hyperstimulation

syndrome (OHSS).

Descriptive statistical analysis has been carried out on this retrospective study. Student t test (two tailed, independent) was used on metric parametric data, Levene's test for assessing homogeneity of variance, and Chi-square test was used to find out significance of study parameters on categorical scale between 2 groups. P < 0.05 was considered statistically moderately significant. P < 0.001 was considered statistically strongly significant.

3. Results

During the study period from Jan 2020 to May 2021, 498 women aged 22-40 years underwent IUI cycles. Of these 140 women were PCOS and their husbands also had male factor infertility. Other causes of infertility like endometriosis, fibroid uterus, blocked tubes, poor endometrium were excluded from this study. Of these PCOS women, 71 women had BMI between 25-29 kg/m² which were included in Group A and 69 women had BMI of 30 kg/m² or more forming Group B. Average Weight in kgs in Group A was 62.46 + 8.3 kg and 76.30 + 8.19 kg in Group B. The difference in weight in both groups which was statistically significant.

Average BMI in Group A was 26.75+1.35 kg/m² and 34.00 + 1.83 kg/m² in Group B. Both Groups had similar age, 28.14 + 3.68 and 30.35 ± 2.44 respectively. Both groups had Polycystic Ovarian syndrome as their primary cause of infertility. (Table 1)

Table 2 shows the comparison of treatment outcome between the two groups.

BMI and lower incidence of Intrauterine Insemination (IUI) (Table 2). In summary, we found that obesity is associated with a lower pregnancy rate after IUI.

The negative impact of obesity in the outcome of assisted reproductive⁵⁻⁷ technology has been suggested by multiple reports. In this study, we report the outcome of IUI treatment for women with BMI between 25 -29 kg/m² and compared the outcome to women with BMI > 30 kg/m² and more. The study population was relatively homogenous, with comparable age and PCOS as the main cause of infertility. The treatment protocol was standardized and all women were undergoing their first treatment cycle. Our results suggest that women in group B had a lower pregnancy rate per started cycle when compared to women in group A. This could be explained by the fact that women in group B had lower number of medium size and mature follicles, and also had higher cycle cancellation rate due to non development of dominant follicle.

4. Discussion

A limitation of this study is that the live birth rate could not be assessed due to our inability to complete follow up with these patients after 7 weeks of gestation when cardiac

Table 1: Comparison of parametric data in Group A & Group B

	Group A BMI <30 (n= 71)	Group B BMI>30 (n= 69)	P Value	Significance of P value
Weight(kg)**	62.46±8.33	76.3±8.19	*P< 0.001(1.3 x 10 ⁻¹⁷)	Extremely Significant
BMI (kg/m2)**	26.75±1.35	34±1.83	*P< 0.001(2.2 x 10 ⁻³⁷)	Extremely Significant
Male factor (%)	34(47.89%)	30(43.48%)	P = 0.93 [§]	Not significant
Failed ovulation (%)	25(35.21%)	29(42.03%)	P = 0.91 [§]	Not Significant

**Above values are mean ± standard deviation

*Unpaired 2 tailed T-test is used.(mean ± standard deviation)

§Chi-square test was used.(absolute numbers)

Table 2: Treatment outcome in Group A & Group B

Cycle Outcome	Group A BMI <30 (n= 71)	Group B BMI>30 (n= 69)	P value	Value
Length of stimulation (days)	10(11-13)	13(11-16)	P = 0.65	Not significant
Total Dose of rFSH / HMG (IU)	1200 (1050 – 1750)	1800(1600- 2250)	P = 0.65	Not significant
No.of follicles on USG	3 (2-6)	1 (3-4)	P = 0.76	Not significant
Clinical Pregnancy rate n (%)	16 (22.54%)	3 (4.41%)	P < 0.001(5.3 x 10 ⁻⁹) [§]	Significant
Cancellation rate n (%)	6 (8.45%)	28(17.39%)	P < 0.001(1.02x10 ⁻⁶) [§]	Significant

The above values are median when values were arranged in ascending order

§Chi-square test was used

activity was confirmed; most of these patients receive care for their pregnancy in tertiary care hospitals. Additionally, it would be interesting to know the live birth rate per started cycle and the late miscarriage rate (following +ve fetal heart beat) for the Group B population in comparison to the Group A women.

As other authors have suggested, weight loss will improve the reproductive function of the obese population.^{8,9} We suggest that life style modification and weight loss programs should be advised for the morbidly obese women before they attempt IUI treatment. This in concordance with new recommendations of the British Fertility Society recommendations to defer treatment in obese women until a BMI of <35 is reached.¹⁰

Current National Institute of Clinical Excellence (NICE) fertility guidelines recommend that all obese women, regardless of their cycle characteristics, should be informed that they are likely to take longer to conceive.¹¹ Obesity is also associated with decreased live birth after IUI and with an impaired response to ovarian stimulation.¹²

Overweight/obese women require increased gonadotrophin dosage and duration, have fewer dominant follicle development, decreased serum estradiol concentrations, frequent cycle cancellations and low pregnancy rate compared with normal weight women.¹³

5. Summary

In a homogeneous infertile and obese population stratified according to their BMI, morbidly obese and obese women

undergoing IUI therapy have lower clinical pregnancy rate when compared to overweight patients. We would suggest that before initiation of this therapy in morbidly obese population, couples should receive counseling about the expected performance and the anticipated clinical pregnancy rate per started cycle.

6. Source of Funding

None.

7. Conflict of Interest

The authors declare that they have no competing interests.

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Cite this article: Baldawa P, Baldawa S. High BMI causing poor outcome of intrauterine insemination method. *Indian J Obstet Gynecol Res* 2022;9(4):494-497.