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Assessment of Intrauterine Insemination (IUI) Programme

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Summary

Intrauterine insemination of sperms is the most commonly used, well accepted and cost effective therapy in the management of infertility in women. To achieve high pregnancy rates, the IUI should be done around ovulation. The COH with sequential CC & hMG in IUI cycles is the mainstay of IUI programmes. The pregnancies were seen in 222 (27.13%) & 25 (6.20%) women with normospermic and oligospermic IUI. Pregnancy rates were 26.92% with good sperm survival and nil with poor and no sperm survival. There was no significant difference in PR with single (19.8%) and double (20.2%) IUI. The corrected PR were 23.84% in women with CC only and 30.82% in women with CC plus hMG protocol. Maximum conceptions were achieved in first 3-4 cycles in 202 (81.78%) women and remaining 45(18.22%) women conceived in more than four cycle of IUI programme. The improvement in pregnancy rates in IUI programmes could be achieved by COH and appropriate number of insemination using good quality sperms coinciding with ovulation.

This study was undertaken to evaluate the results of controlled ovarian hyperstimulation (COH) and the timing and number of inseminations to improve pregnancy rates in IUI programme at the Manipal Assisted Reproduction Center, Dept. of Obstetrics & Gynaecology, Kasturba Medical College, Manipal Academy of Higher Education (MAHE), Manipal 576119, India.

The study period was from January 1994 – June 1999. Total one thousand five hundred and five (1505) patients who underwent IUI, were included in this study.

Introduction

Intrauterine insemination of sperms is the most commonly used, well accepted and cost effective therapy in the management of infertility in women. It is also less invasive compared to other assisted reproductive techniques. For intrauterine insemination (IUI) sperm could be obtained from husband, donor or partner. Sperm with normal parameters (WHO, 1992) if used for IUI, could attain better conception rates. Semen should be processed properly to select the very best sperms which can be made available for fertilising the ovum. To achieve high pregnancy rates, the IUI timing should be around the ovulation. The COH with sequential CC & hMG in IUI cycles has become the mainstay of IUI programmes (Dodson and Haney, 1991). Intrauterine insemination could be done as a single or double procedure around periovulatory period.

Materials & Methods

All patients who were being treated by IUI with COH were recruited for this study. A comprehensive analysis was conducted at different periods from 1994-1999, to assess the role of following factors in achieving and improving the pregnancy rates: semen parameters including concentration, morphology and viability, COH protocols and their duration, timing and number of IUI procedures. When the leading follicle was 18 mm, hCG was administrated and IUI was performed 36 hours later and if no ovulation had occurred then IUI was repeated next morning too.

Observation and Analysis

Following factors were analysed to see their role in achieving and improving pregnancy rates:

1. The sperm concentration, COH, and duration of treatment were studied in 1221 patients who underwent IUI programme (duration – 4 years, July 1995-June 1999).
2. The sperm survival was analysed in 79 patients with unexplained infertility who underwent IUI programme (duration – 6 months, Jan-June, 1994).
3. The number of IUI procedures were evaluated in 205 patients (duration – 1 year, July 1994 – June 1995).

Sperm concentration and PR (Table I)

Table I.
Sperm Concentration and PR

Sperm Concentration	Total Patients (n-1221)		PR	
	No.	(%)	No.	(%)
Normospermic	818	(67)	222	(27.13)
Oligospermic	403	(33)	25	(06.20)

These patients were divided in normospermic group which had 818 (67%) women and in oligospermic group which had 403 (33%) women. The pregnancies were seen in 222 (27.13%) women with normal sperm concentration based on the criteria of WHO (1992). In oligospermic group only 25 (6.20%) women could conceive. The lower pregnancy rate was observed in patients with poor sperm concentration.

Sperm Survival and PR (Table II).

Table II
Sperm Survival and PR

Survival	Total Patients (n=79)		PR	
	No.	(%)	No.	(%)
Good (50% or more)	26	(32.90)	7	(26.92)
Poor (<50%)	19	(24.05)	Nil	
No Survival	34	(43.05)	Nil	

Survival of sperm along with count and motility, plays an important role in predicting the fertilisation potential of the sperms (Fuse 1990). Only those sperms which can survive for more than 18 hours are capable of fertilising the oocytes. In this study, sperms were assessed for count, motility and morphology after swim up technique and motility assessment was again done at 24 hours. The survival rate was calculated as ratio of the total forward progressive sperms at 24 hours multiplied by 100 to initial number of forward progressive sperms. The sperm survival test was rated good when this ratio was 50% or more and poor when the ratio was less than 50 percent. When there was no sperm alive at 24 hours or atleast after 18 hours it was termed as no survival.

These 79 patients were divided in 3 groups based on the sperm survival. Twenty six (32.90%) women had IUI with sperms of good survival and in this group pregnancy was achieved in 7 (26.92%) women. In contrast, 19 (24.05%) women were inseminated with the sperm of poor survival and no pregnancy was observed in this group. Same fate was observed in 34 (43.05%) women who were inseminated with no survival sperms.

Number of IUI and PR (Table III)

Table III
Number of IUI and PR

No. of IUI	Total Patients (n=205)		PR	
	No.	(%)	No.	(%)
Single	101	(49.3)	20	(19.8)
Double	104	(50.7)	21	(20.2)

Intrauterine insemination can be performed either as one insemination in periovulatory period or as two inseminations, the second one done 24 hours later. Single and double IUI were compared and there was no significant difference in pregnancy rates with single or double IUI procedures. Single IUI was done in 101 (49.3%) women and 20(19.8%) conceived. Two IUI procedures were done in 104 (50.7%) women and 21 (20.2%) conceived. This shows that there was no difference between single or double IUI.

Type of COH & PR (Table IV).

Table IV
Type of COH and PR

COH	Total Patients (n=1221)		PR	
	No.	(%)	No.	(%)
CC	719	(58.88)	124	(17.24)
CC + hMG	502	(41.12)	123	(24.50)

The different COH protocols were compared to assess the pregnancy rates in 1221 patients. Total of 247 conceptions occurred. In 719 (58.88%) patients COH was done only with CC and the pregnancies were observed in 124 (17.24%) women. The COH with CC plus hMG was carried out in 502 (41.12%) women and

the conception rate was higher, pregnancy having been observed in 123 (24.50%) women. Hence addition of hMG sequentially to CC gave slightly increased pregnancy rate when compared to that with only clomiphene.

Type of COH and Corrected PR (Table V).

Table V
Type of COH and Corrected PR

COH	Total Patients (n=919)		PR	
	No.	(%)	No.	(%)
CC	520	(56.58)	124	(23.84)
CC + hMG	399	(43.42)	123	(30.82)

Corrected Pregnancy Rates: Couples who had atleast 4 attempts of IUI were considered while calculating the corrected pregnancy rates. Three hundred and two women who were irregular for treatment, had less than 4 attempts of IUI and had no pregnancy, were excluded from 1221 to assess the corrected pregnancy rates in 919 women, 520 (56.58%) with CC only and 399 (43.42%) with CC plus hMG protocol. The corrected PR were 23.84% in women with CC only and 30.82% in women with CC plus hMG protocol. Hence the corrected PR was better with sequential CC plus hMG protocol when compared to only CC protocol.

Number of IUI cycles and PR (Table VI)

Table VI:
Duration (number) of IUI cycles and PR

Duration	Patient Conception (n=247)	
	No.	(%)
First 4 cycles	202	(81.78)
Five or more cycles	45	(18.22)

Maximum conceptions were achieved in first 3-4 cycles in 202 (81.78%) women. Remaining 45 (18.22%) women needed more than 4 cycles of IUI for conception. This signifies the importance of appropriate planning of management in these patients and is also suggestive of higher number succeeding in the first 4 cycles. The PR decreases as the number of cycles increase thereafter.

Discussion

To achieve high pregnancy rates, the IUI timing should be around ovulation which can be predicted by transvaginal sonography (TVS) guided follicular monitoring and LH surge test. Usually IUI is done within 36 hours of hCG injection.

A high PR could be achieved with normal sperm concentration. Pregnancy rates in normo and oligospermic groups, respectively, were as reported by Cruz et al (1986) 20% & 14.3% as compared to 27.12% and 6.20% in our study. These data show that the PR are higher in normospermic patients than in oligospermic patients.

Sperm survival is an important parameter of semen quality. In our study the pregnancy rates were 26.92% in good and nil with poor and no survival groups.

Though double IUI procedures are being performed at most of the infertility treatment centers there is no significant difference in PR with single and double IUI procedures. Silverberg et al, (1992) and Ransom et al, (1994) observed no difference in pregnancy rates in single and double IUI procedures. In the current study also there was no significant difference in PR with single (19.8%) and double (20.2%) IUI, suggesting that a single well timed IUI is sufficient in women undergoing COH and intrauterine insemination.

Pregnancy rates could be improved if adequate COH is followed by well timed intrauterine insemination. Martinez et al, (1993) observed PR of 5.8% in spontaneous cycles, 18.8% in CC and 18.2% in CC plus hMG cycles. In the current study, corrected PR were 23.84% with CC alone and 30.82% with CC plus hMG protocol. It is suggested that the addition of hMG sequentially to CC gives higher pregnancy rates when compared to those with only clomiphene protocols for controlled ovarian hyperstimulation.

To achieve maximum pregnancy rates in IUI programmes, it is important to plan adequate COH and well timed IUI in first 3 or 4 cycles since this is the period when maximum number of patients conceive and with the increasing number of IUI cycles the PR decreases. The pregnancy rates achieved in first four cycles of IUI programme were 94% (Remohi et al, 1989), 84% (Agarwal & Buyalos, 1996), and 81.78% in the current programme. The patients should be advised alternative techniques like in-vitro fertilisation when pregnancies are not seen after 4-6 IUI cycles.

Summary :

1. Normal sperm concentration leads to better pregnancy rates.
2. Sperms with good survival give higher conceptions.
3. There is no significant difference in PR with single

and double IUI procedures.

4. Adequate COH with sequential CC and hMG gives better pregnancy rates than clomiphene citrate alone.
5. Maximum pregnancy rates occur in first three to four cycles.

Conclusion

The improvement in pregnancy rates in IUI programmes could be achieved by COH and appropriate number of insemination using good quality sperms coinciding with the ovulation.

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