Sperm preparation and *in utero* insemination in the management of subfertility

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Abstract

Objective To study the place of sperm preparation and *in utero* insemination in subfertile couples in whom ovulatory and tubal aetiological factors have been excluded or treated.

Design A retrospective cohort study.

Setting Diagnostic Seminology Laboratory, Galle.

Subjects and methods Patients (n=325) who had *in utero* insemination (IUI) from September 1990 to June 1994 were studied retrospectively. All had stimulation of ovaries with clomiphene and the Insler score was used to confirm ovulation before IUI. Swim up, spin down and glass wool filtration techniques, and the Earl's balanced salt solution with human serum albumin were used for sperm preparation.

Main outcome measures Association between variables.

Results Of the subjects 97(30%) had male factor, 79(24%) abnormal sperm-cervical mucous interaction and 41(13%) idiopathic subfertility. In 114(35%) the cause was not documented. The number of IUI attempts per subject ranged from 1 to 19 with a mean of 4.2 and SD 3.2.* There were no significant difference in conception rates in relation to the different methods of sperm preparation or the underlying aetiological factor.

Conclusion Sperm preparation and *in utero* insemination are feasible in Galle and should be considered as an option in the treatment of subfertility.

Introduction

Artificial insemination for the treatment of subfertility was probably started by John Hunter in the 1790s (1). Formerly liquified semen was used without any special preparation. Subsequently various techniques have been used to remove the seminal plasma and obtain a concentrated sample of actively motile sperm (2).

* There were 29(9%) successful pregnancies reported to the laboratory.

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Sperm preparation and IUI were started at the Diagnostic Semen Laboratory (DSL) Galle in September 1990. In June 1994 the work carried out up to then was reviewed and the results are presented.

Subjects and method

The 325 subjects who underwent IUI with processed spermatozoa at the DSL from September 1990 to June 1994 were studied retrospectively. All had ovarian stimulation with clomiphene citrate (50 to 150 mg/day from day 2 to day 6 of menstrual cycle) and confirmation of ovulation by Insler score (3) before IUI.

Tubal patency had been confirmed by hydrotubation, hysterosalpingography or laparoscopy and chromo-hydrotubation earlier. Abnormalities of sperm-cervical mucus interaction was assessed by the Kurzrok Miller Test (4).

Detailed seminal analyses were carried out on the male partners (5). Swim up, spin down and glass wool filtration techniques were used for sperm preparation, and the medium used was the Earl's balanced salt solution with human serum albumin (6, 7).

A 0.5 ml pellet of processed spermatozoa was transferred into the endometrial cavity using a 16 G IV cannula and 1 ml plastic disposable syringe. Any vaginal or cervical infection was treated before insemination.

The diagnostic criteria for abnormalities of semen and sperm-cervical mucus interaction are shown in Table 1.

Results

The demographic characteristics of the subjects are shown in Table 2. There was no significant difference in the number of IUI attempts in those who conceived and those who did not (Table 3). Conception rates were better in couples with idiopathic subfertility, cervical hostility and those with a combination of aetiological factors, compared to those with male or female factors alone. There were 29 (9%) successful pregnancies reported to the laboratory (Table 4).

Table 1. Diagnostic criteria

Abnormal semen :	Count	$<20 \times 10^6$/ml or $<50 \times 10^6$/ejaculate
	Motility	<50% (progressive)
	Normal morphological forms	<50%
	Viability	<50%
	Leucocytes	$>0.1 \times 10^6$/ml

Abnormal sperm cervical mucous interaction:

only clefts and colonization with sperms phalanx formation but no penetration, penetration but no progression

Table 2. Demographic characteristics

	Range	Mean	sd	n
Age of woman (years)	23 to 49	34.6	4.8	308
Age of man (years)	25 to 53	38.7	4.9	308
Years married	0.5 to 20	5.3	3.4	220
Doctors consulted previously	1 to 7	2.1	1.3	220
Distance from residence to DSL (km)	5 to 332	51.7	66.5	219

Table 3. Number of IUI attempts

	Range	Mean	sd	SED	p
Subjects who conceived (n=29)	1 to 19	5.6	4.0)		
Subjects who did not conceive (n = 296)	1 to 18	4.1	3.1	0.75	0.05
All (n = 325)	1 to 19	4.2	3.2		

* Not significant

Table 4. Conception rates in relation to underlying aetiological factors (n=325)

Aetiological factor	n	Pregnancies	(%)
Male	74	5	(6.8)
Female	8	-	(-)
Cervical	56	7	(12.5)
Combination of factors	32	5	(15.6)
Idiopathic	41	7	(17)
Not documented	114	5	(4)
Total	325	29	(8.9)

Table 5. Conception rates in relation to method of sperm preparation (n=325)

Method	Total IUI attempts	Patients	Reported pregnancies	(%)
Swim up	90	34	3	(9)
Spin	11	8	2	(25)
SD after SU failure	63	15	4	(26)
Glass wool filtration	596	176	9	(5)
GWF after SU and/or Sd failure	598	92	11	(12)
All	1358	325	29	(9)

Using the glass wool filtration technique for the preparation of sperms, of 1194 attempts in 268 patients, there were 20 (7.5%) successful pregnancies reported to the laboratory.

However the spin down method used earlier had resulted in 6 pregnancies (26%) in 23 subjects who had undergone 74 IUI attempts with this method (Table 5).

Discussion

The services provided by the DSL were hampered due to several reasons viz. (a) timing of IUI with ovulation was difficult as the laboratory functioned only twice a week. (b) due to the shortage of staff, only 8 couples were given appointments for IUI a day. (c) accurate timing of ovulation was difficult.

Facilities to detect the luteinising hormone surge in the urine are needed (8, 9). In 114 (35%) couples who had been investigated and treated elsewhere before they came to the DSL, the documentation was incomplete, hence the underlying aetiological factor could not be identified.

Ovarian stimulation with clomiphene is probably beneficial in those with idiopathic subfertility (10). Hence all subjects were treated with clomiphene. For sperm preparation, the glass wool technique is quick, convenient and has been found to be better than the swim up method (11). However, at the DSL simple centrifugation appeared to give the best results. Centrifugation on discontinuous percoll gradients is the other method which has been found to be very effective (12, 13). The 9% successful pregnancies reported to the laboratory compares well with the 14% pregnancy rates reported after sophisticated assisted reproductive techniques (14).

Conclusion

In spite of limited facilities, time and staff, sperm preparation and IUI is feasible in Galle. This technique should be considered in the treatment of subfertility where anovulation and tubal factors have been excluded.

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