

ARTIFICIAL INSEMINATION WITH DONOR SEMEN: AN ANALYSIS OF 53 RECORDED PREGNANCIES IN 50 PATIENTS

C. Lim
C.M. Chia
S.S. Ratnam

SYNOPSIS

There were 53 recorded pregnancies in 50 patients resulting from artificial insemination with donor semen in the Obstetrics and Gynaecology Department of the National University of Singapore between December 1973 and August 1981. There were 28 confirmed live-births with a male to female sex ratio of 15:11.

INTRODUCTION

There is an increasing demand for artificial insemination with donor semen (AID) in Singapore.

This has arisen because of the decline in the numbers of babies available for adoption, the result of a successful fertility control programme in Singapore involving contraception, therapeutic abortion and sterilisation.

Another factor which has contributed to this increase in demand for AID is the increasing awareness that the male is responsible for a significant part of the subfertility problem and because results of treatment for azoospermia and severe oligospermia are poor.

A third factor is the increasing acceptance of AID as a mode of treatment for male infertility.

MATERIALS AND METHODS

The Obstetrics and Gynaecology Department of the National University of Singapore has, as a part of its comprehensive infertility service, provided artificial insemination using donor semen. This mode of therapy has been employed sporadically for the last fifteen years but it has expanded considerably over the past two years because of increasing demand.

Patients are seen six days in the week in order to permit insemination during the time of ovulation.

Department of Obstetrics & Gynaecology
National University of Singapore
Kandang Kerbau Hospital
Singapore 0821

C. Lim, MBBS, M. Med, MRCOG, FRCS (G), FRCS(E)
Lecturer

C.M. Chia, BSc (Hons)
Research Associate

S.S. Ratnam, MBBS, MD, FRCOG, FRCS (E), FRCS
(G), FRACS, AM
Senior Professor and Head

The AID Recipient

The main indication for AID is the inability of the husband to produce semen capable of causing pregnancy in his wife: these include aspermia, azoospermia and severe oligospermia. Before the male in a marriage is considered subfertile based on semen analysis, at least three analyses are performed because of known natural fluctuation in semen count in normal men (1).

The female partner is required to undergo a complete investigation to exclude other factors contributing to subfertility before she starts on the donor insemination programme.

She would have her fallopian tube patency confirmed by laparoscopy and hydrotubation or by hysterosalpingogram. Her serum prolactin would have been assayed to exclude hyperprolactinemia and her basal body temperature assessed to note the occurrence and timing of ovulation.

If there are problems with ovulation, ovulation inducing agents are prescribed.

The patient is seen daily for assessment of her cervical mucus from the tenth day of her menstrual cycle onwards and an intracervical insemination is performed when there is satisfactory cervical mucus (2).

Insemination is carried out daily for one to five times until there is a definite thermal shift and a sustained rise of the basal body temperature.

Some 0.2 to 0.5 ml of semen is injected with a plastic tuberculin syringe and a blunt-ended needle into the cervical canal of the patient who is in the lithotomy position. She rests for ten minutes before rising from the couch. Treatment is repeated until the patient becomes pregnant or until she elects to discontinue the treatment.

The Donor

Voluntary donors include medical students and responsible members of the public. Semen is collected by masturbation. Volunteers who have known histories of jaundice, venereal disease or psychiatric problems are rejected.

A satisfactory donor semen should show a count exceeding 40 million spermatozoa per ml, progressive motility of more than 40% of the spermatozoa and white cell count of less than one million per ml.

Donor semen are plated on culture medium to exclude gonorrhoea.

A bank of frozen semen acts as a back-up in case fresh semen is not available on the particular date.

Only semen with good cryo-survival and post-thaw motility are used for freezing in liquid nitrogen. The cryo-protective medium used contains glycerol and egg yolk (3).

RESULTS

There were 53 confirmed pregnancies in 50 patients after artificial insemination with donor semen in the Department of Obstetrics and Gynaecology of the National University of Singapore in the eight year period from December 1973 to August 1981.

There were 45 Chinese and 5 Indian patients. The age range was from 19 to 37 years. They were subfertile from 1 to 16 years.

The 50 patients' husbands had the following problems with their semen:

Aspermia (no semen)	:	2 cases
Azoospermia (no sperm)	:	28
Oligospermia: < 1 x 10 ⁶ /ml	:	7
1- < 5 x 10 ⁶ /ml	:	6
5- <10 x 10 ⁶ /ml	:	3
10- 20 x 10 ⁶ /ml	:	1

Non motile spermatozoa
despite adequate sperm count : 3

Nine women were prescribed clomiphene citrate to induce ovulation in the cycle in which they conceived. One received human chorionic gonadotrophin in mid-cycle.

Of the four patients proven to have endometriosis, three were treated with norethisterone prior to receiving AID.

Of the 29 patients in whom this data was available, 26 of the pregnancies resulted from use of fresh semen and three from frozen semen.

The number of menstrual cycles in which AID was given ranged from one to eighteen.

Ten conceptions occurred with the first treatment cycle. Twenty-eight conceived by three cycles of treatment and forty-two women conceived by six cycles.

One to five inseminations were given in the successful cycle with an average of 2.2 inseminations. Pregnancy resulting from only one insemination occurred in fourteen patients.

The temporal relationship of the closest insemination to the basal body temperature nadir among the 34 patients in whom this data was available is as follows:

day minus 2	=	2 patients
day minus 1	=	8
day	=	15
day plus 1	=	7
day plus 2	=	2

Pregnancy outcome was traced in 27 cases. There were 26 live-births and one first-trimester abortion. There were no stillbirths nor ectopic pregnancies. The average period of amenorrhoea was 38 weeks. Six pregnancies are still ongoing at the time of data collection.

Of the 26 patients with data available, 14 had obstetric complications. These include five cases of pre-eclampsia, one case of antepartum haemorrhage, one case of prematurity and threatened abortion in seven patients.

Of the 26 patients with data available, eight had spontaneous vaginal delivery, eleven had forceps delivery; six were delivered by caesarean section and there was a case of twins. Four labours were induced and one had an elective caesarean section.

The male to female sex ratio was 15:11. The average birth weight was 3010 gm with a range of 2380 gm to 3700 gm. There was one baby with a cleft lip.

DISCUSSION

Thirty out of fifty couples had no chance of conception because the male partner either had no semen or had no spermatozoa in their semen. AID offered them the only chance of conception.

Three husbands had adequate sperm counts but had all non-motile spermatozoa.

The male partners in 16 couples had sperm counts of less than 10 million per ml. This is far less than the level of 20 million per ml set by the World Health Organisation as the lower limit consistent with normal fertility.

It would appear that artificial insemination with oligospermic husband's semen (AIH) would be possible in some of our cases. However, our experience with AIH has been extremely disappointing.

Poor sperm counts are often associated with reduced motility and increased proportions of abnormal spermatozoa.

Ovulation problems in the female partner do not preclude successful outcome as clomiphene citrate can be used. Patients with irregular or long menstrual cycles can have clomiphene citrate to regulate the cycle in order to

improve the logistics of Insemination (4). The spontaneous abortion rate of 3% in our small series is lower than that in other countries: 13.3%(5); 14.6%(6) and in the general population(7).

Complications of pregnancy include pre-eclampsia, antepartum haemorrhage, premature labour and threatened abortion. These are similar to complications seen in A.I.D. pregnancies in other centres(8,9).

Congenital malformation occurred in one baby who had cleft-lip. Other reported congenital abnormalities include Downs Syndrome and cardiac anomalies(10). The risk of congenital malformation appears no higher than in the general population(7).

The risk of consanguinous marriage as a result of AID is small (11,12).

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