

# MALE SEX PRESELECTION: SWIM-UP TECHNIQUE AND INSEMINATION OF WOMEN AFTER OVULATION INDUCTION

J. H. CHECK, B. S. SHANIS, S. O. COOPER,  
and A. BOLLENDORF

Insemination of women with sperm treated by the swim-up technique resulted in 81% male offspring. This was achieved even in women taking ovulation-inducing drugs, in whom the albumin gradient separation technique not only is not effective in male preselection but in which the female sex is favored. Confirmation of these initial data is needed as well as an investigation of the swim-up's efficacy of producing male offspring in women not taking ovulation-inducing drugs.

**Key Words:** Sperm; Semen; Swim-up; Ovulation induction.

## INTRODUCTION

Ericsson and co-workers have described a technique for the isolation of a fraction rich in Y sperm after passage of semen through concentrated gradients of bovine serum albumin [5]. Dmowski and colleagues first published clinical results of Y enrichment of sperm before insemination of the woman, resulting in 5 of 7 (71%) male infants [4]. A larger study supported the conclusion of this study, with 80% of 34 patients delivering male infants [3].

Opposite effects, that is a female sex predominance, have been described when the woman is treated with clomiphene citrate (CC) or human menopausal gonadotropin (hMG) after insemination of sperm separated with albumin gradients. Beernink and Ericsson reported 5 of 6 offspring as female in this setting [2], and a combined report from 17 other investigators who used CC with a two-layer albumin separation technique produced 42 girls and 14 boys [1]. James presented data suggesting a slight yet significant increase in female offspring: in this study, 1207 (46%) male births compared to 1401 (54%) female births resulted from the use of ovulation-inducing drugs with natural insemination [6]. Rawlins and colleagues recently reported a high male offspring rate from the use of a sperm swim-up technique in *in vitro* fertilization (IVF) in which women were treated with hMG [7]. This study was designed to observe the effects of swim-up and subsequent insemination of women treated with either CC or hMG in non-IVF cycles.

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From the Department of Obstetrics and Gynecology, Division of Reproductive Endocrinology, The Jefferson Medical College of Thomas Jefferson University, Philadelphia, Pennsylvania.

Address reprint requests to: J. H. Check, 1015 Chestnut Street, Suite 1020, Philadelphia, PA 19107.

## MATERIALS AND METHODS

Ten anovulatory infertile women were treated with hMG and 9 others with CC. Two men had asthenospermia as a result of sperm antibodies, so that the swim-up technique was employed to improve motility before intracervical insemination (ICI). The other 17 women received intrauterine insemination (IUI) because of hostile mucus resulting in poor postcoital results.

Each semen sample was first mixed with an equal volume of Ham-F10 medium, and then 0.5-ml portions of the mixture were placed in 1.5-ml microcentrifuge tubes. The tubes were then layered with 0.5 ml of Ham-F10 and subjected to centrifugation at 500 g from 5 min. This was followed by a 1-h incubation at 37°C in 5% CO<sub>2</sub>. The supernatant was then diluted 1 : 1 with medium and subjected to centrifugation for 5 min. The resulting supernatant was discarded, and the centrifugate was suspended in 1 ml of medium and again subjected to centrifugation. The final centrifugate was suspended in 0.2 ml of medium for IUI or 0.5 ml of medium for ICI.

The inseminations were performed when the woman had at least one mature follicle as evidenced by a minimum diameter of 18 mm by sonography and a serum estradiol concentration of at least 200 pg/ml per mature follicle. The insemination was repeated in 24 h. When human chorionic gonadotropin (hCG) was given, the insemination was usually performed on the day of hCG administration and 28 to 36 h later.

## RESULTS AND DISCUSSION

Seventeen women had a single birth, and 2 had sets of mixed twins. There were 17 male and 4 female offspring. The probability of 17 of 21 (81%) male births occurring by chance as calculated by Fisher's exact test is  $p < 0.05$ .

The data suggest the possibility that the swim-up technique may help preselect male offspring in women taking ovulation-inducing drugs. These results are comparable to those of a multicenter study of the three-layer albumin separation technique, which yielded a 74% male birth rate. The modified protocol III provided an 85% male birth rate [1]. Should these initial data be confirmed in more extensive studies, then the swim-up technique may provide a way for women taking ovulation-inducing drugs to improve the likelihood of male offspring. This will provide for women who are taking (and perhaps for those who are not taking) ovulation-inducing drugs a generally available and less expensive method for male preselection than the albumin gradient separation technique.

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