

## Research Article



## Does Sperm Morphology Affect the Pregnancy Outcome of Intra-uterine Insemination (IUI)?

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### ABSTRACT

A prospective observational study was performed in the period from Feb 2010 to Apr 2012. The study comprised 100 couples who underwent IUI cycles. All IUI cycles were preceded by ovarian induction with clomiphene citrate 100 mg daily for 5 days from third day of menstrual cycle, and HMG 150 IU daily for 3-4 days from eighth day of menstrual cycle. 10000 IU of HCG was given when at least one dominant follicle reached  $\geq 18$  mm (monitored by vaginal ultrasound). The IUI was performed at 36 hours after HCG injection. Main outcome measure: Clinical pregnancy. A total of 28 clinical pregnancies were obtained, for a pregnancy rate per cycle of 28%. The pregnancy rate per cycle was 28.6% for 2 clinical pregnancies (7 patients) when normal sperm morphology  $\leq 4\%$ , and was 31.8% for 14 clinical pregnancies (44 patients) when normal sperm morphology 5-14%, and was 23.3% for 10 clinical pregnancies (43 patients) when normal sperm morphology 15-30%, and was 33.3% for 2 clinical pregnancies (6 patients) when normal sperm morphology  $\geq 30\%$ . (p. value  $> 0.05$ ). In conclusion, sperm morphology does not affect the outcome of IUI.

**Keywords:** Sperm morphology, IUI, insemination.

### INTRODUCTION

Infertility affects approximately 15% of all couples worldwide<sup>1</sup>. Male factor is the sole reason in 20% and contribute in 30 - 40% of all couples trying to conceive<sup>2</sup>. Causes of male infertility may be due to disorders in the number of spermatozoa, sperm motility or sperm morphology<sup>3</sup>.

Intrauterine Insemination (IUI) is a fertility treatment, that is considered as the first step in assisted reproductive techniques (ARTs) due to its simplicity, easy management, low cost, and absence of potentially serious complications<sup>4,5</sup>. The goal of IUI is to increase the number of high quality sperm that reach the fallopian tubes and subsequently increase the chance of fertilization<sup>6</sup>. The most common indications for IUI are cervical hostility, mild male factor, mild endometriosis, ovarian dysfunction and anovulation<sup>7,8</sup>. There are several factors that affect pregnancy after IUI. For example, age of the couple, body mass index (BMI), female etiology, semen quality, and ovarian stimulation protocols<sup>9,5</sup>. Sperm morphology is one of the most predictive semen parameters for pregnancy after IUI<sup>10</sup>.

The aim of this study is to assess the likelihood of IUI outcome based on sperm morphology in the cases of mild male factor infertility.

### MATERIALS AND METHODS

A total of 100 infertile patients with mild male factor were recruited in this study from February 2010 to April 2012 at Orient Hospital and Faculty of Medicine in Damascus University.

### Semen analysis

All semen samples were collected after 2-6 days of sexual abstinence, after liquefaction for 30-60 minutes at 37°C, volume, PH, sperm count, progressive motility, concentration, and morphology were evaluated according to world health organization criteria (WHO, 2010).

### Swim-Up procedure

Every Liquefied semen sample was thoroughly mixed and diluted with an equal volume of culture medium (medicult/universal IVF- Medium with phenol red; Denmark), after centrifugation at 300 g for 3 min, the supernatant was removed and the pellet resuspended in 2ml of culture medium, a second centrifugation was followed by resuspension to a final volume of 1ml of media, the tube was loosely capped and placed in 37°C incubator under 5% CO<sub>2</sub> for 1h. The top 600-700 $\mu$ l of the supernatant was removed with extreme care by standard IUI catheter.

### Semen analysis after Swim-Up

The quality of sperm was assessed to evaluate the number of motile sperm, progressive motility and sperm morphology according to Kruger strict criteria. Only samples with at least 1 million /ml and the progressive motility above 50%, were selected for IUI.

### Samples groups

Samples were divided into 4 groups according to the percentage of normal sperm morphology after Swim-Up, as follows:

Group A: normal sperm morphology  $\leq 4\%$ : 7 patients.



Group B: normal sperm morphology 5-14%: 44 patients.

Group C: normal sperm morphology 15-30%: 43 patients.

Group D: normal sperm morphology  $\geq 30\%$ : 6 patients.

### Clinical evaluation of female partner

Clinical examination was performed in all of the patients for anatomical integrity of genital system, hormone analysis including Follicle stimulation hormone (FSH), Luteinizing Hormone (LH), Prolactin (PRL), Estradiol (E2) and Progesterone (P4) were also done in third day of cycle by using Enzyme linked immune-sorbent Assay (ELISA).

Hysterosolpingography and Vaginal Ultrasonography were done to exclude any pathology may affect female fertility.

We excluded all the patients who had low ovarian reserve, age more than 40 years, hormones disturbance and any tubal or uterine pathology as; tubal obstruction, endometrial polyp, uterine fibroids, endometriosis, endometrial synechia, uterine anomalies, .....Etc.

Ovulation induction was by clomiphene citrate: 100 mg daily for 5 days from third day of menstrual cycle, HMG (Human Menopausal Gonadotrophin) 150 IU from day 8 for 3-4 day, (the dose was adjusted according to response).10000 IU of HCG (Hormone chorionic gonadotropin) was given when at least one dominant follicle reached  $\geq 18$  mm (monitored by vaginal ultrasound).

IUI procedure was performed approximately 36-38 hours of HCG administration.

Luteal phase was support with 400 mg vaginal micronized progesterone daily until day of pregnancy test which was done often 14 day post IUI.

### IUI procedure & Pregnancy detection

One IUI cycle was applied for each female partner. The prepared semen sample was passed through the cervix and into the uterine cavity under sterile conditions, after insemination, the wife was allowed to bed rest for about 15-30 minutes after the procedure.

Clinical pregnancy (presence of gestational sac in ultrasound) was done after 3 weeks post IUI procedure.

### Statistical analysis

Chi-square test (medcalc program version 12) with P-value  $< 0.05$  were used for statistical analysis.

## RESULTS

The pregnancy rate per cycle was for groups A, B, C, D (28.6%, 31.8%, 23.3%, 33.3%) among (2, 14, 10, 2) clinical pregnancies respectively.

The P. value for the pregnancy rate/cycle showed no significant relationships between the 4 groups (P. Value 0.5).

The clinical pregnancy rate per cycle for each group is shown in figure 1.

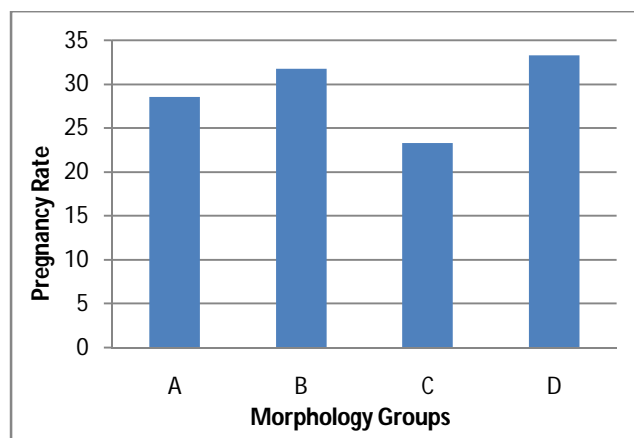


Figure 1: pregnancy rate per cycle for each group.

## DISCUSSION

Many factors affect the likelihood of conception after IUI; etiology of infertility, quality of the sperm, age and the fertility state of the female partner<sup>11,12</sup>. We aimed in this study to evaluate the effects of sperm morphology on the success rate of intrauterine insemination. 4 groups of sperm morphology after Swim-Up were studied ( $\leq 4\%$ , (5-14%), (15-30%), and ( $>30\%$ ).

Previous studies showed contradictory results concerning the effect of sperm morphology on the IUI outcome. For example, Badawy et al reported that IUI has a low possibility of success when the normal sperm morphology is  $<30\%$ <sup>13</sup>, while Merviel et al found that IUI was ineffective for treating male factor infertility when normal sperm morphology was  $<30\%$ <sup>12</sup>. Wainer et al. reported that a minimum of 5 million motile spermatozoa should be inseminated only when the normal morphology of the sperm after preparation is  $<30\%$ <sup>14</sup>. On the other hand, it was found that the highest rate of IUI was achieved when normal sperm morphology was  $\geq 14\%$ , intermediate between (4-14%) and generally poor when  $<4\%$  of the sperm was morphologically normal<sup>15</sup>. The total clinical pregnancy rate/cycle in our study was 28%. This rate is the highest comparing with previous reports where pregnancy rate/cycle was 10.2% in women aged  $<40$  years<sup>16</sup> 11.6%<sup>17</sup> and 12.9%<sup>11</sup>.

We found no significant statistically differences between the four studied groups, this could be related to the fact that we inseminated  $\geq 1 \times 10^6$  motile sperm with progressive motility above 50%. For this reason, we suggest that we could use IUI in the cases of low morphology sperm ( $<4\%$ ), despite previous reports which support the use of in vitro fertilization and intra cytoplasmic sperm injection, when normal sperm morphology  $<5\%$ <sup>18</sup> especially that IUI is less invasive and less expensive method and should be used for treating subfertile couples before undergoing invasive ARTs. Finally, we conclude that sperm morphology does not affect the outcome of IUI.

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