Research Article

Relationship of sperm morphology assessed by strict criteria and outcome of artificial [intrauterine] insemination

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ABSTRACT

Background: The aim of the study was to investigate the relationship between sperm morphology assessed by strict criteria and the outcome of artificial insemination.
Methods: 495 consecutive intrauterine insemination (IUI) cycles done for 417 couples in a 1-year period in Gunasheela IVF Center were studied. In all cases controlled ovarian stimulation and hCG timed IUI were performed. In all cases the inseminating motile sperm count after sperm preparation (at least one sample) was 20 million/ml and motility was 90% Grade A. Sperm morphology was assessed by strict criteria.
Results: Overall the pregnancy rates were significantly higher in cases with ≥14% normal morphology (23%) and in cases with 10-13% normal morphology (14%). This was in contrast to the pregnancy rates in cases with <10% normal morphology group (8%). Further follow up of the outcome of pregnancies between the ≥10% normal morphology and <10% normal morphology groups did not show any increased loss of pregnancies/anomalies in the <10% normal morphology group but this was not statistically significant as the number of pregnancies in the <10% normal morphology group was very less (8 out of 87).
Conclusions: These results emphasize the significance of sperm morphology as a predictor of pregnancy outcome (esp. pregnancy rates) in the IUI outcome.

Keywords: Male Factor Infertility, Intrauterine Insemination, Sperm Morphology

INTRODUCTION

There is good evidence in favour of IUI as the best first line treatment and most cost effective procedure for mild to moderate male subfertility. It seems very difficult to identify individual semen parameters predicting the likelihood of pregnancy after IUI. The percentage of morphologically normal spermatozoa assessed by strict criteria is an important sperm parameter likely to influence the success of IUI. The aim of this study was to establish the influence of sperm morphology assessed by strict criteria on the success rate of IUI in order to determine limits below which the chances of IUI success are limited.

METHODS

During a period of 1 year from September 2010 to August 2011, 495 consecutive IUI cycles were performed for 417 couples. In 406 cycles, the husband's sperm was utilised whereas in 89 cycles, donor sperm was utilized due to severe male factor infertility. In all cases controlled ovarian stimulation and hCG timed insemination was done. All patients had an infertility work-up including ultrasound monitoring of folliculogenesis and hysterosalpingogram.

Semen samples were collected by masturbation in a plastic container after an abstinence period of 3-5 days in the andrology lab. Semen samples were analysed after complete liquefaction according to the WHO guidelines. Sperm morphology was assessed using the strict criteria described by Kruger et al. Spermatozoa were prepared by the conventional swim up technique. In all patients the

insemination motile sperm count after sperm preparation (at least 1 sample) was >20 million and motility was >90% Grade A. The pregnancy rates and outcome of pregnancies were assessed in the following categories of normal sperm morphologies: ≤5%, 6-9%, 10-13% and ≥14%.

RESULTS

Overall, during the period considered, 495 IUI cycles were analysed. A total of 87 patients became pregnant (Table 1).

Table 1: Percentage of pregnancies per IUI cycle.

IUIs	Number	Positives	Percentage
AIH	406	71	17.5
AID	89	16	17.9
Total	495	87	17.6

The pregnancy rates in the different categories of normal sperm morphologies were as analysed (Table 2).

Table 2: Pregnancies in different categories of sperm morphologies.

Normal Forms (%)	No. of IUI's	No. of pregnancies	Pregnancy rate
≤5%	29	2	6%
6-9%	70	6	8.6%
10-13%	139	20	14.4%
≥14%	257	59	23%

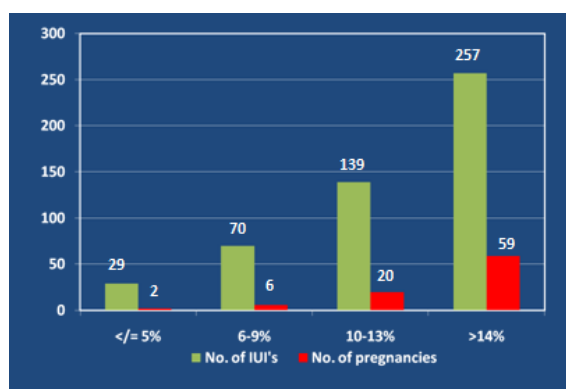The overall outcome of IUI's is as shown below (Figure 1).

Figure 1: Outcome of IUIs.

Follow up of pregnancies in the <10% normal morphology and the ≥10% normal morphology groups showed the following outcomes (Table 3).

Table 3: Outcome of pregnancies based on sperm morphology.

Outcome	<10% normal morphology	≥10%
Live births	2	9
Follow up upto 12 wks. & ongoing	4	54
Missed abortions /Early embryonic demise	0	4
Biochemical pregnancies	1	3
MTP conjoined twins	-	1
Lost for follow up	1	7
Ectopic pregnancy	-	1
Total	8	79

The miscarriage rate was 8.8% in the <10% normal morphology group and 12.5 % in the ≥10% normal morphology group, but this was not significant as the number of pregnancies in the <10% normal morphology group was very small (8 out of 87).

DISCUSSION

Intrauterine insemination is usually performed to overcome mild to moderate male factor infertility, as well as to increase the chances of conception in other cases of infertility.[1] The sperm parameters which can be used to predict successful IUI outcome are controversial.[2] The minimal recommended proportion of normal sperm morphology varies from 14% (Kruger's criteria) to 4% (WHO reference value: 5th edn).[3] In this study, we tried to investigate the importance of sperm morphology to predict the success rates and outcome in an intrauterine insemination programme. Sperm morphology turned out to be a good predictive parameter (i.e. <10% normal forms = poor pregnancy rates). When sperm morphology in semen analysis is very low (<5%), it is better to recommend invitro fertilisation (IVF) and intracytoplasmic sperm injection (ICSI) to the couple rather than IUI. These findings are similar to a study by Lee et al (2002) who concluded that the success rate of IUI was highest when 14% or more of the sperm had normal morphology, was intermediate with values between 4% and 14%, and was generally poor when fewer than 4% of the sperm was normal.[4] Lindheim et al (1998) also found a very low pregnancy rate (1% per cycle) when the sperm morphology score was <4%.[5] However another study did not find any substantial difference in the success of intrauterine insemination when normal sperm morphology in semen analysis is more than 20% compared to when it is less than 20%.[6] Though there did not appear to be an increased incidence of miscarriage in the <10% sperm morphology group,

further studies including a larger number of pregnancies is required.

CONCLUSIONS

There is a definite association between poor sperm morphology and decreased pregnancy rates. The pregnancy rate (14%) in the 10-13% normal morphology group is acceptable. Considering that IUI is less invasive & is cost effective, it may be offered in 6-9% normal morphology after counseling about poor outcome. It is better to recommend IVF/ICSI in the <5% normal sperm morphology group. Larger study is needed to assess the outcome of pregnancies in the poor sperm morphology group.

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