

The effect of sperm morphology on the outcome of Assisted Reproductive Technology

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Abstract—The sperm morphology classification put forward by Macleod draw attention gradually on male infertile evaluation in the past few years. This study by evaluating the effect of different morphology sperm rate on the outcomes of intracytoplasmic sperm injection assists the prediction of reproductive outcome and some reference.

Keywords- Intracytoplasmic sperm injection; Assisted reproductive technology

I. INTRODUCTION

Human Assisted Reproductive Technology (ART) coming out has a great progress in the treat of infertility and the reproductive success of patients with abnormal sperm morphology has a substantial increase by intracytoplasmic sperm injection (ICSI). ICSI is a single sperm into the oocyte cytoplasm by using the method of microinjection, which will make the combination of sperm and oocyte passive fertilization, to form a fertilized zygote and transplant. Whether caused by a male factor infertility patients or not need treatment by ICSI, which depends on the result of semen analysis. However, the analysis results of semen only show sperm morphology, density, activity and activity. These cannot reflect the fertilization ability of sperm completely. We just suggest the basic sperm quality.

II. METHODS

The information of cycles were divided into three groups according to the rate of normal morphology sperm rate: group A (normal morphology sperm rate > 4%), group B (normal morphology sperm rate ≤ 4%), group C (normal morphology sperm rate = 0). It was eventually a total of 815 cycles of group A, 330 cycles of group B, a total of 115 cycles of group C. ① Compare the following content among the three groups of the male age, the female age, duration of infertility; ② Compare the following content among the three groups of fertilization, cleavage, good quality embryos, embryo implantation, clinical pregnancy, ectopic pregnancy, miscarriage, multiple

pregnancy; ③ Compare the following content of ejaculated sperm group and surgical sperm extraction group divided from group C: fertilization, cleavage, good quality embryos, embryo implantation, clinical pregnancy, ectopic pregnancy, miscarriage, multiple pregnancy.

III. RESULTS

Normal sperm morphology group (A), not severely deformed sperm group (B) and severely deformed sperm group (C).

1. The results of the comparison are as follows:

① The male age in the three groups were 29.73 ± 3.13 years, 30.19 ± 3.85 years, 31.66 ± 3.10 years respectively. There was no significant difference among the three groups ($F=0.260$, $P>0.05$); ② The female age in the three groups were 29.40 ± 3.37 years, 30.48 ± 3.30 years, 31.15 ± 2.56 years respectively. There was no significant difference among the three groups ($F=0.242$, $P>0.05$); ③ The duration of infertility in the three groups were 5.33 ± 3.51 years, 4.85 ± 3.07 years, 5.17 ± 3.25 years respectively. There was no significant difference among the three groups ($F=0.016$, $P>0.05$).

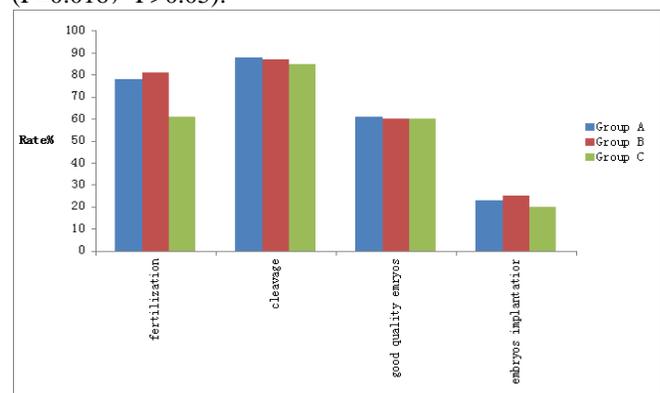


Figure 1 comparison of fertilization, cleavage, good quality embryos and embryo implantation among the three groups.

2. Compare the content among the three groups of fertilization(%), cleavage(%), good quality embryos(%), embryo implantation(%), clinical pregnancy(%), ectopic pregnancy(%), miscarriage(%), multiple pregnancy(%).

① The fertilization rate in group A, B and C were 78.3% (6906/8820), 80.1%(2762/3450) and 64.5% (840/1302) respectively. There was significant difference among the three groups ($P<0.05$). Compared group A and group B, there was no significant difference among the two groups ($P>0.01$). Compared group A and group C, there was significant difference among the two groups ($\chi^2=119.983$, $P<0.001$). Compared group B and group C, there was significant difference among the two groups ($\chi^2=124.472$, $P<0.001$); ② The cleavage rate in group A, B and C were 89.3%(6167/6906), 87.8%(2425/2762) and 85.5% (718/840) respectively. There was no significant difference among the three groups ($P>0.05$); ③The good quality embryos rate in group A, B and C were 60.9% (3756/6167), 58.8% (1426/2425) and 58.6% (418/714) respectively. There was no significant difference among the three groups($P>0.05$); ④The embryo implantation rate in group A, B and C were 25.2% (386/1532), 27.6% (213/771) and 23.3% (56/241) respectively. There was no significant difference among the three groups ($P>0.05$); ⑤ The clinical pregnancy rate in group A, B and C were 48.5% (395/815), 47.0%(155/330) and 33.0% (38/115) respectively. There was significant difference among the three groups ($P<0.05$). Compared group A and group B, there was no significant difference among the two groups($P>0.01$). Compared group A and group C, there was significant difference among the two groups ($\chi^2=9.634$, $P=0.002$). Compared group B and group C, there was significant difference among the two groups ($\chi^2=6.734$, $P=0.009$); ⑥ The ectopic pregnancy rate in group A,B and C were 3.5% (14/395), 5.2% (8/155) and 7.9% (3/38) respectively. There was no significant difference among the three groups ($P>0.05$); ⑦ The miscarriage rate in group A, B and C were 3.8% (15/395), 5.2% (8/155) and 10.5% (4/38) respectively. There was no significant difference among the three groups ($P>0.05$); ⑧ The multiple pregnancy rate in group A, B and C were 20.8% (82/395), 18.1% (28/155) and 23.7% (9/38) respectively. There was no significant difference among the three groups($P>0.05$).

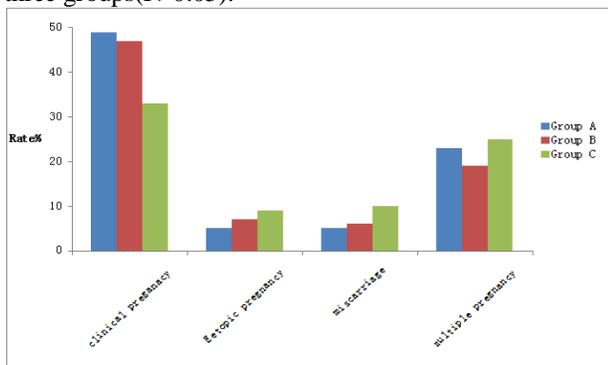


Figure 2 comparison of the outcomes among the three groups

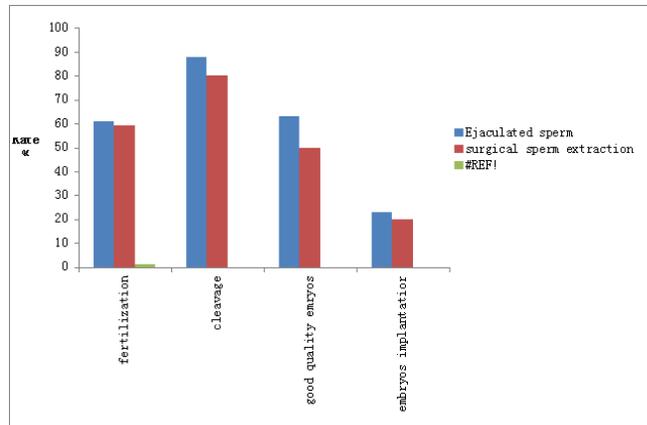


Figure 3 Comparison of fertilization, cleavage, good quality embryos and embryo implantation of ICSI by teratospermia from ejaculated sperm and surgical sperm extraction sperm.

3. In severely deformed sperm group, the comparison between ejaculated sperm group (C1) and surgical sperm extraction group (C2) in fertilization(%),cleavage(%), good quality embryos(%), embryo implantation(%), clinicalpregnancy(%), ectopic pregnancy(%), miscarriage(%), multiplepregnancy(%).

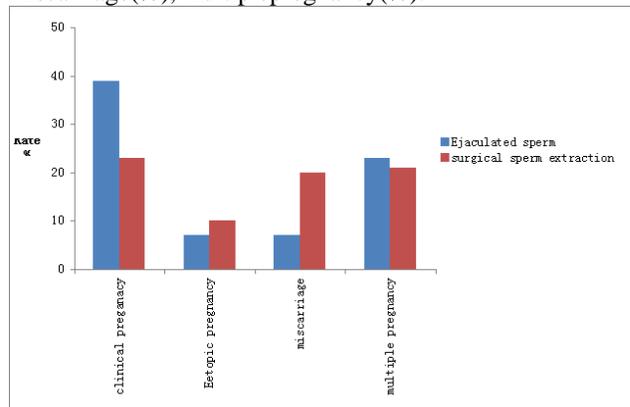


Figure 4 Comparison of the outcomes of ICSI by teratospermia from ejaculated sperm and surgical sperm extraction sperm

①The fertility rate in groupC1and group C2is 65.7% (531/808) and62.6% (309/494) respectively. The comparison between the two groups, there is no statistically significant difference ($P>0.05$); ②The cleavage rate in groupC1and group C2is 88.2% (468/531) and 80.9% (250/309). The comparisonbetween the two groups, there is statistically significant difference ($\chi^2=8.224$, $P=0.004$); ③ The good quality embryos rate in groupC1and group C2is 62.6%(293/468) and 50.0% (125/250). The comparison between the two groups, there is statistically significant difference ($\chi^2=10.647$, $P=0.001$); ④ The embryo implantation rate in group C1and group C2is 25.5% (38/149) and19.6% (18/92). The comparison between the two groups, there is no statistically significant difference ($P>0.05$); ⑤The clinical pregnancy rate in group C1and group C2is 37.8% (28/74) and 24.4% (10/41). The

comparison between the two groups, there is no statistically significant difference ($P > 0.05$); ⑥ The ectopic pregnancy rate in group C1 and group C2 is 7.1% (2/28) and 10.0% (1/10). The comparison between the two groups, there is no statistically significant difference ($P > 0.05$); ⑦ The miscarriage rate in group C1 and group C2 is 7.1% (2/28) and 20.0% (2/10). The comparison between the two groups, there is no statistically significant difference ($P > 0.05$); ⑧ The multiple pregnancy rate in group C1 and group C2 is 25.0% (7/28) and 20.0% (2/10). The comparison between the two groups, there is no statistically significant difference ($P > 0.05$).

IV. CONCLUSIONS

Sperm-oocyte binding and the growth of fertilized zygote and embryos are same with normal sperm morphology rate, only if the sperm is normal sperm morphology, when the ICSI technology assists pregnancy. Patients whose abnormal sperm morphology in ICSI to assist pregnancy, the fertilization rate and clinical

pregnancy rates are lower than who use normal sperm morphology. In very severely deformed sperm group, the cleavage rate and good quality embryos rate of surgical sperm extraction group are lower than ejaculated sperm group.

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