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Post-wash total motile sperm count as the most accurate predictor for live birth after intrauterine insemination

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Study question:

Is it possible to predict the success of a homologous or donor intrauterine insemination (IUI) cycle according to the male infertility?

Summary answer:

The post-wash total motile sperm count (PTMSC) has more precise predictive value over standard WHO criteria at the time of homologous and donor IUI.

What is known already:

The effectiveness of IUI depends on several factors. One of the most important is the sperm quality. World Health Organization (WHO) defined cut-off values to distinguished between normal and abnormal semen samples. Although this criteria classification has been widely used, there is a controversy among clinicians. Some of them claim that the most influential variable in the IUI is only the sperm motility. Others consider that pregnancy rates are influenced by concentration too. This lack of standardization could be solved with the PTMSC, a parameter that represents the exact number of progressive motile sperm that are available for the insemination.

Study design, size, duration:

A retrospective cohort study. A total of 7435 subfertile couples undergoing IUI in the last 15 years were analysed. 5390 couples underwent IUI with homologous semen (IUI-H) and 2045 couples underwent IUI with frozen donor semen (IUI-D).

Participants/materials, setting, methods:

All the infertile couples that underwent IUI. Three prediction models of pregnancy and livebirth were compared according to the WHO parameters, the sperm count and the PTMSC, calculated by multiplying the sperm concentration by progressive motile spermatozoa and the volume used in the insemination procedure. Logistic regression analysis and AUC-ROC curve processed by R package were used to evaluate the association between the three parameters and the likelihood of pregnancy and live birth in IUI.

Main results and the role of chance:

The overall pregnancy rate (PR) per IUI-H cycle was 10.4 and 20.8% after IUI-D. The multiple PR was 5.4% in IUI-H and 7.8% in IUI-D, and the overall live birth rate (LBR) was 80.5% and 85.6%, respectively. Logistic regression analysis showed that the PR and LBR were not influenced by WHO criteria in none of the IUI procedures. Sperm count and PTMSC were significantly correlated with a positive clinical outcome in terms of PR after both IUI ($p < 0.01$). AUC-ROC curves showed that PTMSC has a significantly greater predictive capacity of livebirth. The final predictive model had an AUC of 0.51 ($p < 0.05$) in case of total sperm, and an AUC of 0.55 ($p < 0.01$) in reference to PTMSC in IUI-H. The same trend was observed after IUI-D ($p < 0.01$). The probability of achieving a live birth after IUI-H was higher when PTMSC was over 10

million (OR=0.85, 95% CI: 0.67 to 1.08). The mean value of PTMSC was significantly higher in IUI-H (13.85 ± 9.28 vs 6.59 ± 4.19 , $p < 0.05$). Patients with a PTMSC less than 5 million had a greater challenge in getting a live birth after IUI-D (OR=0.37, CI: 0.24 to 1.18).

Limitations, reasons for caution:

A prospective design study is necessary to further confirm the correlation between PTMSC parameter and clinical outcome in IUI.

Wider implications of the findings:

Due to PTMSC has shown to be better correlated with the PR and LBR than the WHO 2010 classification criteria, we should reconsider using the PTMSC parameter as the best prognostic tool to achieve a live birth after IUI-H or IUI-D.

Trial registration number:

This is not a clinical trial.

Keywords:

male infertility

Intrauterine insemination

Post-wash total motile sperm count

live birth