

SPERM PREPARATION BY MAGNETIC-ACTIVATED CELL SORTING IMPROVE THE ACROSOME REACTION

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Purpose: To evaluate the effect of magnetic-activated cell sorting (MACS) using Annexin V-conjugated microbeads in sperm preparation.

Materials and Methods: This study was approved by our institutional review board. Semen samples (n=40) from unexplained infertility couples were collected. After double density gradient centrifugation (DGC), the sperm cell suspension was divided into two separate fractions with or without subsequent MACS. And then, we check the acrosome reaction of sperm and the apoptosis of sperm by AnnexinV/PI, TUNEL assay (terminal dUTP nick-end labeling) and mitochondrial membrane potential using JC-1. Wilcoxon signed rank test was utilized to calculate the difference between samples.

Results: Following MACS, the sperm DNA fragmentation ($9.2 \pm 0.7\%$ v.s. $12.5 \pm 1.0\%$), mitochondrial membrane potential disruption ($18.7 \pm 1.9\%$ v.s. $27.2 \pm 3.0\%$) and the externalization of phosphatidylserine rates ($5.9 \pm 1.3\%$ v.s. $8.2 \pm 2.0\%$) had significantly reduced compared to the DGC. In addition, the proportion of acrosome reaction was significantly improved ($45.9 \pm 5.3\%$ v.s. $32.8 \pm 4.3\%$, $p < 0.001$) subsequent to MACS.

Conclusion: Magnetic-activated cell sorting using annexin-V microbeads effectively separate apoptotic and non-apoptotic spermatozoa based on the externalization of phosphatidylserine (PS) to the outer membrane leaflet. And, the proportion of acrosome reaction was significantly improved. MACS in combination with DGC can be used as a sperm preparation technique to enhance the sperm quality and function.