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Effect of electromagnetic wave from cellular phone on the spermatogenesis: Development of an experimental model

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INTRODUCTION & OBJECTIVES: There were few studies about exposure to radio frequency electromagnetic field (EMF) of cell phone to spermatogenesis, especially current widely used Smartphone based EMF. The fact that male individuals generally carry their cell phones in their pockets close to their testes in standby mode increases the importance of this study regarding the effects of EMF on the male reproductive system. Therefore, in this study, we focused on examining the effects of EMF, and we analyzed the functional and histopathological spermatogenesis between control and EMF exposure rat.

MATERIAL & METHODS: Each five Spargue Dawly male rats were placed into the 4 groups according to intensity of EMF and distance EMF machine to rats' abdomen. There were 4 groups were 1) Sham procedure, 2) 3cm distance and 6hr/day, 3) 10cm distance and 6hr/day and 4) 3cm distance and 18hr/day. The EMF machine was delivered by Korean Electromagentic Association, which emitted constant energy (2.5V/m, 1.940 GHz). The machine was placed under the each rat cages. After 1 months, body weight, body temperature, testis weight, hormonal levels, sperm count (number of spermatid, spermatocyte, spermatogonia and leydig cell) and histopathologic finding. The sperm count was calculated by urologists and pathologists.

RESULTS: The mean body weight was significantly lower in the group 4 (3cm distance and 18hr/day) than group 1 and 2. There was no significant difference among the groups about body temperature, testis weight and hormonal levels. The mean spermatid count (x 10^6) was 398.6 ± 78.52 in group 1, 365.4 ± 81.25 in group 2, 394.6 ± 53.01 in group 3 and 304.5 ± 76.45 in group 4. Only spermatid count in group 4 had significantly lower than others. Among group 1 to 3, there was no difference.

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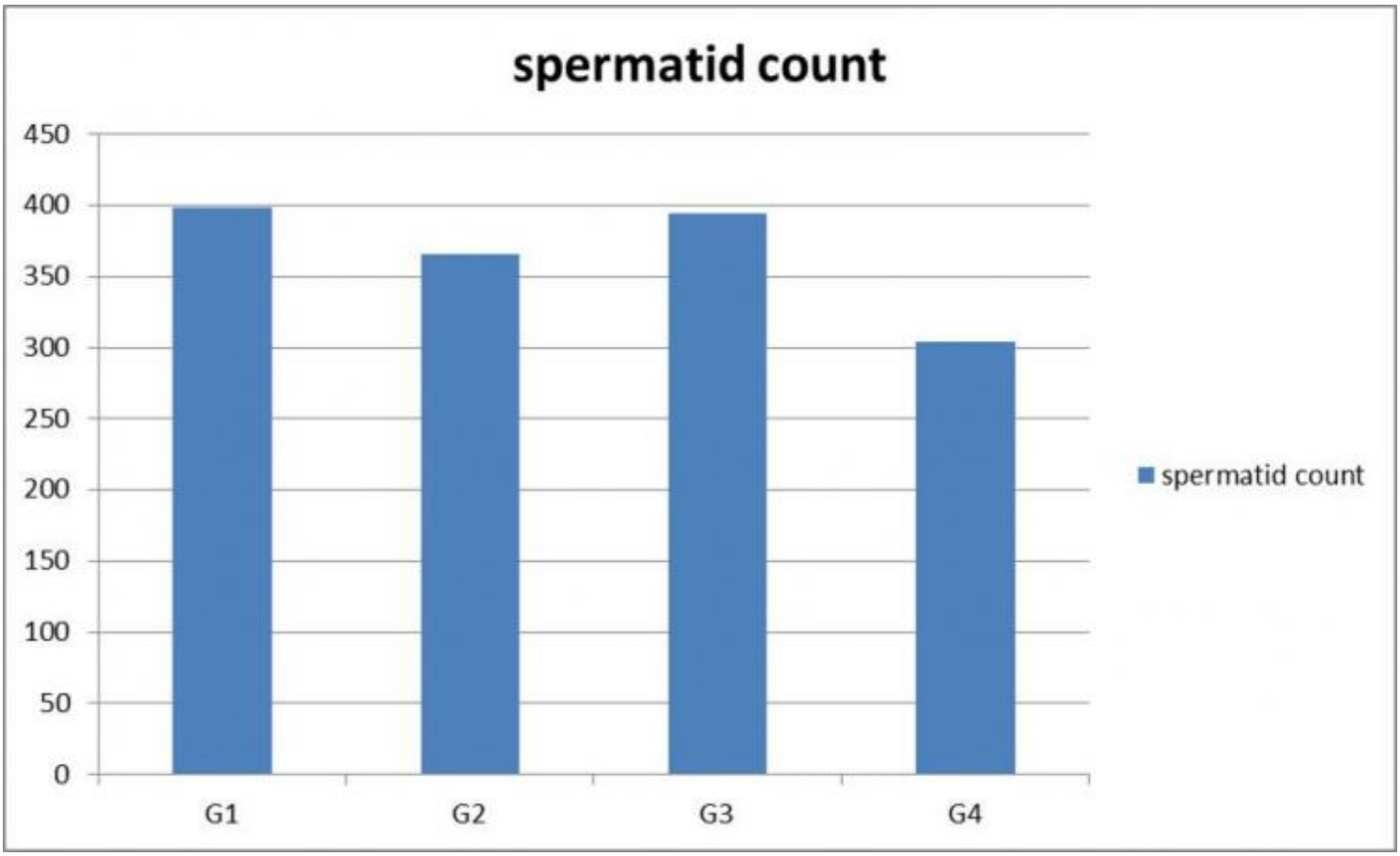

CONCLUSIONS: The short time exposure of 6 hours per day could not affect the spermatogenesis regardless the distances. However, the long time-exposure of EMF significantly decreased the spermatogenesis in rat pre-clinical model. Although these harmful models could not apply to human, these results showed the warning of long time-exposure of EMF to testis should be avoided.