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Effects of 4G mobile phone radiation exposure on reproductive, hepatic, renal, and hematological parameters of male Wistar rat

Rohit Gautam [1], Sonali Pardhiya [1], Jay Prakash Nirala [1], Priyanka Sarsaiya [1], Paulraj Rajamani [2]
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Abstract

Background and objective: Mobile phones have become a vital part of human life. Due to drastic increase in the number of mobile phone subscribers, exposure to radiofrequency radiation (RFR) emitted from these phones has increased dramatically. Hence, the effect of RFR on humans is an area of concern. This study was performed to determine the impact of 4G mobile phone radiation on the male reproductive system, liver, kidney, and hematological parameters.

Methods: Seventy-day-old Wistar rats were exposed to 4G radiation (2350 MHz for 2 h/day for 56 days). Sperm parameters such as sperm count, viability, sperm head morphology, mitochondrial activity, total antioxidant activity, and lipid peroxidation of sperm were evaluated. Histopathology of the testis, prostate, epididymis, seminal vesicle, liver, and kidney was carried out. Complete blood count, liver and kidney function tests, and testosterone hormone analysis were done.

Results: At the end of the experiment, results showed a significant ($p < 0.05$) decrease in sperm viability with alterations in the histology of the liver, kidney, testis, and other reproductive organs in the exposed group of rats. A reduced level of testosterone, total antioxidant capacity, and decreased sperm mitochondrial function were also observed in the exposed rats. Moreover, the exposed rats showed an increase in sperm lipid peroxidation and sperm abnormality. Hematological parameters like hemoglobin, red blood cells (RBC), and packed cell volume (PCV) showed a significant ($p < 0.05$) increase in the exposed rats.

Conclusion: The results indicate that chronic exposure to 4G radiation may affect the male reproductive system, hematological system, liver, and kidney of rats.

Keywords: Hematology; Hepatic; Male infertility; Mobile phone radiation; Oxidative stress; ROS; Renal.