

The effect of chronic spinal cord injury on chromatin and DNA integrity of spermatozoa aspirated from epididymis of Rat

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Abstract

Introduction: Infertility is considered as one of the major problems associated with spinal cord injured (SCI) men. Anejaculation as well as diminished sperm quality such as low sperm viability, low motility, and increased abnormal sperm morphology are the factors involved with infertility following SCI. Since, epididymal autonomic innervation is impaired following SCI, the spermatozoa may remain in epididymis for an unnecessary longer time. This may subsequently disturb the sperm functional capability, motility potential, and sperm nuclear maturity with the presence of free oxygen species (ROS). The main objective was to evaluate the effect of chronic SCI on chromatin integrity and DNA of spermatozoa aspirated from epididymis of Wistar rats.

Materials and Methods: A total of 45 adult Wistar rats were divided into 3 groups of SCI, sham, control. Following laminectomy, SCI was induced with a 15g weight dropped from a distance of 10cm onto exposed dura matter (T10). Sham group underwent laminectomy of T10 only; while, control rats were not exposed to any type of injury or medication. The epididymal sperms were aspirated after 8 weeks for analysis of sperm parameters and sperm chromatin integrity with aniline blue, chromomycin A3(CMA3), SDS, and acridine orange(AO) tests. The data were analyzed with SPSS (version 10).

Results: The sperm parameters of SCI rats were significantly changed compared with other groups ($p < 0.05$). Also, aniline blue as well as CMA3 tests were not changed in different samples ($p > 0.01$). However, SDS and AO tests were significantly changed in SCI samples when compared with other groups of sham and control.

Conclusion: Sperm chromatin condensation takes place during two phases of testicular and epididymal. Following SCI, testicular phase (histone replacement with protamine) is not affected; while, epididymal disulphide bond formation within protamine molecules is disturbed. Therefore, chronic SCI disturbs sperm parameters as well as sperm nuclear maturity, and DNA integrity. This may directly reduce the fertility potential following SCI.

Key Words: Spinal cord injury, Chronic, Chromatin, DNA, Spermatozoa, Epididymis, Rat.

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