Spinal cord injury induces depressive-like behaviors in rats

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Introduction: Growing evidence demonstrates that patients with traumatic injury in spinal cord (SCI) may present psychiatric conditions such as anxiety and depression. SCI induces plasticity in neurons and along the descending nociceptive pathways in the central nervous system. These long-lasting changes induce a dysfunctional neurotransmissions at central sites, which could explain the high co-morbidity of psychiatric conditions; however studies investigating the precise mechanisms underlying these conditions are still scarce. Objective: The objective of the present work was to evaluate whether a protocol of spinal cord injury could induce emotional changes associated with anxiety and depression in rats. Methods: Male Wistar rats were submitted to a spinal cord hemisection at the left side of thoracic vertebra T_{10}. After 14 days, the animals were exposed to the elevated plus maze for 5 min. Behavioral measures scored were the percentage of open-arm time (%OAT) and open arm entries (%OAE), stretched-attend postures (SAPs), and enclosed-arm entries (EAE). Two days later, animals were submitted to a sucrose solution (0.8 %) consumption protocol to investigate the possible occurrence of anhedonic-like behavior. Both sucrose consumption (SC;ml) and sucrose preference (SP; %) were assessed along three days. All results are expressed as Mean ± S.E.M. Statistical analysis was conducted by means of Student’s t test. Results: There was a significant difference (p < 0.05) in SC between sham (37 ± 5 ml) and SCI (24 ± 3 ml) groups, suggesting an anhedonic-like profile in the SCI subjects. Importantly, there was no basal difference in water consumption (sham: 33 ± 11 ml; SCI: 29 ± 3 ml). Regarding anxiety parameters, there were no statistically significant differences between groups. Conclusion: The present results suggest that after 14 days of a traumatic injury in spinal cord, animals presented a depressive-like behavior, characterized by the presence of anhedonia. However, no changes in anxiety levels were observed.