5-The effect of some natural antioxidants against cisplatin-induced neurotoxicity in rats: behavioral testing

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ABSTRACT Background: Cisplatin (CP) is a common antineoplastic agent widely used to treat a broad spectrum of cancers. However, its usage for cancer treatment was restricted due to various side effects such as neurotoxicity, nephrotoxicity, hepatotoxicity and ototoxicity. Neurotoxicity in patients who have undergone a complete course of chemotherapy is clinically evident. CP administration caused problems in rats with memory and learning. Methods: The effect of combination of CP with either thymoquinone (TQ) or geraniol (Ger) on cell viability of human breast cancer cells (MCF-7) was detected by MTT assay. Forty male Wistar albino rats, healthy and adult, were divided into four groups: normal control, CP-treated group, CP þ TQ-treated group and CP þ Ger-treated group. Results: Our results demonstrated that prophylactic treatment with either TQ or Ger plus CP enhanced the anticancer effect of CP in MCF-7 cell line. In vivo study showed that CP-treated rats had higher depressives like behavior in open field and Morris water maze test while prophylactic treatment with either TQ or Ger and CP significantly enhanced the performance of depressive-like behavior. Also, histopathological evaluation of brain tissues proved the neurotoxic effect of CP and the possible protective activity of either TQ or Ger. Conclusion: The findings of the present work revealed that TQ or Ger along with CP may enhance the antitumor effect of CP. Also, spontaneous administration of CP with either TQ or Ger as natural antioxidants may prevent CPinduced neurotoxicity in rats through diminishing the memory and learning impairment.

Keywords: Cisplatin Thymoquinone Geraniol Neurotoxicity Behavior test Rats Behavioral neuroscience Oxidative stress Antioxidant Chemotherapy.