Influence of mesenchymal stem cells and vitamin E on chemically induced hepatocellular carcinoma in male albino rats

Alyaa Ragaie ,Aisha Mansy, Dina Sabry

Abstract

The present study was performed to evaluate the influence of MSCs and / or vitamin E on chemically induced hepatocellular carcinoma (HCC) in male albino rats model. We also aimed to assess IHC staining by Arginase 1 as an early histological marker for HCC.
Methods: Eighty five male albino rats were included in the study and were divided into control and hepato-cellular carcinoma induced groups:
Group 1 (Control group):20 rats received normal balanced diet and 3 ml/kg body weight castor oil twice weekly for 5 month. Animals were scarified 2, 3, 4 and 5 month [5 rats at each scarification].
Hepatocellular Carcinoma induced groups: 65 rats received a single intraperitoneal dose of diethyl nitrosamine (DENA) at a dose of 200 mg/kg body weight followed by twice weekly subcutaneous injections of carbon tetra chloride (CCl4) at a dose of 3 ml/kg body weight. Five rats of that group were scarified after 2 months; blood samples and liver specimen were collected to assess the induction of HCC. The remaining 60 rats were further classified into:
Group 2 (HCC untreated group): 15 rats received DENA and CCl4 as previous and left as model untreated control for the rest of the experimental duration.
Group 3 (HCC/MSCs treated group): 15 rats received DENA and CCl4 as previous, followed by injected with 107 human amniotic-MSCs (h-AMSCs)/rat intravenously (through tail vein).
Group 4 (HCC/vitamin E treated group): 15 rats received DENA and CCl4 as previous, followed by oral administration of 10 mg/kg Ŭ-tocopherol acetate(Vit E) dissolved in 2ml/kg body weight castor oil daily.
Group 5 (HCC/MSCs &vitamin E treated group): 15 rats received (DENA) and CCL4 as previous, followed by injection of 107human amniotic-MSCs (h-AMSCs)/rat intravenously (through tail vein) & oral administration of 10 mg/kg body weight Ŭ-tocopherol, (Vit E) dissolved in 2ml/kg body weight castor oil daily.
Five animals from each group were scarified after (3,4and 5 month) post HCC induction. Both Histological and immunohistochemical examination of liver tissue were done, and serum levels of albumin and Ŭ-fetoprotein were estimated in all groups.
Results: Histopathological examination of liver tissue from animals which received DENA-CCl4 only revealed presence of anaplastic carcinoma, focal nodular hyperplasia with large and small cells atypia. While HCC rats treated with both (h-AMSCs) and Vit E (Ŭ-tocopherol) has shown improvement of histopathological picture in relation to that of human amniotic-MSCs group and Vitamin E group used alone, in the form of attenuation of the tumor size with minimal hepatic cell damage.

Positive Arginase-1 IHC reaction was observed in HCC group with the decrease in it reactivity in all other groups it became absolutely reduced to neoplastic cells only in both (h-AMSCs) group and Vit E only