ΕΡΙΤΗΕΟRESE KLINIKES FARMAKOLOGIAS
ΚΑΙ FARMAKOKINETIKES, INTERNATIONAL
ΕDITION 16: 41 (2002)
©PHARMAKON-Press

Amifostine Protects Blood Vessels from the Effects of X Rays and Prevents Radiation-Induced Tumor Growth and Angiogenesis

E. Giannopoulou[1], P. Katsoris[2], A. Parthymou[1], D. Kardamakis[3] and E. Papadimitriou[1]

[1]Lab. of Molecular Pharmacology, Department of Pharmacy, [2]Division of Genetics, Cell & Developmental Biology, Department of Biology, [3]Department of Radiotherapy, University of Patras, Patra, Greece

AIM

Amifostine (WR-2721) is a well-known radioprotective, selective only for normal cells. The purpose of the present study was to define whether amifostine protects the vascular network from the effects of X rays.

METHODS

We used the in vivo system of chicken embryo chorioallantoic membrane (CAM) as a model of angiogenesis. C6 rat glioma cells were inoculated on CAM and tumour growth, as well as tumour-induced angiogenesis, was estimated on haematoxylin-eosin stained paraffin sections. Apoptosis was estimated after acridine orange staining of CAM cells. Western blot analysis was used for extracellular matrix and nitrotyrosine containing cytoskeletal proteins. Finally, a photometric assay was used to quantitate -SH groups.

RESULTS

Amifostine reversed the early X ray induced decrease in the number of CAM blood vessels and the post irradiation increase in C6 tumor-induced angiogenesis. It also reversed radiation induced apoptosis and tyrosine nitration of actin and α-tubulin. In non irradiated CAM, amifostine caused a significant decrease in non-protein –SH groups, but did not reverse the radiation induced decrease in protein –SH groups. Furthermore, it did not protect CAM from the radiation induced decrease in extracellular matrix (ECM) proteins. In contrast, amifostine decreased significantly the deposited amounts of laminin and collagen I and caused a small, but statistically significant decrease in the number of blood vessels in non irradiated CAM.

CONCLUSIONS

Amifostine protects the vascular network of CAM from the effects of irradiation, while by itself it seems to inhibit angiogenesis. An antiangiogenic action of amifostine further supports the use of amifostine, in combination with radiotherapy, for increased therapeutic efficacy.