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ENHANCED ANTICANCER EFFECT AND REDUCED TOXICITY OF DOXORUBICIN IN COMBINATION WITH THYMOQUINONE RELEASED FROM POLY-N-ACETYL GLUCOSAMINE NANOMATRIX IN MICE BEARING SOLID EHRLISH CARCINOMA

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The incidence of breast cancer remarkably increases all over the world. Therefore, there is a great demand to introduce new approaches into cancer treatment field. The current study was designated to evaluate the role of doxorubicin (DOX) and/or thymoquinone (TQ) nano matrix in potentiating the cytotoxicity of either drug, and to investigate the ability of TQ to reduce cardiotoxicity of DOX in solid Ehrlich carcinoma (SEC)-bearing mice. DOX and TQ were loaded into F2 gel, which is a fully-acetylated poly-N-acetyl glucosamine nanofiber. SEC was induced in female albino mice as a model for experimentally induced breast cancer. Mice were randomly divided into eight groups (n=10): normal control, tumor control, F2 gel, free DOX, DOX+F2 gel, free TQ, TQ +F2 gel, and DOX+ TQ+ F2 gel. On day 28th from tumor inoculation, mice were sacrificed, and blood samples were collected for measurement of the cardiac markers; lactate dehydrogenase (LDH) and creatine kinase (CK-MB). In addition, cardiac tissue was utilized for determination of lipid peroxide, and tumor tissue was used for measurement of anti-apoptotic protein Bcl-2 as well as gene expression of the tumor suppressor gene P53. DOX and/or TQ showed a significant reduction in tumor volume, cardiac markers, tumor Bcl-2, and P53 upregulation compared to free conventional therapies. Co-treatment with DOX+ TQ+ F2 gel was superior to all other groups in exerting beneficial effects. Use of TQ as an adjuvant therapy with DOX could improve its cytotoxic effects and limit its cardiac toxicity. Furthermore, loading of DOX and/or TQ into F2 gel showed a remarkable anti-cancer activity.

BIOGRAPHY

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