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Doxorubicin Induced Cardiotoxicity and its Available Treatment: A Review

Ishu, Sumit Sharma, Lalit Parihar and Ayasha Saiffi
Department of Pharmacology, R.V Northland Institute, Dadri, G.B Nagar

ABSTRACT

Background: Doxorubicin is a secondary metabolite produced by *Streptomyces peucetius* var. *caesius* and belongs to anthracyclines (ANTs) family. It is an efficient antineoplastic agent used for the treatment of child and adult cancers such as solid tumours, leukaemia, lymphoma and breast cancer. Optimal administration of doxorubicin is hampered due to some toxicity such as hematopoietic suppression, nausea, vomiting, extravasation, alopecia, and cardio toxicity. Cytotoxic chemotherapy-induced cardiotoxicity has a high incidence. Cardiotoxicity included short- and long- term toxic effects in the heart ranging from alterations in myocardial structure and function to severe cardiomyopathy and heart failure that may result in cardiac transplantation or death. Chronic cardiotoxicity occurred after prolonged administration of doxorubicin. Although the possibility of cardiotoxicity development is dose dependent, but it could occur even at lower dose due to individual variations. Despite frequent attempts, the molecular mechanism of doxorubicin-induced cardiotoxicity has not been identified yet. Although different mechanisms of cardio toxicity have been described in literature, including DNA damage, alteration of protein synthesis, formation of oxygen free radicals, cell membrane lesions and lipid peroxidation, mitochondrial damage, release of histamine and catecholamines, induction of immunogenic reactions, calcium homeostasis dysregulation whereas a combination of these factors trigger myocardial lesions Generally, antioxidant storage was low in heart tissue compared to other organs in the body that made the heart more susceptible to damage by doxorubicin-induced free radicals. Herbal formulations having antioxidant activity can be effective to reduce cardiotoxicity.

Treatment and Strategies: Reduction of toxic effects by co-administration with iron chelators (dexrazoxane), trastuzumab, taxanes, statins and ACE inhibitors, and Antioxidant herbal formulation.

Conclusion: Larger perspective studies are needed to identify herbal formulation having antioxidant activity and cardio protective properties.

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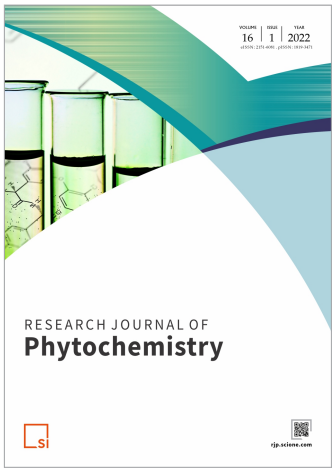

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