Abstract No: BS-32

Therapeutic potential of *Cinnamomum zeylanicum* Blum aqueous bark extract on doxorubicin induced cardiotoxicity in Wistar rats

J. A. N. Sandamali[1*], R. P. Hewawasam[2], K. A. P. W. Jayatilaka[2] and L. K. B. Mudduwa[3]

[1]Department of Medical Laboratory Science, Faculty of Allied Health Sciences, University of Ruhuna, Sri Lanka
[2]Department of Biochemistry, Faculty of Medicine, University of Ruhuna, Sri Lanka
[3]Department of Pathology, Faculty of Medicine, University of Ruhuna, Sri Lanka
jansandamali@ahs.ruh.ac.lk*

The effectiveness of doxorubicin as an anti-cancer agent is hampered by its' life-threatening cardiotoxicity induced by oxidative-stress. As *Cinnamomum zeylanicum* Blum has proven antioxidant activity, the objective of this study was to find out the therapeutic potential of aqueous *Cinnamomum* bark extract against cardiotoxicity induced by doxorubicin in Wistar rats. Sample size of the study group was determined and an equal number of male and female Wistar rats were randomly selected into five groups. Group 1: normal-control (distilled water for 14 days, normal saline (10 mL/kg) on 11th day); group 2: plant control (2.0 g/kg of freeze dried plant extract for 14 days, normal saline (10 mL/kg); group 3: doxorubicin control (distilled water for 14 days, doxorubicin (18 mg/kg) on 11th day); group 4: freeze dried plant extract (2.0 g/kg) for 14 days, doxorubicin (18 mg/kg) on 11th day; group 5: distilled water for 14 days, dexrazoxane (180 mg/kg) 0.5 h before doxorubicin (18 mg/kg). Animals were sacrificed on the 15th day, blood was drawn for biochemical analysis and heart tissues were collected for estimation of antioxidant parameters and histological assessment of tissue damage. A significant ($p < 0.05$) elevation in cardiac biomarkers including cardiac troponin I, AST, LDH and NT-proBNP activity were observed in doxorubicin-control group compared to the normal-control. Pretreatment with *Cinnamomum* bark extract in the doxorubicin treated rats showed a significant reduction ($p < 0.05$) in above cardiac biomarkers compared to the doxorubicin-control. A significant reduction ($p < 0.05$) in reduced glutathione, glutathione peroxidase and glutathione reductase was observed in the doxorubicin control group (Group 3) compared to the normal-control. Total antioxidant capacity as well as superoxide dismutase and catalase activity were markedly reduced ($p < 0.05$) in the doxorubicin control group. However, pretreatment with *Cinnamomum* extract was capable of significantly increasing ($p < 0.05$) all of the above antioxidant parameters compared to the rat group which was treated with doxorubicin alone. A significant increase ($p < 0.05$) in malondialdehyde concentration, which measures the lipid peroxidation and myeloperoxidase activity, which measures the extent of inflammation was observed in the doxorubicin-control compared to the normal-control. The plant-treated group showed a significant decrease ($p < 0.05$) in malondialdehyde concentration and myeloperoxidase activity compared to the doxorubicin-control. Histological assessment of tissue damage was scored according to a scale developed by the authors and doxorubicin-treated group showed a significant damage to the myocardium showing the highest score among the five groups. Plant-treated group showed only a minor degree of damage and showed a significant reduction in the score compared to the doxorubicin control. In conclusion, *C. zeylanicum* Blum bark extract has the potential to significantly reduce doxorubicin induced cardiotoxicity in Wistar rats.

Keywords:
Cardioprotectivity, Cardiotoxicity, *Cinnamomum zeylanicum* bark extract, Doxorubicin, Oxidative-stress

Acknowledgment: This work was supported by the University Grant Commission under the research grant UGC/VC/DRIC/PG2015(III)/RUH/01 and University of Ruhuna under the research grant 2015/RU/PG-R/15/03.