The possible protective effect of vitamin C on Cisplatin induced apoptosis in rats' submandibular salivary glands
(Histological and immunohistochemical studies)

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بسم الله الرحمن الرحيم

" قَالُواْ سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ"

صدق الله العظيم

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DEDICATION

To my great beloved parents and my dear brother,

Thanks a lot for being there for me.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

Abbreviation	Stands for
AIF	Apoptosis inducing factor
BAK	Bcl-2 antagonist/killer
BAX	Bcl-2 Associated X protein
Bcl-2	B cell lymphoma 2
BH3	Bcl-2 homology domain 3
BW	Body weight
DNA	Deoxyribonucleic acid
Endo G	Endonuclease G
FAS	First apoptosis signal
FASL	FAS ligand
Fig.	Figure
GCT	Granular convoluted tubule

Gp	Group
H&E	Hematoxyline and Eosin
Min.	Minute
PCNA	Proliferating cell nuclear antigen
RBCs	Red blood cells
RNA	Ribonucleic acid
ROS	Reactive oxygen species
TNFR	Tumor necrosis factor receptor
TUNEL	Terminal Deoxynucleotidyl Transferase-mediated Deoxyuridine Triphosphate nick end labeling

ABSTRACT

Background: Cisplatin is widely used as an effective chemotherapeutic agent, but it affects normal tissues by generating reactive oxygen species and free radicals. Vitamin C is one of the most available potent antioxidant agents. It can counteract the damaging effect of free radicals and harmful oxygen-derived species in the tissues.

Aim: The aim of this study was to evaluate the apoptosis induced by Cisplatin in rats' submandibular salivary glands and the possible protective effect of Vitamin C.

Materials and methods: The study was carried out on 42 male albino rats weighing between 150-200 grams. The rats were divided into: **Control group:** rats were given distilled water orally and intra-peritoneal injection of saline. **Cisplatin group:** rats were given intra-peritoneal injection of single dose of Cisplatin (5 mg/kg). **Vitamin C and Cisplatin group:** rats were given single dose of vitamin C (100 mg/kg) orally and intra-peritoneal injection of Cisplatin. All groups were further subdivided into: **Subgroup A:** Seven animals were terminated 3 days after the injection. **Subgroup B:** The other seven animals were terminated 5 days after the injection. Sections of the processed submandibular salivary glands were stained by Hematoxyline & Eosin and Anti-active Caspase 3 stains to detect the histological changes induced by Cisplatin and the possible protective effect of vitamin C.

Results: The subgroups received Cisplatin revealed degenerative changes in the acini and ducts as numerous intracellular vacuoles and pyknotic nuclei. While those received Vitamin C and Cisplatin revealed more or less

normal glandular structure. Immunohistochemical examination revealed that the positive reaction to Anti-active Caspase 3 in Cisplatin subgroups was significantly higher than the control subgroups indicating severe apoptotic changes while Vitamin C and Cisplatin subgroups revealed significant reduction in the apoptotic activity in comparison with Cisplatin subgroups.

Conclusion: Vitamin C had a protective effect against cytotoxic and apoptotic changes induced by Cisplatin in rat submandibular salivary glands.