THE PROTECT WE EFFECT OF ASCORBIC ACID ON OXYTETRACYCLINE INDUCED NEPHROTOXICITY AND HEPATOTOXICITY

Pages with reference to book, From 73 To 75

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Abstract

The protective effect of Ascorbic Acid on oxytetracycline induced nephrotoxicity and hepatotoxicity in rabbits was studied. The toxic effects of fresh versus outdated tetracycline were also studied.
Forty two rabbits were divided into 6 groups of 7 rabbits each. Group A served as control and was not given any drugs. Groups B and C were given 140 mg/kg/day of fresh (group B) or outdated (group C) tetracycline for 4 weeks. Similarly group D and E were given fresh (group D) or outdated (group E), tetracycline along with 420 mg/kg/day of Ascorbic Acid. (Group F) was given Ascorbic Acid only. Gross and microscopic examination showed that outdated tetracycline caused more severe changes and that Ascorbic Acid protected the tissues from these changes (JPMA 37: 73, 1987).

INTRODUCTION

Oxytetracycline is known to produce toxic effects in Kidneys and liver when used for prolonged period[1,2] The ingestion of outdated (degraded) oxytetracycline is more toxic than the ones within prescribed date and it produces Fanconi's like syndrome[3,4]
Ascorbic acid (Vitamin 'C') when administered with or before ingestion of oxytetracycline reduces the serum oxytetracycline levels and thus protects the body from its toxic effects[5]. The present study was devised to observe histiologically whether ascorbic acid (Vitamin 'C') has a protective role in oxytetracycline induced hepatotoxicity and Nephrotoxicity.

MATERIAL AND METHODS

Forty two male rabbits, weighing 1-2 kgs, were divided into six groups of seven animals each. One group was taken as control and not given any drug (Group A, Table I).

TABLE I

Schedule of Administration of Drug.

Groups	No of Animals	Drugs used	Dosage & duration
A(Control)	7	No drugs	
B (Experimental)	7	Oxytetracycline within date	140mg/kg/day for four weeks
C "	7	Outdated Oxytetracycline	140mg/kg/day for four weeks
D "	7	Oxytetracycline in date and Vitamin 'C'	140mg/kg/420mg/kg
E "	7	Outdated oxytetracycline and Vitamin 'C'	Oxytetracycline + Vit 'C' 140mg/kg+ 420mg/kg
F "	7	Vitamin 'C' alone	420 mg/kg/day for four weeks

The other groups were given outdated or within date oxytetracycline (obtained from Pfizer Co.), with or without Vitamin 'C' according to the schedule given in Table-I.

The toxic dose of oxytetracycline was determined as five times the therapeutic dose i.e. 28mg/kg/day =28x5= 140mg/kg[2].

The protective dose of Vitamin 'C' was the one recommended by Polec et al[5] as thrice the

oxytetracycline dose i.e. 140x3-420mg/kg in rabbits.
These animals were given drugs for four weeks then sacrificed and their liver and kidneys removed for histiological studies.

RESULTS

Microscopic examination of the control animals (group 'A') showed no significant changes (Tables II, III).

TABLE II
Comparison of Microscopic Findings in Liver.

Groups	No. of Animals	Remarks and Final diagnosis	No	%
A (control)	7	NAD	7	100
B (Expt)	7	Fatty change	6	84
		Focal necrosis	1	14
C (")	7	Fatty change	6	86
		Acute cholangitis	1	14
D (")	7	NAD	5	72
		Fatty change	1	14
		Chronic persistant hepatitis	1	14
E (")	7	NAD	2	28
		Biliary obstruction	2	28
		Cloudy swelling, Fatty change, F. necrosis.	1,1,1	14,14,14
F (")	7	NAD	4	56
		Acute cholangitis	1	14
		Cloudy swelling	2	28

TABLE III

Comparison of Microscopic Findings in Kidney.

Groups	No. of Animals	Remarks and Final Diagnosis	No	%
A (control)	7	NAD	7	100
B (Expt)	7	Congestion pelvis	3	44
		Cat. ch. glomerulonephritis	2	28
		Tubular nephrosis	1	14
		NAD	1	14
C (")	7	Acute interstitial nephritis	2	28
		Cludy swelling tubule	2	28
		Acute tubular necrosis	1	14
		Non-specific granuloma	1	14
		NAD	1	14
D (")	7	NAD	5	72
		Congestion medulla	2	28
E (")	7	NAD	5	72
		Minimal change	1	14
		Congestion glomeruli & medulla	1	14
F (")	7	NAD	6	86
		Congestion glomeruli	1	14

Animals of Group B and C showed fatty changes in liver of six animals with focal areas of The kidneys showed congestion of pelvis necrosis in one animal, while the changes were with catarrhal changes and tubular necrosis in more pronounced, i.e., marked fatty changes, some of the animals as shown in (Table-Ill), necrosis and cholangitis in the liver of animals who more so in animals who received outdated oxytereceived outdated oxytetracydine tracycline.

The animals of group 'D' and 'E' who received oxytetracycline with ascorbic acid showed less changes in the liver and kidneys. Only minimal changes were seen both in the kidneys and liver as shown in Table II and III.

As regards the comparison of indate oxytetracycline and outdated oxytetracycline the last one is slightly more toxic as seen in Table II and III. The group 'F' which only received Vitamin C' showed a few incidental changes.

DISCUSSION

Oxytetracycline is known for its hepatotoxic and nephrotoxic effects[3,4,6] This effect is more severe if the drug is outdated[4].

Polec et al[5] studied the protective effect of ascorbic acid on oxytetracycline induced nephrotoxicity and hepatotoxicity. A significant decrease in the serum levels of oxytetracycline occurred when Vitamin 'C' was given in high doses. Their study did not include any histiological examination of the liver or kidneys. This study shows that animals given Vitamin 'C' showed 'fewer histologic changes as compared to those who did not receive Vitamin 'C'. It is therefore concluded that ascorbic acid has a protective role in reducing the damage to liver and kidneys; it also confirms the toxic effects of oxytetracycline[3,4,6]

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