

Induced aflatoxin and carbon tetrachloride toxicity on gravid uterus of rabbits – A Patho-morphological Study

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Abstract

Uterus of the pregnant rabbits, treated with aflatoxin showed resorption of foetuses. Histologically, extensive haemorrhages in the endometrial and parametrial areas and presence of extensive fibrosis of mucosa and muscularis were observed. In combined treatment with aflatoxin and carbon tetrachloride resorption of foetuses was noticed. Hyperplastic or metaplastic changes of lining epithelium of the endometrial mucosa was observed. The lining epithelium usually was that of cuboidal type. Multiple haemorrhages in the submucosa were observed. In pure carbon tetra chloride treatment, there was no resorption of foetuses, but extensive fibroblastic proliferation in uterine muscularis and as well as periglandular and interstitial proliferation of fibroblasts in the endometrium were seen.

Key words: Pregnant rabbits, Aflatoxin, Carbon tetrachloride, Uterus

Introduction

The Aflatoxins are produced by a certain strains of *Aspergillus flavus* and *Aspergillus Parasiticus* var *globosus*. Consumption of contaminated feed may lead to aflatoxicosis with variety of pathological effects like hepatotoxicity, teratogenicity and immunosuppression (Pier, 1981). The major fractions of aflatoxins are (AF) B₁, B₂, G₁, G₂, M₁ and M₂ are usually found together on various feedstuffs in different proportions. Aflatoxin B₁ is very much predominant in amounts as well as in toxicity, while M₁ is a metabolite of aflatoxin B₁, which is excreted in milk (Purchase and Vorsta, 1968).

Carbon tetra chloride (CCl₄) has long been known to be an effective drug against adult liver flukes and its efficiency against immature flukes increases as the dose rate is increased. It is well known that carbon tetrachloride induces fatty liver and liver cell necrosis in a variety of Mammalian species (Smuckler, 1976).

Very limited information is available on clinico-pathological and immuno-pathological changes due to combined effect of aflatoxicosis and carbon tetra chloride toxicity in pregnant rabbits. By looking at the above facts, the present work was undertaken to study the pathology of experimental aflatoxicosis, Carbon tetra chloride toxicosis and their ill effects in pregnant rabbits in sublethal minimal doses independently and combined proportionate doses.

Materials and Methods

Rabbits for the experiment were procured from a commercial rabbit farm. These rabbits were of mixed breeds viz. New Zealand white, chinchilla and Russian grey giant. Thirty rabbits of age group of one and half years were procured for the experimental studies.

The females were examined in detail for any pregnancy (Hafez, 1970) before carrying out of the experiment. These were caged and reared in the shed for a month, to get acclimated to the new environment. After the confirmative tests for non-pregnancy of the rabbits, each female rabbit was kept in isolation and mated with a proven male rabbit. The successful breeding was confirmed by the examination of the vaginal plug and for the presence of spermatozoa in female genitalia. For all practical purpose the animals having vaginal plug and spermatozoa considered as day one of the gestation.

The mouldy rice powder with known content of aflatoxin was mixed into the feed to achieve the required concentration of 1 ppm (one microgram per gram of feed) and 3 ppm (three micrograms per gram of feed). The carbon tetra chloride was mixed in feed as per the calculated dose of 0.2 ml / kg body weight of rabbit and then administered orally. A control feed free of aflatoxin was also used.

A systemic necropsy was conducted on the

pregnant rabbits that died during the experiment or sacrificed at the end of experiment. The uterus of both dead and sacrificed rabbits was properly examined for the gross and histopathological studies.

Results and Discussion

Aflatoxin treated group: Grossly resorption of fetuses was noticed. This was indicated by presence of four black moles in the uterine horns. Uterine mucous membrane was hemorrhagic and congested (Fig.1). On histological examination, hemorrhages in endometrium with hyperplasia and hypertrophy of the capillary endothelium and presence of haemosiderin deposits in the mucosa of the endometrium were observed. Surrounding the capillaries there was intense fibroblastic proliferation (Fig.2).

Aflatoxin and CCL4 treated group: Gross examination showed enlargement of uterine horns, which were swollen and edematous. Resorption of fetuses, which were exhibited by presence of four black moles in the uterine mucosa (Fig.3). Histologically proliferation of smooth muscles of myometrium and capillaries was observed. In myometrium infiltration of plasma cells and mononuclears were also noticed. Metaplastic changes in endometrium characterized by the lining epithelium were that of low cuboidal type, which was thrown into papillary form of folds (Fig. 4).

CCL4 treated group: Gross examination revealed extensive oedema of the organ with hemorrhagic spots on the placental zones. On histological examination extensive fibroblastic proliferation in uterine muscularis and as well periglandular and interstitial proliferation of fibroblasts in the endometrium were seen. Hypertrophy of endometrial glands and desquamation of endometrial mucosa was also noticed. The uterine mucosa showed

resorption of fetuses characterized by presence of black moles in all treated groups except carbon tetra chloride treated group, wherein extensive oedema of the organ with few hemorrhagic areas on the placental zones were noticed.

On histological examination, uterine mucosa showed hyperplastic or metaplastic changes of lining epithelium of the endometrium, which was that of cuboidal type. Extensive haemorrhages in the endometrial as well as parametrial areas and extensive fibrosis of mucosa and muscularis were noticed. These observations are not recorded or reported earlier in pregnant rabbits and have been put into the record in the present investigation. In carbon tetra chloride treatment, the very early embryonic death (E.E.D) has been pronounced which was known by the fact that it causes oedema and fibrosis rather than that of development of placenta and haemorrhages, which were exhibited in rest of the treated groups indicated by development of placenta. The effect of carbon tetra chloride as embryocidal in toxin treated groups might have been occurred at a very early state, before the development of placenta itself, resulting in lack of black moles.

References

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Fig.1 Morphologically aflatoxin treated group showed congested and hemorrhagic uterine mucous membrane

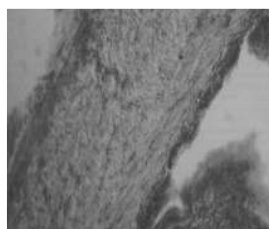


Fig.2 Histologically hyperplasia and hypertrophy of the capillary endothelium & presence of haemosiderin deposits in the mucosa of the endometrium



Fig.3 Gross examination of Aflatoxin and CCL4 treated group showed enlargement of uterine horns, which were swollen and edematous

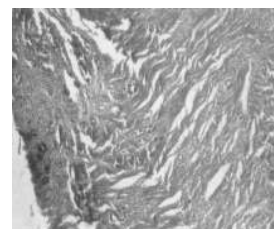


Fig.4 Histologically Aflatoxin and CCL4 treated group showed metaplastic changes in endometrium and infiltration Plasma cells and mononuclear cells
