SEM Study on Cytotoxic effect of Monocrotophos (MCP) on Blood of Mice

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ABSTRACT:

INTRODUCTION:

Monocrotophos (MCP) is an organophosphorus insecticide has both systemic and contact actions and has been used against insects.

METHODS:

Thirty six male Balb/c mice were used. These were divided into six group (A, B, A1, B1, A2, B2, ). MCP was given orally daily by gavage 1/5th of LD50 (0.28 mg/100gm of body wt.), vitamin E and vitamin C was given orally daily by gavage @ 100 mg /kg body wt., while MCP+ Vitamine E and MCP + Vitamine C was also given.

RESULTS:

Scanning electron microscopy (SEM) revealed that of erythrocytes in control were perfect discocytes (D). MCP treatment resulted in drastic alteration in the topography of erythrocytes. Vitamin E and Vitamin C treated mice revealed normal erythrocyte like that in control. MCP+ Vitamin E and MCP + vitamin C treated mice revealed almost normal of topography of erythrocyte.

CONCLUSION:

Pesticide exposure could be prevented by CO- administration antioxidant Vitamin E or Vitamin C.

KEY WORDS: MCP, Vitamin E, Vitamin C, Erythrocytes.
erythrocytes was carried out to visualize topographical changes in erythrocytes as result of MCP, vitamin E and vitamin C treatment.

For this, the technique\textsuperscript{17}, was taken, and viewed under SEM (Jeol 2601).

**RESULTS:**
The signs of pesticide toxicity were observed within 30 minutes of administration of MCP. These include shivering, salivation and lacrimation, urination was also found to be increased as shown by yellowish, these symptoms were more prominent during the initial 15-20 days. The symptoms were found to be less server in MCP + vitamin C treated (group B2). However, MCP + vitamin E treated (group A2) mice appeared to almost normal.

The present study revealed that of the most of the erythrocytes in control (group A) were prefect discocytes (D). A few cup shaped stomatocytes (St) were also observed Fig.1. MCP treatment to mice resulted in drastic alteration in the topography of erythrocytes. Most of the cells changed to stomatocytes (St) as well as echinocytes (E) (irregularly cernated with many projection). Echinocytes observed were of different stage viz. stage 1 (a) characterized by irregularity of edges ; stage 2 (b) characterized by spicules in still flat cells and stage 3 (c) characterized by spicules uniformly distributed over the surface of round cells. One more type of cells called acanthocytes (A) were observed having spicules of varying length irregularly distributed over the erythrocyte surface. Figs.2-4.

Vitamin E treated (group A1) Fig.5 and vitamin C treated (group B1) Fig.6, revealed normal biconcave discocyted like that of normal control (group a) . MCP + vitamin E trat (group A2) mice revealed almost normal topography of erythrocyte whereby most of the cells were found to be prefect discocytes, however a very few echinocytes or spherocytes were also observed Fig. 7. MCP+ Vitamin C treated (group B2) mice also revealed improved morphology of erythrocytes as compared to MCP treated (group B). However, this improvement was found to be less when compared to MCP+ vitamin E (group A2), since the number echinocyted and acanthocytes were more in this group Fig.8.

**DISCUSSION:**
The study of the morphological features of cellular elements has great importance for assessing their functional state and vitality.

SEM having large depth of focus view to delineate the pathologic status of affected erythrocytes, the modification in the shape and size of erythrocytes represent the most common morphologic abnormalities that occur in pathological conditions\textsuperscript{18}. It was revealed in the present study that MCP treatment (group B) to mice resulted in the drastic alterations in the topography of erythrocytes whereby the normal discocytes changed to stomatocytes, echinocytes in various stage and acanthocytes or exhibited central or peripheral protuberances. These alteration in the surface morphology of erythrocytes may be due to abnormal erythropoiesis, deficient haemoglobin formation, damage to red cells after they leave the bone marrow or increased erythropoiesis to compensate for anemia\textsuperscript{19}.

Another possible reason for alterations / changes in erythrocyte morphology could be the formation of active loci on the erythrocyte membrane as a result of interaction of membrane lipids and proteins with free radicals, which might be produced due to the oxidative stress induced by MCP exposure.

In the present study, significant changes in the erythrocyte membrane have been observed following exposure to MCP. Furthermore, the normalization of surface morphology of erythrocyte in MCP+ vitamin E and minimization of toxic effects in MCP+ vitamin C revealed that morphological changes in erythrocytes due to pesticide exposure could be prevented by CO- administration of antioxidant vitamin E or C, the SEM study confirms the protective role of vitamins E and C aginst MCP induced stress. However, vitamin E has been found to be more beneficial since it could ameliorate MCP toxicity more effectively as compared to vitamin C in erythrocytes.

Fig .1 Showing biconcave discocytes (D) and stomatocytes (s t ) in control . Fig .2 Showing pathologically altered erythrocytes echinocytes of various stages (Ea, Eb ,Ec), and acanthocytes (A) in MCP treated group. Fig. 3 Showing pathologically altered echinocytes (E) and acanthocytes (A) at higher magnification in MCP treated group .
Fig. 4 Showing pathologically altered echioncytes (E) and acanthocytes (A) at higher magnification in MCP treated group.

Fig. 5 Showing typical biconcave discocytes (D) and stomatocytes (st) in vitamin E treated group.

Fig. 6 Showing normal erythrocytes in vitamin C treated group.
Fig. 7 Perfectly normal erythrocytes in MCP + vitamin E treated group.

Fig. 8 Showing normal erythrocytes and a few echinocytes (E) in MCP + vitamin C treated group.

REFERENCES:


