SUMMARY AND CONCLUSION

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Children differ from adults in the relative frequencies of various tumours. Also, childhood malignancies are characterized by high hereditary and familial tendencies in some types, acute clinical onset, rapid spread, high radiosensetivity and low therapeutic ratio. The main causes of death in children with malignant diseases are infections, debility, cachexia, anaemia as well as hepatic and renal failures.

In man, trace elements constitute less than 0.01% of the body weight. Despite their relative scarcity, their atoms are present in large numbers and each is believed to play an important role in human growth and development . The trace elements essential to man include zinc, copper, chromium, cobalt, manganese, molybdenum, selenium, tin and iodine.

In the present study, the serum concentrations of six of the essential trace elements (zinc, copper, chromium, cobalt, manganese and molybdenum) were determined in 100 Egyptian children 2-12 years of age. Eighty of them had different neoplastic diseases and the remaining

20 were normal controls. of the patients, 19 had acute lymphatic leukaemia, 16 had brain tumours, 25 had lymphomas and the remaining 20 were suffering from other neoplasms.

A thorough clinical examination and the needed investigations were carried out for all the children included in this study. Serum trace elements' concentrations were estimated by radio-isotopic neutron activation analysis according to Taylor's method (1964).

A significant decrease was observed in serum zinc levels of all the groups of patients. This may be due to anorexia, competition between the tumours and the hosts in respect of their metabolic requirements, infection and/or tissue damage. In infections and tissue damage, the metal enters the liver cells and becomes bound to their metallothionines. The leucocyte endogenous mediator, a factor released from the polymorphonuclear leucocytes, may play a role in this process. No significant differences were observed between the various groups of patients.

A significant increment has been found in serum copper levels of all the groups of patients. This

increment may be attributed to tissue destruction induced by the tumours and/or by complicating infections. Tissue damage leads to liberation of tissue copper into the circulation and elevation of serum ceruloplasmin level with subsequent increase in copper binding capacity. In infection , the increased metabolic activity may be responsible in part for the elevation of serum copper and ceruloplasmin levels.

The high serum copper level observed in the cancerous patients may also be due to cancer anaemia. This anaemia may be dishaemopoietic, either due to nutritional deficiencies or bone marrow replacement by malignant cells, with subsequent accumulation of the unused copper in the serum and hyperglobulinaemia which increases the copper carrying capacity. Cancer anaemia may also be haemolytic, due to haemolytic antibodies produced by cancer cells or due to increased destruction of immature RBC's in the spleen as a result of reticuloendothelial hyperplasia, with subsequent liberation of the erythrocytes' copper into the serum.

The only significant differences observed among the different groups of patients is the increment of

serum copper concentration of the leukaemic group in comparison to that of the patients with lymphomas and that of the group of patients with miscellaneous neoplasms. This may be due to the wider extent of leukaemia, its severer and earlier anaemia and/or its commonly associating hepatic involvement with subsequent release of copper into the serum.

Significantly low mean serum chromium levels have been found in all the groups of patients. This may be due to competition between the tumours and the hosts in respect of their metabolic requirements. It may also be attributed to anorexia and/or infection. The mean detected in our patients are still higher than those reported in normal American subjects probably due to the high dietary intake of the metal in Egypt. So, one can conclude that cancer seldom leads to chromium deficiency in Egyptian children.

All the groups of patients have shown significantly low cobalt levels. This may be due to anorexia and/or the competition between the tumours and the hosts for the common metabolic needs. No significant differences have been found between the mean values of the different groups of patients.

All the means of serum manganese levels of our groups of patients are significantly low. This may be attributed to anorexia and/or the competition between the tumours and the hosts for the metabolic requirements. The only significant difference among our groups of patients is that between the patients with brain tumours and those with lymphomas. The decrease in serum manganese level is least pronounced in brain tumours probably because they usually manifest early in the disease, while they are still small in size, due to their presence in a critical closed area.

No significant differences of serum molybdenum levels have been found between our groups of patients and the controls. Also, no significant differences have been observed among our groups of patients except the increment of serum molybdenum level of the leukaemic children in comparison to that of the patients having brain tumours. This may be due to hepatic affection with subsequent release of the metal into the serum, decreased hepatic uptake of the metal which accumulates in the serum and/or interrupted bile flow with decreased excretion of this trace element.

Our study may be a spotlight for future investigations in the field of trace elements and their

relation to various diseases. It may give some information concerning the disorders of trace elements' metabolism in neoplastic conditions. The changes observed may be of aetiologic importance. Also, they may help in diagnosis, follow up, prognosis and/or treatment. We can conclude that cancerous children may be at risk of the hazards of hypercupraemia as well as deficiency of zinc, chromium, cobalt and manganese. Dietary and therapeutic measures to avoid or treat these hazards are recommended for these patients. Research in this area migh be repaid with a worthwile reduction in morbidity and mortality .