S U M M A R Y A N D C O N C L U S I O N

The role of metals in breast tumours evokes increasing interest with the advent of accurate methods of detecting their concentrations in human tissues and biological fluids .

This study aimed to compare the patterns of metal levels in patients with benign and malignant breast tumours and to detect any deviation from the normal patterns . This may be used in diagnosis and prognosis of breast tumours .

Our study was carried out at the departments of Surgery and Biochemistry of Faculty of Medicine , Zagazig University .

Eighty females were included in this study . They were classified into five groups as follows :

First group : 20 normal females as a control group .

Second group : 15 cases with fibroadenoma of the breast .

Third group : 15 cases with fibroadenosis of the breast.

Fourth group: 15 cases with early breast cancer.

Fifth group : 15 cases with advanced breast cancer .

All subjects were submitted to clinical and laboratory investigations . Radiological examination was also done to patients with breast cancer . Histopathological examination was done for diseased and normal breast tissues .

Serum , urine, normal and diseased breast tissues were used for determination of the studied ten minerals. Extreme care was taken to prevent contamination during the whole work by extraneous metals . Sodium and potassium were estimated using "CORNING , 400 " Flame photometer according to the method of Hawk, (1965) . Serum , urine and tissue inorganic phosphorus was measured by modified Hohenwallner and Wimmer method, (1973) . Determinations of calcium , magnesium , iron, copper , zinc , manganese and lead were done using "C.A.L. - ASS - II" Atomic Absorption Spectrophotometer .

All the obtained results were tabulated and statistically analysed . The gained data revealed the following :

(A) Control group :

Our results for serum and urine metal levels in normal females were in the same ranges reported by previous investigations .

(B) Fibroadenoma group :

There was a significant decrease of serum magnesium and iron in patients with fibroadenoma of the breast, and non significant changes in the levels of other studied metals in the serum .

As regards urinary levels of the studied metals, we found highly significant decrease of sodium and potassium , while other studied minerals showed non significant changes .

Concerning tissue minerals, we reported a significant increase of diseased breast tissue sodium, and highly significant increase in the concentration of potassium , calcium, magnesium and inorganic phosphorus in diseased breast tissue when compared with normal breast tissue . On the other hand, we found a significant decrease of diseased tissue copper and non significant changes in the concentrations of other studied elements .

(C) Fibroadenosis group :

There were non significant changes of serum levels of the studied metals in patients with fibroadenosis of the breast .

Regarding urinary levels of the examined metals, we reported a significant decrease of sodium and potassium in patients with fibroadenosis of the breast, and non significant changes in the other studied minerals .

Our results indicated a highly significant increase of potassium, calcium, magnesium and inorganic phosphorus in diseased breast tissue, and non significant changes in the concentrations of other studied metals .

(D) Early breast cancer group :

The gained results showed that there was a highly significant increase in the serum copper level in patients with early breast cancer, and there were no significant changes in the levels of other studied elements .

As regards urinary levels of the studied metals, we found a highly significant decrease of urinary sodium, and significant decrease of urinary potassium. On the other hand, there was a significant increase of calcium in the urine , while other studied metals showed non significant changes of urine levels in patients with early breast cancer .

Concerning cancerous breast tissue minerals, we reported a highly significant increase of sodium , potassium, calcium, magnesium , inorganic phosphorus and zinc when compared with noncancerous breast tissue, and non significant changes in the concentrations of other studied elements .

(E) Advanced breast cancer group :

The obtained results for minerals in the serum , urine and tissues from patients with advanced breast cancer were in the same ranges obtained in patients with early breast cancer . The results were almost the same because metals might not be affected by the stage of carcinoma of the breast . Another possible interpretation is that distant metastases were not detected or included in the advanced group .

Conclusion :

Based on this study, the concentrations of some minerals differ in the serum, urine and breast tissues of patients with benign and malignant breast tumours . This may reflect the role of metals in many enzymes and the requirement of malignant cells to more minerals. The complex reactions of chelation

may also influence the accumulation or depletion of certain metals in the cancerous tissues, depending on the carcinogenic agent involved . Another possible interpretation of these data may simply be a reflection of the largely intracellular location of some metals in normal tissues and the highly cellular nature of diseased breast tissues .

Additional data on metals in breast tumours are essential to discover the role of these elements in the pathogenesis of breast tumours . Further information are necessary before they may be used as biochemical markers for diagnosis and prognosis of breast tumours .