Ke ords: Gastric cancer (GC); Serum minerals; Selenium (Se); Copper (Cu); Zinc (Zn); Iron (Fe)

Introd ction

Gastric cancer (GC) continues to be the second most common malignant neoplasm around the world with varied regional incidences due to di erent factors [1] and in Kashmir among all the cancers GC has been reported to be a highly prevalent malignancy, constitutes about 30-40% of all malignancies [2]. Various studies have been done on incidence rate and distribution of gastrointestinal cancers in Kashmir [3], but there was no information regarding the mineral status of the GC patients till date. GC has remained a main clinical challenge due to its poor prognosis, limited treatment options, relatively resistance to chemotherapy/radiotherapy and late diagnosis of the disease. Several possible mechanisms have been proposed for the probable role of Selenium (Se), Copper (Cu), Zinc (Zn), and Iron (Fe) in GC etiology [4-6]. Since the beginning of the 1970s the minerals has received a lot of attention as per the variations of mineral concentration in serum has been related to increased risk for various types of cancer in humans [7-10]. She plays a vital role in cancer prevention and appears to have important structural and enzymatic roles such as antioxidant activity. It is well established that oxidative stress plays an important role in the carcinogenic process, as reactive oxygen species (ROS) which induce oxidative damage, DNA damage and protein damage. However, in the literature there are many controversial studies regarding the protective/ therapeutic role of Se in human cancer [11-13]. Fe and Cu can produce the reactive oxygen species which can attack DNA and cause DNA mutation, and can act as an element in the pathological process of cancer, as Fe may be a limiting nutrient to the growth and replication of cancer cells in the humans [14]. Cu can be concerned in the activation of several organic peroxide and making them more carcinogenic [15]. Zn plays an anti-carcinogenic role by stabilizing the structure of DNA, RNA and ribosome [16] also Zn is necessary to theto oy T[*(DNsr(nex an/nss /rip0ne(is)0 welrecogniz)0.5(thT*in16])0ceeo*imizp2h5Spequ

2. e ask was then kept at room temperature for overnight.
3. en on next day ask was put on a hot plat at simmering heat till the volume in the ask was reduced up to 0.5 ml.
4. en nal volume of ask was made up to 10 ml by diluting by distilled water.
5. ese 10 ml were used for the examination of mineral estimation by using the Atomic absorption spectrophotometer.

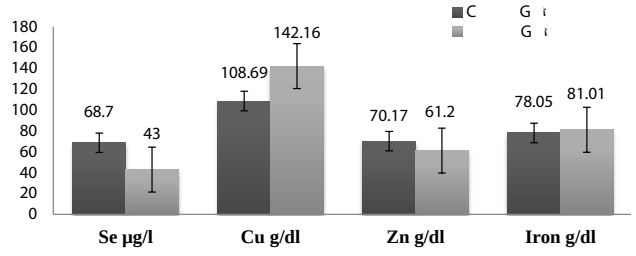
Res lts

All values of Se, Zn, Cu and Fe are expressed as means ± Se at each time interval. e level of signi cance was set at $p<0.05$ and data was analyzed by SPSS. Graph 1 represents the serum concentration of Se, Zn, Fe, and Cu among GC patients and controls and Graph 2 showing among GC ganders.

e mean serum Se levels were signi cantly $p<0.05$ di erent in GC patients (44.00 ± 6.3 µg/l)and in the control group of healthy individuals (69.70 ± 4.5 µg/l) and remained insigni cant for the two genders (43 ± 6.3) in female and 42 ± 5.9 in male $p>0.05$. e mean serum Cu levels ($p<0.05$ di erent in GC patients (142.16 ± 18.72) and in the control group of healthy individuals (108.69 ± 16.47) and on correlation between serum concentration and gender the mean serum Cu levels were signi cantly $p<0.05$ di erent for the two genders, in female 147.66 ± 18.72 and in male136.79 ± 17.79. e mean serum Zn levels $p<0.05$ di erent in GC patients (61.20 ± 5.57) and in the control group of healthy individuals (70.17 ± 6.43) and on correlation between serum concentration and gender the mean serum Zn levels were insigni cantly di erent for the two genders $p>0.05$, in female 62.28 ± 5.57 and in male 60.12 ± 6.01. e mean serum Fe levels were insigni cantly ($p>0.05$) di erent in GC patients (78.05 ± 3.25) and in the control group of healthy individuals (81.01 ± 2.15) and on correlation between serum concentration and gender the mean serum Fe levels were also insigni cantly $p>0.05$ di erent for the two genders, in female 83.06 ± 3.21 and in male79.04 ± 4.00.

Disc ssion

In the past studies on minerals it was showed that there was an inhibitory e ect of some minerals on the cell growth, DNA, RNA and protein synthesis in transformed cells, [12] in view of the above data we analyze the status of Se, Zn, Fe, and Cu in serum of gastric and healthy individuals. Results of our study showed that there was a signi cant decline in the concentration of Se in serum samples of GC patients on comparison with the healthy individuals and on comparison within the genders among GC patients the level of Se concentration remained insigni cant which was in agreement with the ndings of many coworkers [7,20,21]. e decline of Se may be due to over uptake of it by malignant cells and thus may be there was an increase in the concentration of Se in the tumor cells. In our study the concentration of Cu in serum samples of GC was increased signi cantly on comparison with the healthy individuals and on comparison within the genders among GC patients there was a signi cant decline in the concentration of Cu in male on comparison with the female group, which was in agreement with the ndings of many coworkers in di erent cancers, bladder cancer [22], breast cancer [23], colorectal cancer [24], GC [25]. As Cu can be concerned in the activation of several organic peroxides [26,27] and can produce the hydroxyl radicals which cause mutation in DNA which may be one of the causes of cancer development, but we do not understand why there was a signi cant decline in Cu concentration in male as compared to female group patients. ere was a signi cant decline in the concentration of Zn in serum samples of GC patients in our study on comparison with the healthy individuals and on comparison within the genders among GC patients the level of Zn concentration remained insigni cant which was inconsistent with the most nding of the earlier studies which have reported higher serum Zn levels in the cases of cancer [28]. Zn plays an important role in stabilizing the structure of DNA, RNA and ribosome, it is also necessary for functioning of several transcription factors, proteins that recognize certain DNA sequences and control gene transcription and protects against free radical damage. So may be due to decline in the concentration of Zn in GC patients any of the above process get disturbed and may be acting as a causative agent for cancer. In our study there was found no signi cant di erence in the levels of Fe in serum of GC patients as compared with the healthy individuals and on correlation within gender among GC the mean serum Fe levels were insigni cantly di erent for the two genders, and are in contradict with the ndings of Weinberg.



Graph 1: Se, Zn, Fe, and Cu among gastric and healthy individuals.

Concl sion

Minerals appear to have important structural and enzymatic roles in body, as there are some minerals having role in antioxidant activities like Se or some having role in stabilization of DNA, RNA, ribosome and protein structures like Fe and Cu or some producing oxygen reactive species like Zn. We detected in our study, there was a signi cant decline in the concentration of Se and Zn while high level of serum Cu in gastric cancer patients, as compared with normal healthy controls. is shows an association of serum selenium, zinc and copper with cancer gastric cancer. e increase or decrease of mineral concentration in serum of gastric cancer patients may be one of the factors which can lead to other biological processes to cause gastric cancer. If there is really happen so then there is need of such studies in future whey and which biological process is going under or overtakes of minerals during cancer development.

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Conflict of Interest

Authors declare that they have no conflict of interests.

Author's Contribution

All authors read and approved the final manuscript.

References

1. Prakash S, Sarran L, Socci N, DeMatteo RP, Eisenstat J, et al. (2005) Gastrointestinal stromal tumors in children and young adults: a clinicopathologic, molecular, and genomic study of 15 cases and review of the literature. J PediatrHematoloncol 27: 179-187.

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