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Review on Gynecologic Cancer Recurrence is Linked to Zinc Deficiency

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Abstract

Zinc deficiency can cause a variety of symptoms, including anemia, taste disorders, and hair loss. Due to its antioxidant properties, the link between zinc deficiency and cancer has received a lot of attention recently. Only a small number of studies have looked at the connection between zinc and gynecologic cancers; no studies have looked at the serum zinc status at the time of gynecologic cancer's development or the association between zinc and cancer recurrence. This study's objectives were to clarify the dynamics of serum zinc, identify the associated determinants, and determine whether serum zinc concentrations are related to the development and recurrence of gynecologic cancer. As a result, we retrospectively assessed serum zinc concentrations before treatment in gynecologic patients with cancer or benign illness.

Introduction

We investigated anaemia and hypoalbuminemia, the most common causes of zinc deficiency, as indicators of hypo nutrition to determine the relationship between zinc deficiency and chemotherapy, radiation therapy, and recurrence, which may have an effect on zinc concentration during cancer recurrence. The results showed that there was no difference in serum zinc concentration between preoperative cancer patients and noncancer patients, and that serum zinc concentrations were not associated with the development of gynecologic malignancies [1]. While recurrent cancer patients had a 4.8-fold higher risk of developing zinc shortage than nonrecurrent cancer patients, gynecologic cancer patients had considerably lower serum zinc concentrations after therapy. An independent predictor of recurrence was a serum zinc concentration of less than 61 g/dL. The recurrence rate of zinc deficiency reached as high as 69% once zinc deficiency occurred. Overall, our research shows that gynecological cancer recurrence is linked to zinc deficiency, so doctors should keep an eye on zinc levels while treating the disease.

Zinc consumption in moderation can reduce the risk of gastrointestinal cancer, depression, and type 2 diabetes in adults as well as benefit the general population. Adults who take zinc supplements are said to experience improvements in depression, sperm quality, attentiveness, pregnancy rates, diarrhea, pneumonia risk in children, zinc deficiency, and growth [2]. Additionally, due to its antiviral, antioxidant, and anti-inflammatory properties, it alleviates respiratory tract infections (including COVID-19). A deficit in zinc can happen rather fast since the body cannot store it, for example because of a poor diet. Numerous epidemiological studies have shown a connection between dietary intake of zinc and the risk of developing cancer. The main causes of zinc's impacts are its anticancer characteristics. The creation of proteins, the immune system, and gene expression are only a few metabolic processes that require the trace metal zinc. As a result, if zinc levels are low, the human body may experience several illnesses.

Numerous digestive cancers have been associated to zinc deficiency; therefore, increasing zinc consumption may reduce the incidence of pancreatic, colorectal, and digestive cancers. However, just a few studies have found evidence of a connection between gynecologic malignancies and zinc intake.

Symptoms caused by zinc deficiency

- Alopecia
- Anemeia
- Decreased immune function infection.
- Dermatitis
- Diarrhea
- Gastrointestinal disfunction
- Hepatosplenomegaly
- Hypogonadism
- Intractable Bed Sores
- Memory Loss , Cognitive impairment
- Stomatitis
- Taste Disorder

Cervical cancer patients have lower zinc concentrations than healthy adults, according to just three previous observational studies. A comprehensive search of PubMed using the terms "zinc" (MeSH term) and "gynecologic cancer" (MeSH term) yielded only one report describing changes in serum zinc concentrations prior to and following gynecologic cancer treatment. 28 patients with suspected zinc deficiency were prospectively evaluated prior to chemotherapy, and the findings indicated that chemotherapy may be a risk factor for low zinc concentration .Only three prior observational studies have shown lower zinc concentrations in cervical cancer patients than in healthy persons. Only one report describing changes in serum zinc concentrations before and after therapy for gynecologic cancer was found after a thorough search of PubMed using the terms "zinc" and "gynecologic cancer" (MeSH terms). Prior to chemotherapy, 28 patients with suspected zinc shortage were prospectively assessed. The results showed that chemotherapy may increase the risk of low zinc concentrations [3].

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No research has investigated zinc recurrence or serum zinc status at the time gynecologic cancer first appeared (zinc insufficiency linked to the emergence of gynecologic cancer). To determine whether serum zinc concentrations are associated with the onset of gynecologic cancer, what influences serum zinc concentration at the time of recurrence, and how serum zinc dynamics relate to the onset and recurrence of gynecologic cancer were the objectives of this study [4]. By assessing serum zinc concentrations in individuals with benign illness or treated cancer, we were able to ascertain the relationship between serum zinc concentrations and the occurrence, diagnosis, and recurrence of gynecologic malignancies.

The three criteria listed below make it possible to accurately diagnose zinc deficiency [5].

• Some of the symptoms and signs of zinc deficiency include dermatitis, aphthous stomatitis, hair loss, loss of appetite, taste disturbance, hypogonadism in men, anaemia, increased susceptibility to infection, growth low serum levels of alkaline phosphatase (ALP), as well as problems with children's weight and height. Patients with chronic kidney illness, liver disease, osteoporosis, diabetes mellitus, or osteoporosis may not always have low serum ALP levels.

• Exclude other diseases that could be connected to the signs or low serum ALP levels. It is important to rule out conditions including atopic dermatitis, contact dermatitis, dermatitis brought on by vitamin A, biotin, or essential fatty acid deficiency, alopecia areata, hair pulling, Turner syndrome, congenital hypophosphatasia, and low height brought on by a lack of growth hormone.

• Low levels of zinc in the blood: 60 g/dL indicate a zinc insufficiency; 60 to 80 g/dL indicate a borderline zinc deficiency Patients who satisfy I, II, and III criteria are eligible to take zinc supplements. These patients' symptoms may be improved with a zinc supplement. Estimates show that the serum zinc levels of cancer patients are lower than those of non-cancer patients, and zinc shortage due to its antioxidant qualities may result in DNA oxidative modification damage, raising the risk of cancer. Previous research has raised the possibility that food or other variables can lower serum zinc levels, which in turn lowers the amount of zinc in tumour tissue. As a result, the serum zinc's antioxidant abilities are reduced, which leads to DNA oxidation and carcinogenesis.

However, when compared to the noncancer patient group in this study, the cancer patient group maintained comparable preoperative zinc concentrations. In addition, despite receiving nutritional guidance to adopt a zinc-rich diet and being treated with oral zinc supplements until their serum zinc concentrations improved, 69% of patients with recurrent cancer who had previously developed zinc deficiency developed zinc deficiency again. Therefore, a zinc deficiency was linked to recurrence and carcinogenesis in our cohort of cancer patients, even though zinc deficiency was not linked to carcinogenesis [6-9].

Due to our findings of a drop in zinc concentration after cancer treatment, we hypothesized that post-treatment nutritional status and other factors may have led to a decrease in blood zinc concentrations. As a result, we looked into the possibility of chemotherapy and radiotherapy, which demand fewer nutritional intakes, as potential contributors to zinc shortage. We also thought about the relationship between zinc concentrations and signs of malnutrition including anaemia and hypoalbuminemia. But it turned out that zinc deficiency was solely associated with cancer recurrence. It is possible that some of the symptoms of this condition, such as taste disorders and anemia, which also frequently occur in these patients, can be attributed to zinc deficiency because 87% of patients with recurrent cancer had this condition. However, our study did not look at symptoms that were caused by zinc deficiency in the past; As a result, it is unclear how it affects recurrent cancer patients' quality of life .

We found that low serum zinc concentrations were independently linked with cancer recurrence after adjusting for variables such age, anaemia, hypoalbuminemia, and prior cancer treatment. Because zinc insufficiency is linked to a poor prognosis, measuring blood zinc concentrations may be incorporated into treatment plans for gynecologic cancers. However, more study is needed to determine whether zinc supplementation improves patient prognosis. Patients with zinc deficiency who complained of alopecia or taste disorders unrelated to chemotherapy were uncommon, even though the clinical symptoms of zinc deficiency were not examined in this study. In contrast to some studies that claim low zinc concentrations cause carcinogenesis, most cases of zinc deficiency occurred after a cancer recurrence, with a mean of 17 months between the two.

Conclusion

Patients with benign gynecologic illness and those with gynecologic malignancy had the same serum zinc concentrations prior to treatment. Patients with recurring cancer and those who have finished their initial treatment for gynecologic cancer are more prone to have zinc deficiencies. Low serum zinc concentration is a distinct risk factor for cancer recurrence and a poor prognosis. In addition, once zinc deficiency has happened, it is quite likely to happen again. To enhance prognosis and maintain quality of life, gynecologic oncologists should actively assess serum zinc concentrations in patients with recurrent malignancy.

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