

ABSTRAK

STUDI NOVEL : EFEK DARI SUPLEMENTASI ZINC TERHADAP PROFIL BESI DAN HEMOGLOBIN PADA KANKER PAYUDARA DI RUMAH SAKIT UMUM PUSAT DR. SARDJITO - YOGYAKARTA

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Latar belakang: Anemia penyakit kronik dan penurunan kadar Zinc serum sering ditemukan pada pasien kanker payudara dan dapat memperburuk kualitas hidup serta luaran klinis. Zinc berperan dalam regulasi inflamasi, eritropoiesis serta peningkatan kapasitas antioksidan. Oleh sebab itu, efek suplementasi zinc berkaitan dengan perbaikan anemia via penurunan beban inflamasi dan penekanan produksi radikal bebas.

Tujuan: Menilai efek suplementasi zinc terhadap profil besi dan kadar hemoglobin pada pasien kanker payudara luminal non-metastasis.

Metode Penelitian: Penelitian ini merupakan uji klinis acak terkontrol *double-blind* yang dilakukan di Poliklinik Kanker Terpadu RSUP Dr. Sardjito, Yogyakarta. Sebanyak 54 pasien kanker payudara luminal A atau B non-metastasis atau Non-metastasis Breast Cancer (NMBC) yang memenuhi kriteria inklusi diacak ke dalam kelompok intervensi (suplementasi zinc) dan kelompok plasebo. Parameter yang dinilai meliputi besi serum, *total iron binding capacity* (TIBC), saturasi transferin, dan kadar hemoglobin sebelum dan sesudah intervensi. Analisis statistik menggunakan uji Wilcoxon signed-rank untuk perbandingan dalam kelompok dan uji Mann-Whitney atau uji t tidak berpasangan untuk perbandingan antar kelompok. Efek samping dinilai menggunakan *Common Terminology Criteria for Adverse Events* (CTCAE) versi 5.0.

Hasil Penelitian: Pada kelompok intervensi, suplementasi zinc tidak menyebabkan perubahan signifikan kadar besi serum dan saturasi transferin, namun meningkatkan TIBC secara bermakna ($p = 0,012$). Kadar hemoglobin meningkat signifikan pada kelompok intervensi ($p = 0,010$), sedangkan pada kelompok plasebo tidak ditemukan perubahan bermakna. Perbandingan perubahan antar kelompok menunjukkan kecenderungan peningkatan hemoglobin yang lebih besar pada kelompok intervensi, meskipun tidak signifikan secara statistik. Efek samping ringan (CTCAE grade I-II) dilaporkan pada 33,3% partisipan dan bersifat reversibel.

Kesimpulan: Suplementasi zinc pada pasien NMBC meningkatkan TIBC dan kadar hemoglobin tanpa menimbulkan efek samping berat, meskipun tidak menunjukkan perbedaan signifikan terhadap profil besi dibandingkan plasebo. Zinc berpotensi sebagai terapi adjuvan suportif pada populasi ini.

Kata Kunci: Hemoglobin, Breast Cancer, Iron Metabolism, Transferrin

ABSTRACT

A NOVEL STUDY: EFFECTS OF ZINC SUPPLEMENTATION ON IRON PROFILE AND HEMOGLOBIN LEVELS IN BREAST CANCER PATIENTS AT DR. SARDJITO GENERAL HOSPITAL, YOGYAKARTA

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Background: Anemia of chronic disease and reduced serum zinc levels are frequently observed in patients with breast cancer and may worsen quality of life as well as clinical outcomes. Zinc plays an important role in the regulation of inflammation, erythropoiesis, and enhancement of antioxidant capacity. Therefore, zinc supplementation may contribute to anemia improvement through reduction of inflammatory burden and suppression of free radical production..

Objective: To evaluate the effect of zinc supplementation on iron profile parameters and hemoglobin levels in patients with non-metastatic luminal breast cancer.

Methods: This study was a double-blind randomized controlled trial conducted at the Integrated Cancer Clinic of Dr. Sardjito General Hospital, Yogyakarta. A total of 54 patients with non-metastatic luminal A or B breast cancer who met the inclusion criteria were randomly assigned to either the zinc supplementation group or the placebo group. Serum iron, total iron binding capacity (TIBC), transferrin saturation, and hemoglobin levels were measured before and after the intervention. Within-group comparisons were analyzed using the Wilcoxon signed-rank test, while between-group comparisons were performed using the Mann–Whitney U test or independent t-test as appropriate. Adverse events were assessed using the Common Terminology Criteria for Adverse Events (CTCAE) version 5.0.

Results: In the zinc supplementation group, no significant changes were observed in serum iron or transferrin saturation; however, TIBC increased significantly after the intervention ($p = 0.012$). Hemoglobin levels showed a significant increase in the intervention group ($p = 0.010$), whereas no significant changes were observed in the placebo group. Between-group analyses demonstrated a greater increase in hemoglobin in the zinc group compared to placebo, although this difference did not reach statistical significance. Mild adverse events (CTCAE grade I) were reported in 33.3% of participants and were reversible with symptomatic treatment.

Conclusion: Zinc supplementation in patients with non-metastatic luminal breast cancer was associated with an increase in TIBC and hemoglobin levels without serious adverse effects. Although no significant differences in iron profile changes were observed compared to placebo, zinc may serve as a potential supportive adjuvant therapy in this population.

Keywords: Hemoglobin, Breast Cancer, Iron Metabolism, Transferrin