The Preventive Effect of Metformin on Paclitaxel-Induced Peripheral Neuropathy

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Abstract : Background. Peripheral neuropathy is a common side effect of the administration of neurotoxic chemotherapy agents. This adverse effect is a major dose-limiting factor of many commonly used chemotherapy drugs. Currently, there are no Food and Drug Administration (FDA) approved medications for the prevention or treatment of chemotherapy-induced peripheral neuropathy. Therefore, this study was performed to investigate the efficacy and safety of metformin on paclitaxel-induced peripheral neuropathy (PIPN). Methods. In this randomized clinical trial, cancer patients who were candidates for chemotherapy with paclitaxel referred to the radiation oncology departments in Iran from 2022 to 2023 were studied. Patients were randomly divided into two groups; 1- Case group (n = 30) received metformin 500 mg orally twice a day after meals during chemotherapy with paclitaxel, and 2- Control group (30 people) received chemotherapy without metformin or any additional medication. Patients were visited in terms of numbness or other neurological symptoms two weeks before chemotherapy, 1-2 days before and weekly during chemotherapy, and at the end of the study. They were assessed by nerve conduction study (NCS) before intervention and one week after the end of chemotherapy. The primary outcome was the efficacy in reducing PIPN and the secondary outcome was adverse effects. Eventually, the outcomes were compared between the two groups of patients. Results. A total of 60 female cancer patients receiving chemotherapy with paclitaxel were evaluated in two groups. The groups were matched in terms of age, body mass index, fasting blood sugar, smoking, pathologic stage, and creatinine levels. The results showed that 18 patients (60.0 %) in the case group and 23 patients (76.6 %) in the control group had PIPN clinically (P = 0.267), and NCS showed 11 patients (36.6 %) in the case group and 15 patients (50.0 %) in the control group suffered from PIPN which no significant difference was observed between the two groups (P = 0.435). Diarrhea (n = 3; 10.0 %) and nausea (n = 3; 10.0 %) were the most common side effects of metformin in the case group and no serious side effects (lactic acidosis and anemia) were found in these patients. Conclusion. This study indicated that metformin did not significantly prevent PIPN in cancer patients receiving chemotherapy, although the frequency of peripheral neuropathy in the case group was lower than in the control group. The use of metformin in the patients had acceptable safety and no serious side effects were reported.

Keywords : peripheral neuropathy, chemotherapy, paclitaxel, metformin
Conference Title : ICO 2025 : International Conference on Oncology
Conference Location : London, United Kingdom
Conference Dates : December 09-10, 2025