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Comparative Features of Breast Cancer in Patients with and Non-Suffering with Type 2 Diabetes Mellitus

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Abstract: *This article discusses the incidence of breast cancer in patients with type 2 diabetes, the work done on them, experiments, as well as diagnostic methods and treatment for its treatment.*

Keywords: *diabetes, treatment, endometrial cancer, diabetes mellitus, essential hypertension*

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Diabetes and cancer are common diseases with tremendous impact on health worldwide. Epidemiologic evidence suggests that people with diabetes are at significantly higher risk for many forms of cancer. Type 2 diabetes and cancer share many risk factors, but potential biologic links between the two diseases are incompletely understood. Moreover, evidence from observational studies suggests that some medications used to treat hyperglycemia are associated with either increased or reduced risk of cancer.

Since insulin is produced by pancreatic β-cells and then transported via the portal vein to the liver, both the liver and the pancreas are exposed to high concentrations of endogenously produced insulin. Diabetes-related factors including steatosis, nonalcoholic fatty liver disease, and cirrhosis may also enhance susceptibility to liver cancer. With regard to pancreatic cancer, interpretation of the causal nature of the association is complicated by the fact that abnormal glucose metabolism may be a consequence of pancreatic cancer (so-called "reverse causality"). However, a positive association between diabetes and pancreatic cancer risk has been found when restricted to diabetes that precedes the diagnosis of pancreatic cancer by at least 5 years, so reverse causation does not likely account for the entirety of the association.

Only for prostate cancer is diabetes associated with a lower risk. This association has been observed both before and after the advent of screening with prostate-specific antigen (PSA), so detection bias due to differential PSA utilization does not account for this finding. Some metabolic factors associated with diabetes, such as reduced testosterone levels, may be involved (although circulating testosterone levels have not been consistently associated with prostate cancer incidence). While obesity has not been associated, and in some studies is even inversely associated, with prostate cancer incidence, obese men with prostate cancer have higher cancer mortality rates than those of normal weight. In addition to metabolic factors such as hyperinsulinemia, obesity may be associated with clinical factors (such as delayed diagnosis, poorer treatment) that may underlie the worsened prostate cancer prognosis.

Results of some, but not all, epidemiological studies suggest that diabetes may significantly increase mortality in patients with cancer. For example, in one study, 5-year mortality rates were significantly higher (hazard ratio 1.39) in patients diagnosed with both breast cancer and diabetes than in comparable breast cancer patients without diabetes. Since diabetes is associated with excess age-adjusted mortality, whether the apparent excess mortality associated with diabetes in cancer patients is any greater than the excess mortality observed among diabetic patients without cancer is unclear. Of note, higher pre-diagnosis C-peptide levels (an indirect marker of insulin resistance) have been associated with a poorer disease-specific survival for prostate cancer and colorectal cancer.

Objective of the study: to compare the clinical and morphological characteristics of breast cancer in patients with and without type 2 diabetes mellitus, and to analyze the possible reasons for the differences in the studied parameters, if detected.

Materials and methods of the study:

A total of 66 patients were included in the study, which included: patients who received treatment for breast cancer in 2018-2021. (a total of 28 primary patients, including 16 with diabetes and 12 without diabetes), who received specialized treatment. (secondary 38 primary patients, 21 with diabetes, 17 without diabetes) in the Samarkand branch of the RSNPMTSOiR. Breast cancer was diagnosed for the first time; the patients had not previously received antitumor treatment. Suffering and not suffering from T2DM were obtained from outpatient records, case histories and archives of the pathological department, as well as from their examination in the scientific laboratory of oncoendocrinology. A careful collection of anamnesis was carried out and the anthropometric parameters of the patients were measured. The diagnosis of the disease for all patients was confirmed by histological examination of the surgical material.

Results:

Our study on the influence of diabetes on the stage of the disease according to the TNM classification revealed a number of features. In patients with breast cancer without diabetes, stage I of the process was more often observed (31.9%), while in patients with type 2 diabetes, stage II A was more often detected (36.8%) and a tendency towards a more frequent occurrence of stage II in diabetic patients was noted. compared with patients without diabetes ($p = 0.08$).

According to the results of our study, in breast cancer patients with T2DM, the comorbidity index was higher than in patients with endometrial cancer with diabetes (10.1 ± 0.4 vs 8.1 ± 0.22; $p = 0.00$). To elucidate the reasons for such seemingly unexpected results, a comparative analysis of the incidence of concomitant diseases in cancer patients of two groups with diabetes was performed. It turned out that coronary heart disease is more common in women with breast cancer and diabetes mellitus (61% vs 22%, $p = 0.0002$). In terms of the incidence of essential hypertension (HD) and CHF, the patients were comparable. There were no distant metastases in patients with breast cancer,

this indicator was 58% (p = 0.0001), which is associated with the peculiarities of the course of these oncological diseases.

Conclusions:

Diabetes mellitus is not only a risk factor for the development of breast cancer, but also a modifier of the course of the analyzed oncopathology, while demonstrating features of tumor-specificity. In breast cancer patients, the presence of diabetes in comparison with patients without diabetes aggravates the course / characteristics of the disease, which manifests itself in a larger tumor size (p = 0.01), a tendency towards a more frequent occurrence of stage II A (p = 0.08) and more rare identification of highly differentiated (G1) adenocarcinomas (p = 0.09).

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