

Streszczenie w języku angielskim

Evaluation of galectin-3 concentration in blood serum in patients with type 2 diabetes and colorectal polyps

Type 2 diabetes (T2D) is one of the most common chronic diseases in the world, affecting approximately 8% of the adult population in Poland, or over 3 million people. This condition is characterised by insulin resistance, disorders of carbohydrate and lipid metabolism, and chronic inflammation. T2D increases the risk of cardiovascular disease, cancer and premature death. In the context of gastrointestinal oncology, its association with an increased risk of colorectal cancer (CRC) is emphasised. The relationship between T2D and the presence and characteristics of CRC precancerous lesions – colorectal polyps (PJG) – has not yet been fully explained.

Colon polyps are among the most common lesions of the lower gastrointestinal tract. They are estimated to occur in 15–20% of adults aged 50 and above. Most often, they are adenomas, which can transform into CRC within approximately 10 years. According to the literature, patients with T2D develop PJG more frequently and at a younger age than the general population. The mechanisms that may explain this phenomenon include chronic inflammation, hyperinsulinemia, and metabolic disorders associated with T2D. The consequence of this is not only a higher risk of CRC in patients with T2D, but also the possibility of earlier onset of CRC, which justifies the need for individualised screening for this patient population. At the same time, there is growing interest in the search for biomarkers that could support the identification of patients at risk of developing PJG or CRC. One potential candidate is galectin-3 (Gal-3), a protein involved in inflammatory processes, fibrosis, and malignant transformation, which modulates the tumour microenvironment and links metabolic disorders with carcinogenesis.

The study aimed to determine the relationship between T2D, metabolic factors and the presence of PJG, and to assess the usefulness of Gal-3 as a potential predictive biomarker in a population of patients with and without T2D.

The series of publications includes one review article and two original cross-sectional articles. Publication No. 1 serves as the introduction to the topic and provides a current summary of the problem of gastrointestinal oncology in patients with T2D, to raise awareness of the link between T2D and cancer and stimulate discussion on an individualised approach to patients. This study outlines a proposed algorithm for screening gastrointestinal neoplasms in

patients with newly diagnosed T2D. Publication No. 2 concerns the assessment of the frequency, characteristics and distribution of PJG in patients with and without T2D. The results indicate that the presence of T2D alone is not an independent risk factor for PJG, but that coexisting metabolic disorders, such as obesity, insulin resistance, and dyslipidemia, are significant. Adenomas with dysplasia and colorectal cancer were more common in the T2D group, although these differences were not statistically significant. An important observation was the distinct distribution of polyps between the study groups: in patients with T2D, PJG were evenly distributed throughout the large intestine, whereas in patients without T2D, they predominantly occurred in distal locations. Publication No. 3 focuses on the assessment of Gal-3 serum concentrations in patients with T2D, with and without PJG. The analysis revealed that Gal-3 concentrations were higher in patients with T2D than in the control group, and that Gal-3 levels were associated with age, sex, and metabolic parameters. The results suggest that Gal-3 may be a non-specific marker of metabolic disorders. However, its role as an independent risk factor for T2D or the presence of PJG has not been confirmed.

In summary, the findings of this study suggest a contributory role of metabolic disorders in the pathogenesis of PJG in patients with T2D, as well as a potential, although non-specific, utility of Gal-3 as a biomarker. Further prospective studies are needed to determine the clinical utility of this approach and to explore the potential use of Gal-3 in future diagnostic and prognostic strategies. Importantly, although the presence of T2D itself was not an independent risk factor for PJG, the results of numerous studies confirm an increased risk of gastrointestinal cancers — especially CRC — in patients with T2D. The observed differences in the distribution and frequency of cancerous lesions suggest the need for further research on the relationship between T2D and gastrointestinal carcinogenesis, which may inform future recommendations for the prevention and monitoring of this patient population.