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OPIS PRZYPADKU
CASE REPORT

Should we exclude hemato-oncological patients from obesity treatment with semaglutide? – A case report

Czy powinniśmy wykluczyć pacjentów hematoonkologicznych z leczenia otyłości semaglutydem? – opis przypadku

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ABSTRACT

Semaglutide, a glucagon-like peptide-1 receptor agonist (GLP-1RA), is now widely used in the treatment of diabetes and obesity. However, there are still insufficient safety data for the use of GLP-1RAs in oncological and hemato--oncological patients, as they have not been included in clinical trials. The potential prooncogenic activity of GLP-1RAs in patients with thyroid cancer has been reported, raising concerns about the safety of semaglutide in oncological and hemato-oncological patients. We present a case of a 57-year-old man, who suffered from class III obesity (BMI: 40.4 kg/m^2), type 2 diabetes, and chronic lymphocytic leukemia (CLL; RAI stage I and Binet A stage). The patient started therapy with semaglutide to manage obesity and diabetes; he had already begun systemic therapy for CLL with obinutuzumab and venetoclax, which was continued after its complete remission. More than 3 years of semaglutide therapy improved the patients' metabolic control of diabetes and resulted in significant weight loss (16% of the initial body mass), with no reported adverse drug reactions and without compromising hematologic stability. Our case report suggests that hemato-oncological patients should not be categorically excluded from treatment with semaglutide, as long as close hematological and clinical monitoring is ensured. However, as this observation is based on a single case report, no definitive general recommendations regarding the safety of semaglutide in hemato-oncological patients can be made at this time.

KEYWORDS

obesity, cancer, case report, type 2 diabetes, oncogenesis, semaglutide

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STRESZCZENIE

Semaglutyd, będący agonistą receptora glukagonopodobnego peptydu 1 (*glucagon-like peptide-1 receptor agonist* – GLP-1RA), znajduje szerokie zastosowanie w terapii cukrzycy oraz leczeniu otyłości. Mimo to wciąż brakuje wystarczających danych dotyczących stosowania GLP-1RAs u pacjentów onkologicznych i hematoonkologicznych, ponieważ nie zostali oni uwzględnieni w badaniach klinicznych. Pojawiające się doniesienia o korelacji stosowania GLP-1RAs i nowotworzenia, szczególnie w przypadku nowotworów tarczycy, zrodziło dalsze obawy co do bezpieczeństwa stosowania semaglutydu u pacjentów onkologicznych i hematoonkologicznych. W pracy przedstawiono przypadek 57-letniego pacjenta, chorującego na otyłość III stopnia (BMI: 40,4 kg/m^2), cukrzycę typu 2 oraz przewlekłą białaczkę limfocytową (*chronic lymphocytic leukemia* – CLL; RAI I, Binet A). W celu leczenie otyłości i cukrzycy pacjent rozpoczął terapię semaglutydem, następnie włączono leczenie systemowe CLL obejmujące obinutuzumab z wenetoklaksem; po uzyskaniu remisji CLL kontynuowano leczenie semaglutydem. Ponad 3-letnia terapia semaglutydem pozwoliła na optymalną kontrolę glikemii i spowodowała istotną utratę masy ciała (16% wyjściowej masy ciała pacjenta), podczas leczenia nie odnotowano żadnych działań niepożądanych ani negatywnego wpływu na parametry hematologiczne oraz uzyskaną remisję. Opisany przypadek sugeruje, że pacjentów hematoonkologicznych nie należy kategorycznie wykluczać z leczenia semaglutydem, pod warunkiem zapewnienia właściwego monitorowania parametrów hematologicznych oraz stanu klinicznego. Ponieważ jednak obserwacja opiera się na pojedynczym opisie przypadku, nie można obecnie sformułować jednoznacznych, ogólnych zaleceń dotyczących bezpieczeństwa stosowania semaglutydu w tej grupie pacjentów.

SŁOWA KLUCZOWE

otyłość, nowotwór, opis przypadku, cukrzyca typu 2, onkogeneza, semaglutyd

INTRODUCTION

Obesity and type 2 diabetes (T2D) are among the most significant factors that promote neoplasia. The primary mechanism contributing to this process is hyperinsulinemia, which compensates for insulin resistance [1,2]. Hyperinsulinemia activates the mitogen-activated protein kinase (MAPK) and the PI3K/Akt signaling pathways, which are involved in the regulation of cell division and differentiation, thereby promoting oncogenesis [1]. Obesity, through the accumulation of adipocytes in the bone marrow, leads to the formation of so-called "fat marrow," which affects hematopoietic functioning and promotes the formation of abnormal blood cells. Harmful adipocytes in the bone marrow promote the secretion of proinflammatory cytokines, such as IL-6, IL-1β, and TNF-α, which may contribute to the development of hematological malignancies [3].

Incretin drugs, such as glucagon-like peptide 1 receptor agonists (GLP-1RAs), are among the modern therapeutic options for both T2D and obesity. They act centrally, reducing appetite and decreasing gastrointestinal motility, in turn resulting in significant weight reduction [4]. However, the use of such therapy in patients with cancer is a controversial issue due to the potential activation of the pathways involved in carcinogenesis [5,6,7]. Nevertheless, there is no conclusive evidence of increased cancer risk among those treated with liraglutide or semaglutide [8]. When the study was published, the authors emphasized the need for closer monitoring of the potential link between GLP-1RAs and thyroid malignancies, as conclusive evidence was lacking [9].

Meanwhile, the body weight reduction and beneficial effects for T2D therapy and cardiovascular complications remains a debatable issue in cancer patients. In the case study, we describe a 57-year-old male patient diagnosed with chronic lymphocytic leukemia (CLL), obesity, and T2D, who benefited from treatment with semaglutide.

METHODS

The patient gave informed consent to review and publish his anonymized medical history, diagnosis, and disease management. The confidentiality and security of personal data have been maintained. Our observations and conclusions are based on medical history, laboratory results, and diagnostic imaging obtained during the 4-year follow-up. Furthermore, a literature review and analysis were carried out and are presented.

CASE REPORT

A 57-year-old patient with obesity and related T2D was diagnosed with asymptomatic RAI stage I, Binet A stage CLL in 2019. At that time, the patient did not meet the criteria for the initiation of systemic therapy for CLL. Additionally, the man suffered from comorbidities, including benign prostatic hyperplasia, arterial hypertension, and mild chronic kidney disease. Initially, the treatment of T2D consisted of metformin, followed by metformin and sitagliptin, with good glycemic control. During the COVID-19 pandemic, the patient gained weight and the control over T2D

deteriorated. As of June 2021, at a body mass index (BMI) of 40.4 kg/m^2 – which indicates class III obesity – therapy was modified, adding subcutaneous semaglutide in increasing dosages, from 0.25 mg to the final dosage of 1 mg per week. Significant improvements in glycemic control and weight reduction were achieved. By September 2021, a decrease in BMI to 35.8 kg/m^2 had already been noted, signifying a change in obesity classification from class III to class II within four months.

In April 2022, due to rapidly increasing lymphocytosis, symptomatic spleen and lymph node enlargement, and thrombocytopenia with neutropenia, the patient was qualified for systemic therapy with obinutuzumab and venetoclax. These medications may mutually exacerbate the risk of infection, severe neutropenia, and tumor lysis syndrome (TLS). The patient was closely supervised, especially during the initial phase of treatment. The assessments included regular hematological examinations (Table I) and monitoring of kidney and liver function and electrolyte levels. The treatment consisted of six administrations of obinutuzumab and 12 cycles of venetoclax. During treatment, the patient's BMI was further reduced to 33.9 kg/m^2 by November 2022, bringing his obesity level down from class II to class I. In March 2023, lab tests showed minor leukopenia and thrombocytopenia, and a follow-up computed tomography scan revealed no lymphadenopathy or splenomegaly. A complete remission was achieved with a partial hematologic recovery (CRh).

Upon completion of CLL therapy, the patient's BMI was 33.9 kg/m^2, which equates to a loss of 20 kilograms, and 16% of the patient's initial body weight. No adverse drug reactions (ADRs) or interactions between the administration of semaglutide and CLL therapy were reported. The patient maintained moderate physical activity both before and during treatment. His diet was not restricted and he reported no use of cigarettes or alcohol.

In August 2023, the patient was hospitalized due to a lower respiratory tract infection followed by acute respiratory failure. Echocardiography and coronary angiography revealed significant coronary artery disease, and a CABG was performed. After the surgical intervention, the patient remained stable. A computed tomography scan carried out in April 2024 confirmed no lymphadenopathy or splenomegaly, maintaining complete remission of CLL. The patient is under close oncological supervision and is currently being evaluated for thrombocytopenia. Chronic conditions are being actively managed, including diabetes, which is treated with metformin and preprandial insulin boluses based on glycemic levels.

Interestingly, the improvement in metabolic parameters occurred independently of hematologic disease progression, suggesting that semaglutide therapy was not only safe, but also effective in managing obesity without interfering with oncological treatment.

Table I. Laboratory data

Parameter	Reference range	April 1, 2022	March 6, 2023	April 5, 2024	March 14, 2025
WBC [×10^3/µl]	4–10	194.17↑	3.85	14.64↑	8.15
RBC [×10^6/µl]	4–5.8	4.99	3.83↓	4.79	4.56
HGB [g/dl]	11.2–15.8	13.3	13.8	15.7	13.2
HCT [%]	35–45	43.1	39.7	46.3↑	42.5
MCV [fL]	82–98	86.4	103.7↑	96.7	93.2
PLT [10^3/µl]	130–400	207.0	86.0↓	20↓	6↓
Neutrophils [×10^3/µl]	1.6–6	9.07↑	1.55↓	8.00↑	2.96
Lymphocytes [×10^3/µl]	1–3.3	–	1.28	3.19	2.25
Monocytes [×10^3/µl]	0.15–0.6	–	0.81↑	2.46↑	2.34↑
Eosinophils [×10^3/µl]	0.2–0.5	0.32	0.00↓	0.13↓	0.53↑
Basophils [×10^3/µl]	0–0.1	0.11↑	0.01↓	0.06↓	0.02↓
Reticulocytes [%]	0.5–2	1.89	1.52	5.25↑	4.13↑
Glucose [mmol/L]	3.9–5.5	9.91↑	5.12	6.74↑	7.00↑

WBC – white blood cell count; RBC – red blood cell count; HGB – hemoglobin; HCT – hematocrit; MCV – mean corpuscular volume; PLT – platelet count

DISCUSSION

Obesity is an important and modifiable risk factor for the development of T2D and cardiovascular diseases such as hypertension and atherosclerosis [10]. Additionally, numerous studies have demonstrated the association between being overweight and the occurrence of malignancies such as cancers of the breast, endometrium, ovary, prostate, colon, gallbladder, esophagus (adenocarcinoma), liver, kidney, and thyroid, as well as some leukemias and non-Hodgkin lymphoma [11,12].

Despite the knowledge of obesity, it is a significant and growing health problem. However, in cancer patients, weight loss is particularly complex, since they may develop cachexia [13]. Intentional weight loss may improve prognosis and reduce cardiovascular risk, but is recommended only for selected cancer patients. In advanced diseases, it may lead to cachexia and reduced treatment response [14].

The literature on weight loss during cancer treatment is inconclusive. The American Society of Clinical Oncology's 2022 guidelines recommend lifestyle changes to maintain healthy weight. Physical activity helps reduce ADRs associated with oncological therapy. Additionally, the importance of dietary changes is emphasized, but evidence regarding specific diets and their impact on treatment is limited [15].

An "obesity paradox" is described in the literature, suggesting that an elevated BMI may promote better treatment outcomes compared to a normal BMI [16]. Possible explanations for this phenomenon are being investigated, including deliberations on the methodology of the relevant studies and the immunological and hormonal mechanisms associated with excess body fat accumulation. In addition, some studies have reported a better response to immunotherapy in obese patients, especially to anti-PDL1/PD-1 palliative therapy [17]. The obesity paradox applies to cases of solid tumors, such as colorectal, prostate, breast, and lung cancers, as well as certain hematologic malignancies. Despite this phenomenon, there is a preponderance of scientific evidence and meta-analyses indicating a correlation between obesity and cancer and stating that excessive body weight harms cancer patients.

Cardiometabolic complications of obesity, necessitating coronary revascularization, also occurred in our patient, despite the complete remission of CLL. This cannot be interpreted as a failure of semaglutide treatment, while cardiovascular benefits can only be estimated from clinical trials in non-cancer patients [18].

Non-pharmacological methods (such as lifestyle or dietary changes or surgical treatment) and pharmacological methods are currently used to treat obesity. Current pharmacotherapy options mostly use naltrexone with bupropion, GLP-1RAs (liraglutide or semaglutide), or recently, the combination of a gastric inhibitory polypeptide (GIP) analog and a GLP-1RA (tirzepatide). Results show the high efficacy of semaglutide therapy, in which a patient can achieve a reduction of up to 7% from the baseline body weight within 68 weeks through treatment at a dosage of 1 mg per week and of 9.6% at a dosage of 2.4 mg [19]. In 2021, it was approved by the US Food and Drug Administration and a year later by the European Medicines Agency for the treatment of obesity. This drug's growing popularity has shed new light on its ADRs and potential involvement in carcinogenesis [1,20]. A correlation between treatment with liraglutide and the incidence of medullary thyroid cancer was highlighted, as liraglutide therapy has been shown in animal models to activate GLP-1 receptors on thyroid C cells and thereby increase the incidence of cancers originating from them [1,2,20]. Having reviewed evidence from the literature on the subject, the European Medicines Agency's (EMA) Pharmacovigilance Risk Assessment Committee (PRAC) concluded on October 27, 2023 that there is no confirmed correlation between GLP-1RAs and thyroid cancer (not only medullary cancer) [21]. Moreover, in 2024, a meta-analysis of randomized controlled trials (RCTs) involving 14,550 patients showed an incidence of thyroid cancer among participants treated with semaglutide of less than 1%, suggesting no significant risk [22]. Similar results were also obtained in another study summarizing RCTs, where actual studies of patients receiving semaglutide in the intervention group showed no increased risk of any cancer [23].

Ashruf et al. [24] and co-authors conducted a retrospective cohort study on patients with T2D who had been prescribed GLP-1RAs, insulin, or metformin. The study showed that the usage of GLP-1RAs was associated with a significant reduction in the risk of hematological malignancies, including leukemia, lymphoma, and myelodysplastic and myeloproliferative syndromes, compared with metformin and insulin.

An ongoing study led by Sørum et al. [25] is investigating the impact of semaglutide on the severity of gastrointestinal mucositis in patients diagnosed with lymphoma undergoing high-dose chemotherapy followed by autologous hematopoietic stem cell transplantation (auto-HSCT). This is expected to be a life-saving strategy for patients, as it reduces the

toxic effects of chemotherapy on the gastrointestinal mucosal barrier.

T2D and CLL are becoming increasingly common diseases in society. We can identify risk factors and mechanisms common to both diseases, for example, the presence of hyperinsulinemia. An analysis of data on drugs for glycemic control, including GLP-1RAs, can provide valuable information on treatment and prevention strategies for hematological malignancies [26].

Although it is still necessary to monitor patient safety during therapy with GLP-1RAs, it is also worth remembering that patients suffering from obesity and hemato-oncological malignancies may benefit from improving metabolic conditions and reducing cardiovascular mortality.

PATIENT PERSPECTIVE

Semaglutide has numerous ADRs, most of which are mild, including dizziness, headache, fatigue, and gastrointestinal issues [9]. The experience of patients suffering from cancer and being treated with semaglutide can vary. Oncological disease and its treatment can worsen patients' well-being, leading to an increase in concerning symptoms. There is also a possibility that the side effects of semaglutide and cancer therapy may overlap and become more noticeable. The patient we described did not report any ADRs during the therapy, and achieved clinically significant weight reduction and CLL remission, as presented in Figures 1, 2 and 3.

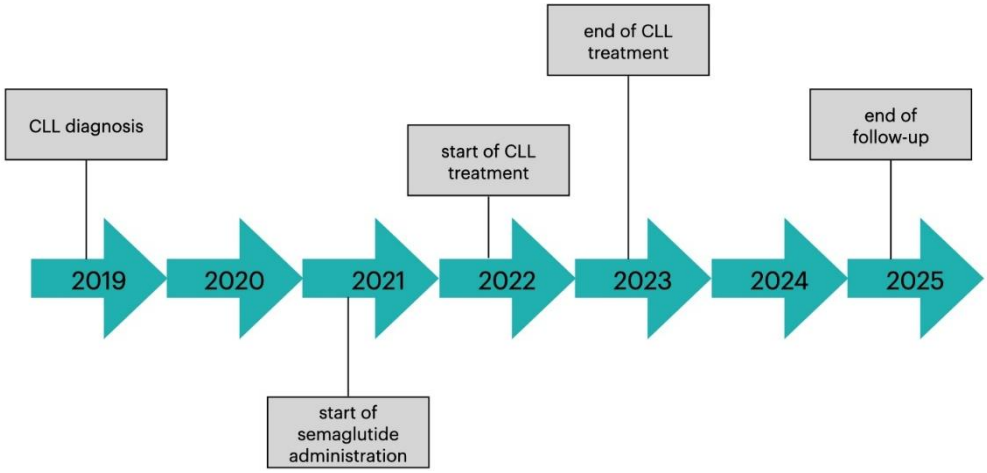

Fig. 1. Treatment timeline. CLL – chronic lymphocytic leukemia.

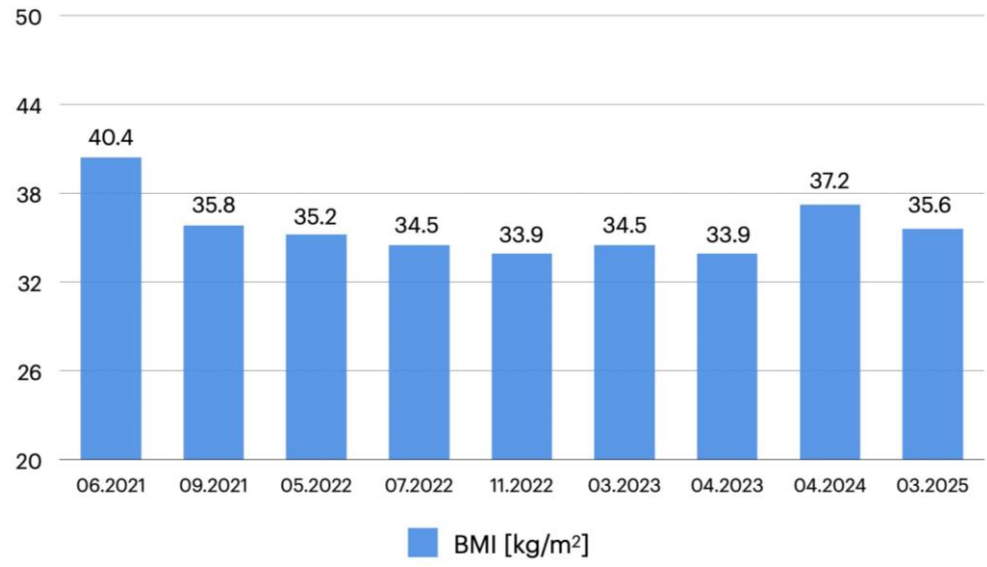

Fig. 2. Patient's body mass index (BMI).

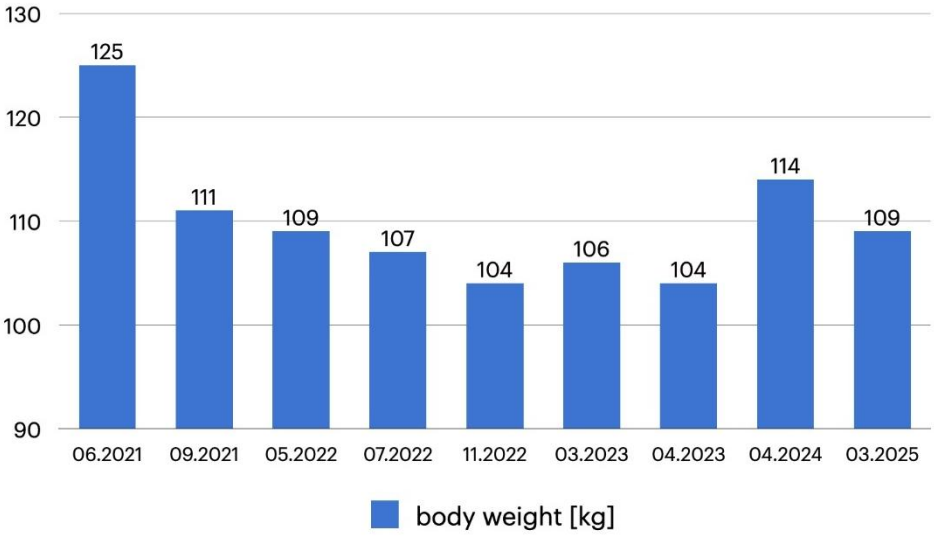

Fig. 3. Patient's body weight.

CONCLUSIONS

In this case report of a patient who suffered from asymptomatic RAI stage I, Binet A CLL with concomitant obesity, semaglutide treatment resulted in significant weight loss without compromising hematologic stability. Throughout the course of CLL treatment, the medication was well tolerated and no ADRs were reported, which suggests its potential safety in this specific group of patients.

These findings suggest that hematological patients should not be categorically excluded from obesity treatment with semaglutide, as long as close hematological and clinical monitoring is ensured. However, as this statement is based on a single case report, no definitive general recommendations regarding the safety of semaglutide in hemato--oncological patients can be made at this time.

In light of the intricacy inherent in the treatment of obesity in individuals with malignancies, as well as the insufficient evidence on the use of semaglutide in such cases, further research is required. As the opportunities for performing clinical trials on oncological and hemato-oncological patients are scarce, there is a need to collect real-life data to evaluate the long-term safety and therapeutic efficacy of GLP-1RAs in these patients in order to establish their safety.

Authors' contribution

Study design – J. Chudek
Data collection – J. Dobrowolska, K. Kozak, A. Morawa, L. Peisert, K. Wdowiak
Manuscript preparation – J. Dobrowolska, K. Kozak, A. Morawa, L. Peisert
Literature research – J. Dobrowolska, K. Kozak, A. Morawa, L. Peisert
Final approval of the version to be published – J. Chudek, K. Wdowiak

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