

Szafrńska Małgorzata, Głowczewska-Siedlecka Emilia, Siedlecki Zygmunt. Insidious enemy - pheochromocytoma. Can diabetes be cured? Journal of Education, Health and Sport. 2022;12(9):519-524. eISSN 2391-8306. DOI <http://dx.doi.org/10.12775/JEHS.2022.12.09.061> <https://apcz.umk.pl/JEHS/article/view/39822> <https://zenodo.org/record/7056882>

The journal has had 40 points in Ministry of Education and Science of Poland parametric evaluation. Annex to the announcement of the Minister of Education and Science of December 21, 2021. No. 32343. Has a Journal's Unique Identifier: 201159. Scientific disciplines assigned: Physical Culture Sciences (Field of Medical sciences and health sciences); Health Sciences (Field of Medical Sciences and Health Sciences). Punkty Ministerialne z 2019 - aktualny rok 40 punktów. Załącznik do komunikatu Ministra Edukacji i Nauki z dnia 21 grudnia 2021 r. Lp. 32343. Posiada Unikatowy Identyfikator Czasopisma: 201159. Przypisane dyscypliny naukowe: Nauki o kulturze fizycznej (Dziedzina nauk medycznych i nauk o zdrowiu); Nauki o zdrowiu (Dziedzina nauk medycznych i nauk o zdrowiu).
© The Authors 2022;
This article is published with open access at Licensee Open Journal Systems of Nicolaus Copernicus University in Toruń, Poland
Open Access. This article is distributed under the terms of the Creative Commons Attribution Noncommercial License which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author (s) and source are credited. This is an open access article licensed under the terms of the Creative Commons Attribution Non commercial license Share alike. (<http://creativecommons.org/licenses/by-nc-sa/4.0/>) which permits unrestricted, non commercial use, distribution and reproduction in any medium, provided the work is properly cited.
The authors declare that there is no conflict of interests regarding the publication of this paper.
Received: 21.08.2022. Revised: 02.09.2022. Accepted: 07.09.2022.

Insidious enemy - pheochromocytoma. Can diabetes be cured? Podstępny wróg - guz chromochłonny. Czy można wyleczyć cukrzycę?

Małgorzata Szafrńska¹, Emilia Głowczewska-Siedlecka¹, and Zygmunt Siedlecki²

¹Department of Geriatric, The Ludwik Rydygier Collegium Medicum in Bydgoszcz, The Nicolaus Copernicus University in Toruń

²Department of Neurosurgery, Neurotraumatology and Pediatric Neurosurgery, The Ludwik Rydygier Collegium Medicum in Bydgoszcz, The Nicolaus Copernicus University in Toruń

Running headline: pheochromocytoma as a cause of diabetes

Corresponding address:

Dr. Małgorzata Szafrńska, Department of Geriatric, The Ludwik Rydygier Collegium Medicum in Bydgoszcz the Ludwik Rydygier Collegium Medicum in Bydgoszcz,

tel.: + 48 608 154 469

e-mail: m.szafranska@cm.umk.pl

ORCID: 0000-0002-2916-9251

Abstract

We present the case of a 54-year-old patient with long-term type 2 diabetes, treated with intensive insulin therapy, who was considered to be ordinary diabetes. In a random imaging examination it turned out to be a pheochromocytoma. The patient underwent surgical treatment. It turned out that after the surgery, the diabetes resolved. It is a casuistic curiosity that the patient was "cured" of the disease after diagnosis and treatment for pheochromocytoma, and on the second day after the surgery. It is also a valuable guide when looking for all possible causes of "secondary" diabetes.

Key words: pheochromocytoma, diabetes

Introduction

Pheochromocytoma is a relatively rare disease of the adrenal glands. The estimated incidence is 2 to 9.1 cases per million adults. It occurs in both men and women, most often in the 4th and 5th decade of life (1). About 10% of all pheochromocytomas are considered to be malignant (2). Due to nonspecific clinical symptoms there is a high risk of not diagnosing pheochromocytoma. There are many reports on the danger of overlooking an existing tumor and disease (4,5). A Mayo Clinic report revealed 54 autopsied people in whom pheochromocytoma could have contributed to the deaths, and in 75% of whom was unsuspected and / or undiagnosed (5). Clinical symptoms depend on the one hand on the concentration of secreted hormones - catecholamines and their metabolites, and on the other hand on the tumor mass effect. Pheochromocytoma most often produces norepinephrine, less often adrenaline (or both substances simultaneously), rarely dopamine. The occurrence of clinical symptoms depends on the type, amount and frequency of secretion of the substance.

The most common symptoms are: headaches, arterial hypertension, especially paroxysmal increases in blood pressure with tachycardia, pallor of the face, excessive sweating, anxiety, muscle tremors or nervousness (7). Factors triggering catecholamine release, occurrence or intensification of clinical symptoms include physical exertion, general anesthesia, stressful situations, childbirth or sometimes a heavy meal (6, 8). And so, pheochromocytoma is not a major problem for clinicians if it is associated with the presence of symptoms related to the cardiovascular system, so asymptomatic cases or those associated with atypical rare clinical symptoms can be problematic. Therefore, we wanted to present a case of a patient with a randomly detected pheochromocytoma, the only clinical symptom of which was diabetes previously considered to be type 2 diabetes.

Case description

A 54-year-old patient was admitted to the endocrinology department as part of an internist's on-call duty due to pneumonia. From chronic diseases, before hospitalization, the patient was treated for diabetes and hypercholesterolaemia. He was taking atorvastatin at a dose of 40 mg / day and human insulin analogues (lispro) in the form of boluses at a meal 10-14 J 3 times a day and a long-acting insulin analog (glargine) at a dose of 18 J at bedtime. Diabetes was diagnosed in the patient - at the age of 42, in a patient without clinical symptoms of hyperglycemia, after laboratory tests and an oral 75-gram glucose loading test (OGTT), with a blood glucose level of 249 mg / dl in the 120th minute of the test. After an initial attempt of several weeks on metformin treatment, treatment with metformin was discontinued due to the occurrence of diarrhea. Sulfonylureas were introduced (Gliclazide at a dose of 60 mg / day), however, in the course of treatment, frequent hypoglycemia occurred, with blood glucose levels falling to 50 mg / dl. Due to financial reasons, the patient decided not to be treated with dipeptidyl peptidase IV (DPP IV) inhibitors, phosins (SLTL-2) or GLP1 analogues. One year after the diagnosis of diabetes mellitus, it was decided to start insulin therapy in the form of multiple injections. The course of diabetes in the patient from the very beginning is quite unstable, with numerous episodes of unexplained hypoglycaemia and hyperglycaemia - usually explained as non-compliance with the prescribed diabetic diet or incorrectly selected insulin dose by the patient.

During hospitalization due to pneumonia, the patient had a routine ultrasound examination of the abdominal cavity, which showed the presence of a tumor in the right adrenal gland. This change was also described in the abdominal CT scan. A 20 x 18 x 8 mm lesion in the right

adrenal gland and a density of 24 Hounsfield's was visualized. After the end of antibiotic therapy due to pneumonia, a complete hormonal diagnosis was performed for the adrenal gland tumor. There were no abnormalities in the secretion of cortisol. In the morning determination of serum cortisol (at 8 o'clock), the level of cortisol was 19 $\mu\text{g} / \text{dl}$ (normal: 3.4-22.5 $\mu\text{g} / \text{dl}$) and in the measurement at 22.00 - 5.0 $\mu\text{g} / \text{dl}$. This study is characterized by high sensitivity of 97% and specificity of 88%, which allowed us to exclude Cushing's syndrome (8).

Additionally, the secretion of free cortisol was determined in the 24-hour urine collection. The obtained results were also within the limits of 145 $\mu\text{g} / \text{day}$ (normal <292.3 $\mu\text{g} / \text{day}$). Due to the absence of electrolyte disturbances, especially hypokalemia, and no history of arterial hypertension, and normal blood pressure values were found during hospitalization (RR 120-135 / 80-85 mmHg), no complete diagnosis of primary aldosterinism was performed, the aldosterone-renin ratio was not determined (RAA) based on the ratio of aldosterone to plasma renin activity (ng / ml / h). Only the level of aldosterone after an overnight sleep was determined. The obtained result was within the norm of 8.54 ng / dL with the norm of <23.6 ng / dL. The levels of testosterone and epiandrosteredione sulfate (DHEAS) were also determined without any abnormalities, and disturbances in the functioning of the thyroid gland were excluded. During the hormonal diagnostics performed, an increased concentration of chromogranin A 7.4 ng / ml (N 1.6 - 5.6 ng / ml) and methoxycatecholamines in the 24-hour urine collection was found to be 6730 (N 0-1000 $\mu\text{g} / 24 \text{ h}$).

After preparing the patient for 2 weeks for surgery by administering doxazosin at a dose of 2 mg / day and metaprolol at a dose of 50 / day under blood pressure control - not exceeding 135/85 mmHg during daily activity and heart rate - below 80 / min the procedure was performed operating. Laparoscopic adrenalectomy was performed. In the patient before surgery, fasting blood glucose levels, despite the use of intensive insulin therapy, ranged from 95-160 mg / dl, measured 120 minutes after meals, 130-230 mg / dl. On the first day after the surgery, the fasting blood glucose level was 85 mg / dl, in the daily profile the values did not exceed 140 mg / dl. The fasting and postprandial blood glucose levels were also within the normal range with the introduction of oral nutrition. From the moment of surgery, the patient did not require insulin or oral antidiabetic drugs. Eight weeks after surgery, the patient underwent an oral glucose loading test with 75 grams. In the 0 minute of the test, the glucose level was 85 mg / dl, and after 120 min - 138 mg / dl.

Summary and Conclusions

Summing up, we met a case of a person with pheochromocytoma, whose only symptom of the disease was diabetes, who for several years was treated and treated as typical type 2 diabetes. in the form of multiple injections. Despite the intensive treatment of diabetes, our patient was unable to achieve normoglycemia and there was a high risk of developing chronic micro- or macroangiopathic diabetic complications. After meeting our patient, we realized that everyone should be treated individually and always think about the "non-textbook" course of diseases. It is a casuistic curiosity that the patient was "cured" of the disease after diagnosis and treatment for pheochromocytoma, and on the second day after the surgery. It is also a valuable guide when looking for all possible causes of "secondary" diabetes.

Competing Interests: The authors declare that they have no conflict of interest.

References

1. Endocrine Regulations, Vol. 53, No. 3, 191–212, 2019doi:10.2478/enr-2019-0020
Pheochromocytoma Frederick-Anthony Farrugia, Anestis Charalampopoulos
2. Extent of surgery for phaeochromocytomas in the genomic era
H M Rossitti, P Söderkvist, O Gimm British Journal of Surgery, Volume 105, Issue 2, January 2018, Pages e84–e98, <https://doi.org/10.1002/bjs.10744>
3. Diagnosis and management of pheochromocytoma – recent advances and current concepts W.M.Manger – Kidney International, Volume 70, Supplement 104, December 2006, Pages S30-S35
4. Mcneil A.R., Blok B.H., Koelmeyer T.D., Burke M.P., Hilton J.M. (2000)
Phaeochromocytomas Discovered During Coronial Autopsies in Sydney, Melbourne and Auckland. Aust N Z J Med 30: 648–652
5. Mayo Clin Proc . 1981 Jun;56(6):354-60. Prevalence of clinically unsuspected pheochromocytoma. Review of a 50-year autopsy series
6. Mannelli M, Ianni L, Cilotti A i wsp. Pheochromocytoma in Italy: a multicentric retrospective study. Eur J Endocrinol 1999; 141: 619–624.
16. Szosland K, Kopff B, Lewiński A. Pheochromocytoma — chromaffin cell tumor. Endokrynol Pol 2006; 57: 54–62.

7. Endokrynologia Polska/Polish Journal of Endocrinology Tom/Volume 60; Numer/Number 3/2009 ISSN 0423–104X Guz chromochłonny w 8-letniej obserwacji akademickiego ośrodka endokrynologicznego we Wrocławiu Pheochromocytoma in 8-year observation at a single endocrinological center in Wrocław Grażyna Bednarek-Tupikowska , i inn
8. Endokrynologia Polska , Vol 67, No 2 (2016) . Adrenal incidentaloma in adults – management recommendations by the Polish Society of Endocrinology, Przypadkowo wykryty guz nadnercza (incydentaloma) u dorosłych – zasady postępowania rekomendowane przez Polskie Towarzystwo Endokrynologiczne Tomasz Bednarczuk, Marek Bolanowski, Krzysztof Sworczak, i in.