



CASE REPORT

Psychotic depression after obesity surgery and recovery with vitamin B12 replacement

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ABSTRACT

While obesity surgery can improve obesity and its complications, it may decrease the absorption of some foods in the stomach. It is known that from the first day after gastric bypass operation, the blood level of B12 start to decrease. However, the change of B12 levels can be measurable after 6 months. B12 deficiency may cause several psychiatric and neurological disorders or aggravate psychiatric symptoms. In this case report, we present a patient who had been in remission before gastric surgery but developed major depression with psychotic features and to describe the course of treatment.

Keywords: Gastric bypass, psychotic depression, vitamin B12 replacement.

INTRODUCTION

Vitamin B12 is essential for the functioning of the central nervous system, and it regulates a person's mood through various mechanisms (1). A lack of vitamin B12 can produce depressive symptoms, cognitive and affective disorders, and neuropsychiatric conditions such as confusion, inclination to violence, fatigue, delirium, and psychosis.

Vitamin B12 plays an important role in the metabolism of homocysteine, which has a neurotoxic effects if exceeds higher than physiological serum levels. Homocysteine is an endogenous compound that can cause NMDA receptor-mediated excitotoxicity, damage neuronal DNA, and induce apoptosis. The nervous system is sensitive to extracellular homocysteine levels (2). As the brain lacks alternative ways to metabolize homocysteine, it folate and vitamin B12 are needed for homocysteine metabolism in the brain. Limited vitamin B12 depot in glial cells are

quickly affected that are quickly affected by a deficiency of the vitamin. It is suggested that through this mechanism, homocysteine plays a role in the pathophysiology of depression. Therefore, a holistic assessment is of great importance in conditions such as depression and anxiety disorders (3).

In this case report we present a patient with psychotic depression, who developed suspiciousness, ideas of death, introversion and unhappiness after obesity surgery related vitamin B12 deficiency and his treatment.

CASE

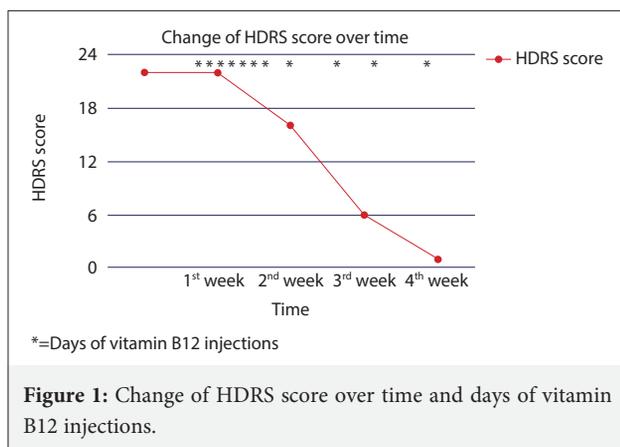
A 38-year-old male patient, university graduate, presented with complaints of not enjoying life, suspiciousness, suicidal ideation, receiving subliminal messages from television and radio, paranoid thoughts, and unhappiness, for the past month. His complaints had first started in 2012 with introversion, insomnia, and a

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belief to be possessed by the devil. In that period, he had used sertraline 100 mg and risperidone 3 mg for 8 months and had gone into complete remission. The patient's symptoms recurred in 2015, and he was hospitalized for one week. For the next two years, he has been in remission. Eleven months after undergoing obesity surgery in 2017, his complaints reemerged with increasing severity; therefore, the patient was admitted to our department. The patient had a history of smoking two packs of cigarettes per day for 20 years, drinking 1-2 glasses of alcohol three times per week, and two instances of using a cannabinoid two years previously. One year previously, he had undergone laparoscopic Roux-en-Y surgery for obesity. The patient, who had weighed 219 kg before the operation, lost 95 kg in the course of one year. He had no known chronic disease. While the patient's functionality was impaired during disease episodes, he had been working in various jobs during remission. Due to obesity, he was exempted from military service. From his relatives, we learned that he had an introverted social disposition, and his sibling had been diagnosed with depression. In the general assessment of appearance and behavior, reduced self-care, reduced quantity and rate of speech, reduced and interrupted sleep, and psychomotor retardation were present. In the mental state examination, the patient was conscious, fully oriented, his spontaneous attention was reduced, memory test and perception tests were normal, his affect was depressed, and he had paranoid, persecutory delusions and ideas of reference. Suicidal ideation was present, but he had no suicidal intent. Illness insight was present. According to DSM-5 criteria, the patient was diagnosed with "major depressive disorder with mood-congruent psychotic features." Depressive symptoms were monitored with the Hamilton Depression Rating Scale (HDRS), the score on admission was 22 points (Figure 1). The patient was started on risperidone 4 mg/day and

sertraline 50 mg. The sertraline dose was gradually increased to 100 mg/day. During the first week of treatment, there was no improvements in the depression score. The patient had thoughts that his roommate had been placed there deliberately to harm him.

A routine blood test showed vitamin B12 deficiency; the vitamin B12 value on admission was 73 pg/mL (normal range is 180-914 pg/mL). One month before the operation, the patient had a vitamin B12 blood level of 222 pg/mL, one month post-operatively the vitamin B12 blood level had been 258 pg/mL (after 1 month of vitamin B12 replacement). We learned that the patient had not attended the controls in the general surgery polyclinic regularly after his obesity surgery and discontinued the vitamin B12, folic acid, and iron preparations after one month of use. In all, he had presented to the general surgery polyclinic twice, seven and nine months after the operation, but did not use the recommended vitamin B12 preparation. Seven months after the operation, his vitamin B12 value was 172 pg/mL, and nine months postoperatively, it was 131 pg/mL. During that period, the patient's psychiatric symptoms began. In the hemogram, the hemoglobin value was 16.0 g/dL, MCV was 89.1 fL, and total protein was 6.2 g/dL; the other blood values were normal. Given the low vitamin B12 level and the history of gastric bypass, a gastroenterology consult was requested. From the 6th day of admission, the patient was given intramuscular vitamin B12 injections 1000 mcg/day for seven days and in the following week twice. After the 6th dose of the vitamin B12 IM treatment, a significant improvement in the HDRS and the clinical observations was seen. In the second week of admission, the HDRS score was 16 points, in the 3rd week six points, and in the 4th week one point. The patient's ideas of reference and persecutory and paranoid delusions gradually decreased and resolved; clinical improvement and HDRS scores were correlated with vitamin B12 blood levels. At the end of four weeks of observation and treatment in our department, the patient had no psychotic symptoms or suicidal intent or ideation, and his affect was euthymic. He was discharged with a treatment of risperidone 4 mg/day and sertraline 100 mg/day. The patient's vitamin B12 value at discharge was 456 pg/mL.

After discharge, the patient attended controls in the outpatient clinic regularly. The antipsychotic drug was gradually phased out over a 3-month period after discharge, while the sertraline dose was increased to 150mg/day. On the recommendation of the gastroenterology department, the patient continued to receive a monthly vitamin B12 IM injection. In the last

mental state examination, the patient's affect was euthymic, his euthymic mood, sleep, and appetite were good, his perception test was normal, he had no thought content disorder, no suicidal ideation or intent. For the last month, his functionality was good, and he started a new job.

DISCUSSION

Patients with a massive weight loss, especially after Roux-en-Y gastric bypass operations, are prone to develop nutritional deficits. The most common nutritional deficits are the lack of vitamins and elements such as vitamin B12, folate, vitamin C, thiamine, calcium, vitamin D, vitamin K, iron, zinc, and selenium (4). In our patient, we found no deficits in parameters other than vitamin B12. The absorption of vitamin B12 is a complex process. During the digestion of food, the cobalamin is released and forms a complex with gastric R-protein, which is digested in the duodenum. The released cobalamin binds to intrinsic factor, which is secreted by the parietal cells in the stomach. Given that a large section of the stomach remains inactive after gastric bypass operation, administering vitamin B12 by injection postoperatively is recommended (5). Our patient declared that he had taken vitamin support during the first month after the operation, but then discontinued the use. In a meta-analysis of 136 studies with a total of 22,094 subjects, Buchwald et al. (6) showed that after bariatric surgery, morbidly obese patients achieved a significant weight loss. Diseases like diabetes, hyperlipidemia, hypertension, and obstructive sleep apnea resolved completely or in part. However, after bariatric operations there were also surgical, internal medical, and neuropsychiatric complications. Some studies emphasize the role of vitamin B12 deficiency in psychosis and depression, showing that vitamin B12 replacement can contribute to recovery (7). In 2011, Milanlioglu (8) presented the case of a 33-year-old woman with symptoms of fear of being harmed, unhappiness, insomnia, and lack of appetite, which did not respond to 8 weeks of sertraline and risperidone use, but completely resolved within one month of vitamin B12 replacement only. Different to Milanlioglu's (8) case, we did not wait during the lack of response to treatment but started vitamin B12 replacement six days after the start of sertraline and risperidone treatment. Our patient's depressive symptoms receded quickly with vitamin B12 replacement. As the symptoms resolved quickly in a short period of time, the effect of the administered medications, even if it might have begun to

show slightly, had not yet reached a level that would account for the fast clinical resolution; therefore, it is more plausible to assume a contribution of the vitamin B12 replacement to the achieved remission. In the case presented by Milanlioglu, the patient's vitamin B12 level before the treatment was 82 pg/mL, and until the vitamin B12 level reached the normal range (200-900 pg/mL), vitamin B12 injections were applied over 10 days, as was done in our case. Although our patient had a family history and a previous diagnosis of psychotic depression, he had been in remission for the last two years. A control in the psychiatry outpatient before undergoing obesity surgery also confirmed his remission. In the light of the literature, the fact that the depletion of vitamin B12 depots and reduction of vitamin B12 blood levels coincided with his psychotic depression symptoms points out the role of vitamin B12 in the process. The low level of vitamin B12 found in our patient nine months after the obesity surgery corresponded in time with the onset of the symptoms, which began to recede in the first week of vitamin B12 replacement and completely resolved in the 4th week.

After a gastric bypass operation carried out by Jiang et al. (9), the 39-year-old male patient lost more weight than recommended and vomited; 52 days after the stomach operation, psychotic symptoms developed, suggesting Wernicke encephalopathy. The psychotic symptoms were treated by adjusting the patient's food intake and supplementing thiamin.

The frequency of obesity surgery today is increasing. A variety of complications related to this intervention are known. In our case, we observed vitamin B12 deficiency occurring after obesity surgery with a clinical picture of psychotic depression resolving quickly through adequate vitamin B12 replacement.

Prior to obesity surgery, all patients need a psychiatric evaluation. Particularly in patients with a psychiatric history as in our case, complications like vitamin deficiencies and potential psychiatric effects should not go unnoticed. As our patient had been diagnosed with psychotic depression earlier and also had a family history, the psychiatric assessment before obesity surgery was of great importance. With the vitamin B12 deficiency developing after obesity surgery, our patient experienced a period similar to that of his past psychotic depression episodes.

With this case presentation, we wanted to emphasize the possible psychiatric complications after obesity surgery and point out the place of vitamin B12 deficiency in the etiology of psychotic depression and the complications of obesity surgery.

| Contribution Categories | | Author Initials |
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| Category 1 | Concept/Design | M.B.S. |
| | Literature review | K.S., Y.G. |
| | Data analysis/Interpretation | R.K.C. |
| | Case follow-up (if applicable) | K.S., Y.G. |
| Category 2 | Drafting manuscript | Y.G., K.S. |
| | Critical revision of manuscript | Y.G., K.S. |
| Category 3 | Final approval and accountability | K.S., Y.G., M.B.S., R.K.C. |
| Other | Technical or material support | K.S. |
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