

Diabetic and depressed

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Tearful and depressed, Mr. N plans to shoot his daughter's abusive husband and himself. He has poorly controlled diabetes and other comorbidities. What is exacerbating his mood symptoms?

CASE Worsening depression

Mr. N, age 64, is a disabled factory worker with a complicated medical history. He has poorly controlled type II diabetes mellitus; obesity (body mass index 40 kg/m²); complicated cryptogenic cirrhosis with prior esophageal varices, portal gastropathy, splenomegaly, and no encephalopathy; surgically treated colon adenocarcinoma; and bilateral thalamic and right occipital infarcts with residual left homonymous hemianopsia and vertical gaze paresis. Mr. N sustained a perioperative stroke 18 months ago while undergoing a colectomy procedure for colon adenocarcinoma; an MRI done at that time showed the bilateral thalamic and right occipital infarcts. While in the internal medicine consultation clinic, Mr. N expresses suicidal and homicidal thoughts, which prompted the internal medicine team to refer him to the emergency department (ED). The team deems Mr. N's medical problems stable except for diabetic dyscontrol.

In the ED, Mr. N says he feels sad, worthless, and "tired" of his complex family issues and multiple medical conditions. He says he's had these feelings for at least a year, but his depression has worsened in the last few days. Mr. N is tearful while explaining his discouragement with following a diet for diabetes; earlier that day he ate an entire chocolate cake. He says all 3 of his children have ongoing substance abuse and relationship problems, but he is

particularly focused on his youngest daughter, who is involved with a man who is addicted to drugs and physically abuses her and her children. Mr. N describes a detailed plan to shoot him and then commit suicide. This disclosure prompts the ED physician to admit Mr. N to ensure his safety and stabilize his mood.

Mr. N's temperature is 36.4°C (97.5°F), blood pressure is 123/60 mm Hg, pulse is 81 beats per minute, respiratory rate is 24 breaths per minute, and oxygen saturation is 96% on ambient air. His physical exam is notable only for dysphoria and mild gynecomastia. He shows no evidence of acute cardiopulmonary, gastrointestinal, or other neurologic changes. His serum glucose is 650 mg/dL, and his recent hemoglobin A_{1c} (HbA_{1c}) is 10.9%. His other laboratory tests include a hemoglobin of 11.7 g/dL; white cell count, 3500/mm³; platelet count, 41,000/mm³; sodium, 129 mEq/L; potassium, 5.0 mEq/L; alkaline phosphatase, 90 U/L; aspartate aminotransferase, 23 U/L; alanine aminotransferase, 21 U/L; total bilirubin, 1.8 mg/dL; creatinine, 1.2 mg/dL; prothrombin time, 10.4 sec; and arterial ammonia, <50 µg/dL. Arterial blood gases are normal.

A year ago, his primary care physician prescribed fluoxetine, 20 mg/d, for fatigue and chronic back pain and neuropathic pain re-

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Clinical Point

Premorbid neuroticism and a history of mental illness are predictors of post-stroke depression

Table 1

When to consider medical causes of depressive symptoms

Late onset of initial depressive presentation
Known underlying medical condition, such as cancer, diabetes, or stroke
Atypical symptoms and signs of depression, such as hypersomnia, hyperphagia, or agitation
Absence of personal or family history of psychiatric illnesses
Illicit substance use
Medication use (eg, opioids, reserpine, methyl dopa, chemotherapy agents, steroids, and oral contraceptives)
Treatment resistance or unusual response to treatment
Sudden onset of mental symptoms (eg, sudden episode of uncontrollable crying)
Source: References 1,2

lated to diabetes. We continue Mr. N's outpatient prescription of fluoxetine, 20 mg/d, and low-dose acetaminophen as needed for pain. Furosemide, 40 mg/d, spironolactone, 100 mg/d, and propranolol sustained release, 60 mg/d, are maintained for complications of cirrhosis. Insulin aspart, 22 units with breakfast, 24 units with lunch, and 24 units with supper, also are administered routinely.

We consult with the internal medicine, ophthalmology, neurology, endocrinology, and diabetes services to assist in evaluating and managing Mr. N's multiple medical conditions.

Which condition would you consider as part of the differential diagnosis?

- depression due to a general medical condition
- adjustment disorder with disturbance of conduct
- major depressive disorder, single episode
- post-stroke depression
- severe decompensation of an underlying personality disorder

The authors' observations

Depression and other forms of psychopathology may be underrecognized in geri-

atric patients because older adults may not report psychiatric symptoms that are secondary to physical conditions. Cognitive impairment in some older adults also may lead to underreporting of symptoms. Mr. N denies a history of depression, which we confirmed with his wife, daughter, and primary care physician. The late onset of his initial presentation prompted close investigation for a potential medical etiology (*Table 1*).^{1,2}

We considered post-stroke depression because shortly after Mr. N's stroke, his neurologist described emotional lability and frustration related to his poor vision. Depression occurs in one-third of chronic stroke survivors and is prevalent among patients referred for neurologic rehabilitation.¹ Premorbid neuroticism³ and a history of mental illness are predictors of post-stroke depression. Stroke laterality is not related to risk of post-stroke depressive symptoms,³ but women have a higher risk of developing post-stroke depression.³

Diabetes and depression

Up to 30% of patients with type 2 diabetes mellitus report a lifetime history of major depression.² Depression increases the risk of hyperglycemia and accompanying long-term metabolic complications.^{4,5} Few studies have explored the effects of poor glycemic control on depressive symptoms among diabetic patients.⁶⁻⁹ A literature review revealed no large-scale study investigating worsened depressive symptoms in patients with poor glycemic control.^{10,11}

The cross-sectional difference between a single episode of major depression and adjustment disorder can be subtle. DSM-IV-TR describes the latter as a maladaptive reaction to an identifiable psychosocial stressor, or stressors, that occurs within 3 months of onset of that stressor (*Table 2*).¹² Because we did not deem Mr. N's depressive symptoms, which were evident only when he was hyperglycemic, to be grossly

disproportionate to his stressors, we diagnose him with major depression rather than adjustment disorder.

EVALUATION **No psychiatric history**

On admission, Mr. N is overwhelmed, tearful, and dysphoric when describing his situation. He displays no evidence of psychosis, but his judgment and insight are impaired. He shows no change in consciousness or ability to stay awake. Mr. N acknowledges hypersomnolence, anhedonia, anergia, and decreased concentration and continues to express suicidal and homicidal thoughts. He repeatedly denies any personal or family psychiatric history or personal substance abuse, including alcohol and nicotine.

What is the best next step in Mr. N's treatment?

- increase fluoxetine to 40 mg/d
- aggressively treat Mr. N's underlying medical conditions before changing medications
- use behavioral activation only; ask Mr. N to focus on group therapy and educate him about healthy lifestyle
- discontinue fluoxetine and switch to a serotonin-norepinephrine reuptake inhibitor

TREATMENT **Glycemic control**

Mr. N receives 1 L of saline in the ED and is encouraged to drink more water during hospitalization. With appropriate insulin dosing, Mr. N's serum glucose levels improve from 650 to 426 mg/dL by the next morning. On his third hospital day, Mr. N's glucose level is 155 mg/dL in the morning. With tighter glycemic control, his dysphoria improves. He is future-oriented, markedly less dysphoric, and denies homicidal or suicidal ideation. Mr. N is interested in participating in group therapy, and his insight and judgment regarding his homicidal and suicidal thoughts improve. He still doesn't fully understand the importance

Table 2

DSM-IV-TR diagnostic criteria for adjustment disorder

- The development of emotional or behavioral symptoms in response to an identifiable stressor(s) that occurs within 3 months of the onset of the stressor(s)
- These symptoms or behaviors are clinically significant, as evidenced by either of the following:
 - Marked distress in excess of what is expected from exposure to the stressor
 - Significant impairment in social or occupational (academic) functioning
- The stress-related disturbance does not meet criteria for another specific axis I disorder and is not merely an exacerbation of a pre-existing axis I or axis II disorder
- The symptoms do not represent bereavement
- Once the stressor (or its consequences) has terminated, the symptoms do not persist for more than an additional 6 months

Specify whether the condition is acute or chronic, as follows:

- Acute: The disturbance lasts <6 months
- Chronic: The disturbance lasts ≥6 months

Source: Reference 12

of diabetic control, and he struggles with his diet.

On the fourth hospital day, Mr. N's glucose level rises to 325 mg/dL in the early evening. Subsequently, his mood deteriorates; he becomes increasingly withdrawn and somnolent. With appropriate attention to his dietary intake and supplemental insulin, his serum glucose improves to the 100 to 200 mg/dL range overnight, and his mood improves. When the glucose is controlled, he attends group therapy, tends to his hygiene, denies feeling hopeless, and offers several ideas about how to manage his family situation. After his glucose rises, Mr. N becomes isolative, hopeless, and unable to cope with stressors. With considerable education about the importance of glycemic control, Mr. N is hopeful and future-oriented when he is discharged after 9 days of hospitalization. At outpatient

Clinical Point

Depression increases the risk of hyperglycemia and accompanying long-term metabolic complications

Clinical Point

In severe cases of hyperglycemia, mental status changes may include lethargy, twitching, cloudiness, motor or sensory defects, and coma

Related Resources

- Katon W, Russo J, Lin EH, et al. Depression and diabetes: factors associated with major depression at five-year follow-up. *Psychosomatics*. 2009;50(6):570-579.
- Biessels GJ, Luchsinger JA. *Diabetes and the brain*. New York, NY: Humana Press; 2009.

Drug Brand Names

Fluoxetine • Prozac	Methyldopa • Aldomet
Furosemide • Lasix	Propranolol • Inderal
Insulin aspart • NovoLog	Reserpine • Serpasil
Insulin glargine • Lantus	Spiroinolactone • Aldactone

Disclosure

The authors report no financial relationship with any company whose products are mentioned in this article or with manufacturers of competing products.

evaluation, he continues to report euthymia with adequate glycemic control.

The authors' observations

Patients with hyperglycemia may experience symptoms secondary to volume depletion and hyperosmolality. The severity of these symptoms generally is proportional to the extent and duration of the hyperosmolar state. Initially, most patients complain of polyuria and polydipsia, but in more severe cases, mental status changes may evolve and include lethargy, twitching, cloudiness, motor

or sensory defects, seizures, and coma. Some evidence shows that hyperglycemic patients with hyperosmolality are symptomatic only if hypernatremia is present.¹³ Mr. N was hyponatremic, which resolved with aggressive hydration and insulin administration.

Traditionally, depression has been observed to worsen glycemic control in diabetic patients; discussion of increased glucose levels leading to worsened depression rarely has been reported. In a meta-analysis, Lustman et al⁷ revealed that depression is significantly associated with hyperglycemia. A review by Li et al¹⁴ demonstrated that depression is much more common in patients with diabetes compared with general population and 45% of diabetes patients with depression were undiagnosed. Calhoun et al¹⁵ showed that for every 1-unit increase in HbA_{1c} the odds of depressive symptoms increase by 22%. Researchers also found a positive relationship between depression and glycemic control in American Indians.¹⁵

Mr. N's case is further evidence that the relationship between diabetes and depression is bidirectional and diagnosis and treatment of each illness impacts the

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other. Although this case does not confirm causality, it highlights the importance of aggressive approaches to screening and treatment of depression in patients with diabetes, and vice versa.

References

1. Srivastava A, Taly AB, Gupta A, et al. Post-stroke depression: prevalence and relationship with disability in chronic stroke survivors. *Ann Indian Acad Neurol*. 2010;13(2):123-127.
2. Marcus MD, Wing RR, Guare J, et al. Lifetime prevalence of major depression and its effect on treatment outcome in obese type II diabetic patients. *Diabetes Care*. 1992; 15(2):253-255.
3. Storor DL, Byrne GJ. Pre-morbid personality and depression following stroke. *Int Psychogeriatr*. 2006;18(3):457-469.
4. Songar A, Kocabasoglu N, Balcioğlu I, et al. The relationship between diabetics' metabolic control levels and psychiatric symptomatology. *Integrative Psychiatry*. 1993;9:34-40.
5. Von Dras DD, Lichty W. Correlates of depression in diabetic adults. *Behav Health Aging*. 1990;1:79-84.
6. Lustman PJ, Clouse RE. Depression in diabetic patients: the relationship between mood and glycemic control. *J Diabetes Complications*. 2005;19(2):113-122.
7. Lustman PJ, Anderson RJ, Freedland KE, et al. Depression and poor glycemic control: a meta-analytic review of the literature. *Diabetes Care*. 2000;23(7):934-942.
8. Lustman PJ, Griffith LS, Clouse RE. Depression in adults with diabetes: results of a 5-yr follow-up study. *Diabetes Care*. 1988;11:605-612.
9. Van der Does FE, De Neeling JN, Snoek FJ, et al. Symptoms and well-being in relation to glycemic control in type II diabetes. *Diabetes Care*. 1996;19:204-210.
10. Genuth S. A case for blood glucose control. *Adv Intern Med*. 1995;40:573-623.
11. Wrigley M, Mayou R. Psychological factors and admission for poor glycaemic control: a study of psychological and social factors in poorly controlled insulin dependent diabetic patients. *J Psychosom Res*. 1991;35:335-343.
12. Diagnostic and statistical manual of mental disorders, 4th ed, text rev. Washington, DC: American Psychiatric Association; 2000.
13. Magee MF, Bhatt BA. Management of decompensated diabetes. Diabetic ketoacidosis and hyperglycemic hyperosmolar syndrome. *Crit Care Clin*. 2001;17(1):75-106.
14. Li C, Ford ES, Zhao G, et al. Prevalence and correlates of undiagnosed depression among U.S. adults with diabetes: the Behavioral Risk Factor Surveillance System, 2006. *Diabetes Res Clin Pract*. 2009;83(2):268-279.
15. Calhoun D, Beals J, Carter EA, et al. Relationship between glycemic control and depression among American Indians in the Strong Heart Study. *J Diabetes Complications*. 2010;24:217-222.

Clinical Point

One study showed that for every 1-unit increase of HbA_{1c}, the odds of depressive symptoms increase by 22%

Bottom Line

Depression is more common among patients with diabetes than the general population. Higher blood glucose levels may be associated with depressive symptoms in some patients. When addressing depressive symptomatology in patients with medical comorbidities, treat the underlying medical condition first and consider biopsychosocial factors such as family relationships, social support, coping skills, and distress tolerance.