
Diabetes, Dementia, and Depression: Experiences of a Psychogeriatric Program

With the number of diabetic and demented elderly on the rise, as well as the constant large number of elderly with depressive symptoms, an understanding of the relationship between diabetes, dementia and depression is now more important than ever. This article examines the possible causal relationship of these three conditions through the case study presentation of Mrs. J, a patient at the Regional Specialized Geriatric Program of Glenrose Rehabilitation Hospital in Edmonton, Alberta.

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The Regional Specialized Geriatrics Program is an integrated geriatric medicine and psychiatry program based at the Glenrose Rehabilitation Hospital in Edmonton, Alberta. Our 22-bed psychogeriatric unit evaluates and treats patients older than 65 years with a primary psychiatric diagnosis in a multi-disciplinary setting. Between 2002 and 2003,

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approximately 7.5% of our patients treated for a variety of psychiatric disorders had a secondary diagnosis of diabetes mellitus. Between April and December of 2005 however, this figure increased to 32.5%. Two of the most common axis-one¹ conditions treated are dementia and depression and, in 2005, program data revealed that 62.5% of the diabetic sample also had a diagnosis of depression and that 37.5% had dementia (Table 1). Do these increased numbers reflect a growing relationship between diabetes, dementia and depression, or is there another explanation? What would be the underlying mechanism if such a relationship existed? What would it mean for the future of geriatric care if there was such a relationship?

Case Presentation

Mrs. J is a 76-year-old woman who was admitted to our unit with a diagnosis of recurrent major depression as well as cognitive impairment not otherwise specified. Her initial depression started approximately 10 years earlier, after her husband died, and she has had only partial relief of symptoms since then despite antidepressant therapy.

The previous year had been especially difficult, as Mrs. J had endured symptoms including anergia, anhedonia, amotivation, and short-term memory loss. Her Geriatric Depression Scale² score was 11/15 on admission and her Mini-Mental Status Examination³ score was 27/30, losing one point in orientation and two points on recall. Other diagnoses included

Table 1

The “3Ds” — Dementia, Diabetes and Depression in Unit 3C

Time frame	2002/03	2003/04	2004/05	April to Dec 2005
Total separations/discharges	202	194	210	156
Total # patients with Dx of diabetes	27	26	43	48
% of total discharges	13%	13%	20%	31%
Total # patients with Dx of diabetes & depression	18	17	26	30
Total # patients with Dx of diabetes & dementia	7	3	7	18

gastroesophageal reflux disease, chronic obstructive pulmonary disease, and chronic sinusitis. She also smoked about a third of a pack of cigarettes per day for the previous 20 years. Initial medications included fluticasone/salmeterol and ipratropium inhalers, venlafaxine XR 150 mg daily, mirtazapine 30 mg qhs, and temazepam 30 mg qhs. Her initial laboratory values are listed in Table 2.

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Diabetes and Dementia: A True Relationship or “Just Hanging Around Together”?

A large number of studies have been undertaken to study the possible causal relationship between diabetes mellitus and dementia.

The Rotterdam Study⁴ included 6,370 non-demented patients, of which approximately 11% had a diagnosis of diabetes mellitus. Follow-up was for an average of 2.1 years and the major finding

was that diabetes mellitus almost doubled the risk of dementia and Alzheimer’s disease (AD). Diabetics treated with insulin were found to be at the highest risk, more than twice those not treated with insulin.

The Honolulu-Asia Aging Study⁵ found that those with diabetes had a significantly increased risk of total AD and vascular dementia. The study also found that

the risk further increased for all types of dementia in diabetics who also carried the ApoE e4 allele. As well, those with both factors were found to have a higher risk of cerebral amyloid angiopathy, and had higher numbers of hippocampal neuritic plaques and hippocampal and cortical neurofibrillary tangles.

There have also been conflicting results, including the Canadian Study on Health and Aging,⁶ which found no relationship

between diabetes mellitus and the incidence of all dementias (including AD) but found that diabetics had approximately twice the risk of vascular cognitive impairment.

The Kungsholmen Project⁷ found no association between diabetes mellitus and the risk of AD in the absence of ApoE e4 allele or severe systolic hypertension.

What Could be Behind This Relationship?

AD has traditionally been studied and treated as a separate disease from vascular dementia, but multiple authors have noted a considerable overlap between AD pathology and vascular pathology.⁸ Evidence from neuropathologic studies suggests that the presence of vascular and AD lesions leads to more severe dementia than either lesion independently.⁹ Diabetics and hypertensives are at increased risk for atherosclerosis, and this could be one mechanism mediating the association between AD and ApoE, and AD and blood pressure. Direct toxicity through

Table 2

Mrs. J's Profile History

	Admission	Discharge
Cholesterol	7.26 mmol/L	
Triglycerides	6.97 mmol/L	
Weight	75.3 kg	73.0 kg
Waist circumference	40.5 inches	
BMI	31	28.1
Fasting glucose	8.3 mmol/L	5.3 mmol/L
Microalbumin	38 mg/day	31 mg/day
Blood pressure	170/80 mmHg	132/76 mmHg
HbA1C	7.8%	
Additional medications on discharge: metformin and ramipril		

dysregulation in glucose metabolism as well as exposure of diabetics to high levels of insulin due to insulin resistance may be part of the link between diabetes mellitus and dementia (*i.e.*, AD) but it may also be related to common problems in clearing amyloid products.¹⁰

Diabetes and Depression: Could There be Something Between Them?

The scope of the research connecting depression and diabetes is far too large for this article, but some of the major findings are briefly described below.

Amato et al¹¹ found depressive symptoms to be more common in diabetics (13.6%) than non-diabetics (8.7%), independent of age, gender, loneliness, or chronic disorder. Saydah¹² described no increased incidence of dia-

betes for those with high or moderate depressive symptoms, and found that no high-school education and increasing BMI were the greatest co-founders. Palinkas et al¹³ found that depressed mood was more likely to be a risk factor for type 2 diabetes in older

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adults than the reverse, and this was backed up by Lustman,¹⁴ who concluded that the clinical syndrome of depression was not related to advancing diabetes. Smoking and obesity seem to be associated with major and minor depression in diabetics and major depression seems more related to patients with diabetic complications who are younger than

65 years compared to minor depression in those older than 65 years.¹⁵ Anxiety, depression, and negative beliefs about illness influence physical and mental functioning in diabetics, but not necessarily diabetic control.¹⁶ There is also evidence that collaborative care improves affective and functional status in older patients with diabetes and depression.¹⁷ Finally, total health costs for diabetics were found to be 4.5 times higher in patients with depression than in individuals without depression according to a study by Egede et al.¹⁸

Mrs. J: How Did She Do?

During admission to our unit, Mrs. J was helped with smoking cessation and healthy eating was promoted. An exercise program was started and our staff used the PERK¹⁹ program to help her gain an understanding of her diabetes condition.

She brought in her own glucometer and the staff observed her doing her own testing, and she was put on a self-medication program. Blood pressure control was emphasized. Psychiatric treatments including cognitive-behavioral group therapy as well as psycho-education were administered in addition to pharmacotherapy, and individual treatment was available from her nurse

and psychiatrist. By the time she was discharged, Mrs. J felt much better, with improved energy and mood, and was much more motivated to work on her issues. Her short-term memory remained poor but she was much better able to cope. Table 2 shows her discharge lab values and medication changes.

Conclusion

The research into the relationship between diabetes, dementia and depression continues, with many studies suggesting a link

between the conditions, but the relationship today is still far from clear. With the large increases in especially the number of diabetic and demented elderly as well as the constant large number of elderly with depressive features, an understanding of the relationship is now more important than ever.

While there is no clear evidence that the ultimate outcome of diabetes and its complications are altered by dementia and depression treatment, our patients like Mrs. J certainly feel

better and are much more empowered to take on future challenges. Our knowledge of the increased risks of dementia in diabetics can help us seek out high-risk patients like Mrs. J as far as providing ongoing support for them and their families and intervening early as cognition declines.

It is our belief that a comprehensive treatment plan that aggressively treats the diabetes, dementia and depression together is the best approach to helping patients with these conditions.

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