

## Original Research

# A 65-years-old woman with past history of diabetes mellitus experiences sudden acute onset of psychosis

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## Abstract

Positive association between hypoglycemia and psychosis has been reported by many of the researchers and health care professionals. In our study case, we have reported a 65-year-old woman who diabetes mellitus with co morbidities for the past 20 years. For the last 10 days, she had experienced psychosis symptoms which showed abnormal behavior. As per the diagnosis by the physicians, inadequate insulin therapy may lead to hyperglycemic stage and psychosis symptoms. In order to prevent mental illness and as the best treatment for psychosis in diabetes patients, insulin therapy must be administered to the patient at the right time and needs regular follow up. In some of the cases it was also noted that, if the patients were left untreated they developed chronic mental illness with short term dementia.

**Keywords:** Abnormal behavior, Glucose disturbance, Mental health, Metabolic pathway.

## Introduction

Diabetes mellitus is a metabolic disease characterized by high plasma glucose which if not controlled in time results in multiple micro and macro vascular complications. The prevalence of diabetes mellitus is increasing worldwide and affected 382 million people in 2013 and is expected to rise to 592 million by 2035 [1-2]. Long term left untreated it is recognized as the leading cause of end stage renal disease, non traumatic lower limb amputations, blindness, and a major cause of cardiovascular disease and stroke.

Mental illness and diabetes mellitus are closely linked. Type 2 diabetic patients with chronic hyperglycemia show abnormal behavior with aging. Depression and psychotic behavior are very well noticed in type 2

diabetes patients. The risk factor of schizophrenia or bipolar illness in diabetic patients is two to three times more than in the general population [3-7]. Diabetes mellitus and other metabolic risk factors may also change human behavior. However, association between diabetes mellitus and psychosis has not been reported in our studied population. We present the case of a female patient suffering from type 2 diabetes mellitus, who developed recurrent episodes of short lasting psychosis that are associated with metabolic syndrome.

## Case Presentation

A 65-year-old female patient from rural area near Mullana was presented in the Emergency Department of the Hospital, having



**Case study: 60 year women experienced psychosis by Hyperglycemic condition**

TIME POINT FOLLOW UP PERIOD (DAY'S)

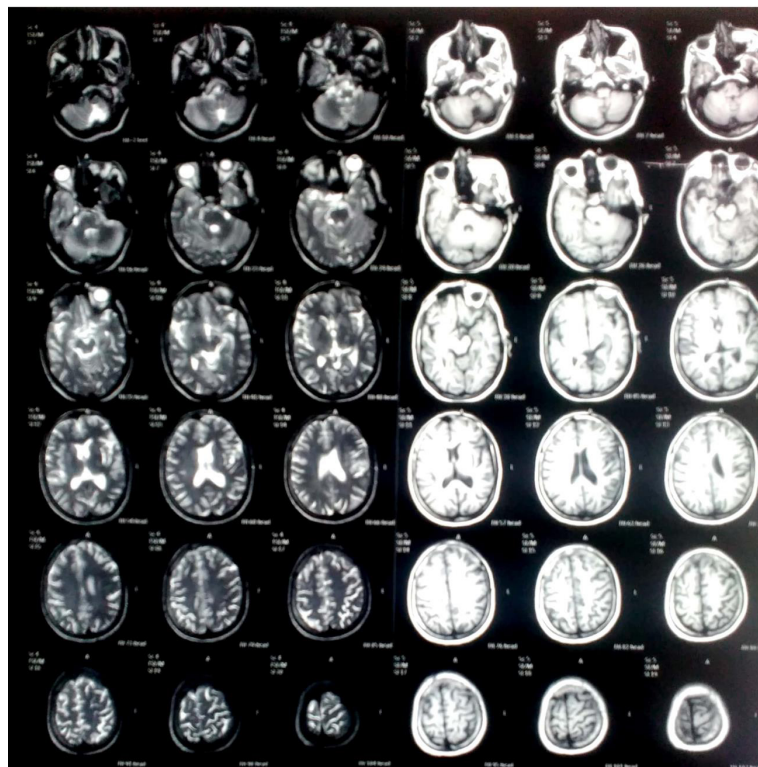
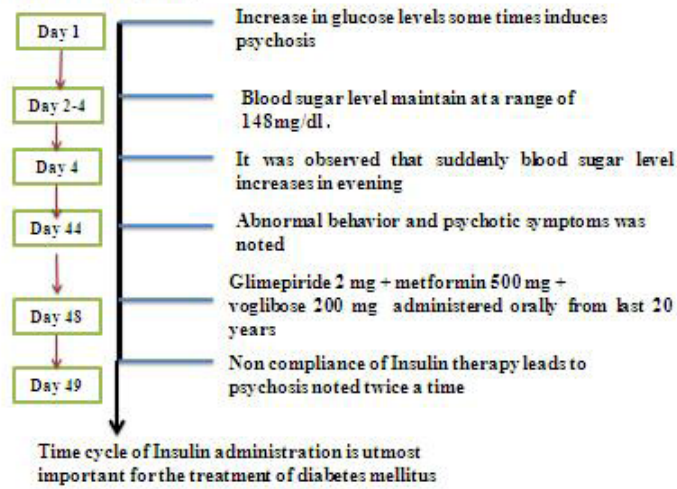


Figure 1: MRI of 65-years-old women showing normal brain

co-morbidities and acute onset psychotic illness for the past 10 days. The patient had a history of type 2 diabetes mellitus from last 20 years and hypertension since 10 years with coronary artery disease and congestive heart failure. She also had grade 4 diabetic nephropathy and with diabetic foot on left leg. Since last 10 days the patient was complaining of shortness of breath and swelling in bilateral lower limbs. From detailed case study – according to New York Heart Association

guidelines, the patient had grade 4 dyspnoea with experience of Orthopnea, Paroxysmal Nocturnal Dyspnoea, and decreased urine output. Detailed exploration of the history revealed that she had experienced one to two similar psychotic episodes in the evening since last 10 days with each episode of being of 2 hrs duration. Over the last two months, she exhibited symptoms like agitation, abusive language, emotional lability, smiling and muttering to herself, irrelevant talking,

poor self-care, decreased sleep, decreased appetite, and angry outbursts. During these episodes, there was no clouding of consciousness, disorientation, or disturbances in cognitive functions. After being admitted in hospital, we observed that psychosis episodes occurred every day at the same time during which, she exhibited symptoms like agitation, abusive language, irrelevant talking and angry outbursts with no other symptoms. At other times, she also experienced negative thoughts and false belief. Apart from psychotic illness, patient had fever, chest pain, palpitation and hypoglycemia four days back. The psychosis symptoms had no correlation with any substance abuse, fever, and infection. There was no family history of mental illness. The patient usually takes vegetarian diet and no wrong habit was observed.

## Result

On day 1, the blood sugar level was maintained (148 mg/dl), the blood pressure level was found to be 160/90 mm Hg, respiratory rate was 34 per minute and the pulse rate was 96/minute. On day 2, blood sugar level was found to be 212 mg/dl. The physician's opinion was taken and insulin was administered as advised. Then, after three hours, blood sugar came down to the normal level. In the evening, nurse again checked the blood glucose level; it was 264 mg/dl. These observations were noted regularly for four days from the date of admission and we observed that, only in evening, the blood sugar level was high and psychosis episodes were also observed at the same time. She also had increased speech outbreak and complaint of threat to her life by the people around her. After every episode, the patient could not remember her activity which she had a few hours back. All other lab results regarding diagnosis including ketoacidosis were within normal range. Magnetic resonance imaging (MRI) revealed no abnormality in the brain. In general, pallor, cyanosis, and clubbing were absent. During physical examination, it was found that the patient had gangrene in left foot with big toe edema with cellulites. During CNS examination, the plantar was flexor and pupils

show mild dilated. Drug management concerned regular use of oral tablet with combination of glimepiride 2 mg + metformin 500 mg + voglibose 200 mg prescribed by the physician and the patient was taking these medicine since last 20 years. Additionally, insulin was also started to normalize blood sugar levels as per requirement. Psychotic symptoms were resolved over the period of one week. No psychotropic drugs were prescribed. After two months following this episode, patient was again presented in OPD with similar psychotic symptoms and this again was due to non-compliance of drug therapy and insulin intake. The patient was made stable by slow administration of injection haloperidol over 5 min along with ascitalopram 10 mg and zolpidem 5 mg at bed time. Regular insulin was on sliding scale every six hourly. It was noted that, psychotic illness has temporal positive association between insulin therapy and rise in blood glucose levels in the normal range of 300 mg/dl. Following this, a final diagnosis was considered as diabetes mellitus induced psychosis and the patient was alerted by the physician about the importance of insulin and anti-diabetic drug.

## Discussion

It is well established that there is a co-relationship between hypoglycemia and psychosis which sometimes leads to depression. Many of the studies trying to establish regarding abnormal behavior in diabetic mellitus patients induces psychosis [8–9]. We observed a very rare case in which hyperglycemia induced psychosis in a chronic patient which likely contributes to the lack of evidence based information on the mechanism of action in positive association manner. It may be possible that due to multiple pathogenesis, the metabolic disturbance may develop abnormal behavior especially in the hyperglycemic stage which is due to production of Advanced Glycation End products via stress radicals including polyol pathway, AGE pathway, thiamine metabolism pathway, hexamine pathway, PKC pathway and oxidative stress pathway [10–12]. Several studies reported about the control of hyperglycemia which is targeted at certain

point in various mechanisms and this may be well defined to understand the exact association theory between psychosis and hyperglycemia.

## Conclusion and limitations

From our case, it is clear to define, how important it is to treat a diabetic patient at the right time otherwise the patient may develop psychosis. There might be a correlation between high blood sugar level and mental illness. In our present study, we noticed that, patients having inadequate control of blood sugar level had problem with symptoms of psychosis. Our case highlights the importance of insulin in diabetes patient with mental illness. Hyperglycemia exacerbates the psychosis symptoms and as suggested by the physicians, the patient was administered insulin and was relieved immediately from psychosis symptoms. This is the first case observed in our OPD which is well established by the follow up of the patients during the treatment. Proper medication and regular follow up may prevent mental illness in diabetes patients. Clinicians could be faced with problems due to some of the cognitive impairment symptoms as these symptoms could also be observed in many other underlying and undetected clinical conditions. As this patient is having multiple complications, we strictly recommended the use of latest a diagnostic tool like genomic study; it can help in the treatment of psychosis in acute diabetic patients. Further, we strictly did a follow-up of this patient for analyzing the exact cause and to observe any change in physical and mental behavior in the presence of drugs. Lastly, we conclude that this study will help further for analyzing different patients who are at risk for the development of psychosis.

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## Statement of ethics

The study was assessed as per guidelines of World Medical Association, Declaration of Helsinki with prior permission from the patient during patient recruitment for the study conducted “Correlation ship between anti-hypertensive therapy and type-2 diabetes mellitus in population of Haryana” and it is approved by the IEC of M. M. (Deemed to be University)

## Conflict of interest

The authors declare no conflict of interest.

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## Author's contribution

Mansi Batra, Suraj Sandil contributes to conception, design, and acquisition of data, analysis and interpretation of data. Harbir kaur main lead for investigation and Rohit Tiwari supports the study. Sumeet Gupta drafts the manuscript and critically approved final manuscript.

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