

# Screening and management of statin cause a case of prediabetes in an outpatient clinic in Afghanistan: a case report in Andkhoy City

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Dyslipidemia is known as an independent risk factor for cardiovascular disease. Recently, interest has been raised on the risk of new onset of diabetes mellitus with statin treatment. We report on a 41-year-old man with dyslipidemia. His blood tests at the time of admission showed that there was a rise in low-density lipoprotein levels (155 mg/dl), low high-density lipoprotein levels (34 mg/dl), normal triglyceride levels (82 mg/dl), normal fasting blood sugar levels (85 mg/dl), and normal glycated hemoglobin (HbA1c) (5.3%). Follow-up for about 2.5 years for statin use revealed that the patient's lipid profile has improved; however, his HbA1c increased from 5.3 to 6.1%. The patient was prescribed Metformin and the statin was replaced with Ezetimibe. Little changes in blood HbA1c levels were observed at 1-year follow-up. Then, dipeptidyl peptidase-4 inhibitors, Sitagliptin, was introduced at 25 mg once per day, and Metformin was discontinued. One year later, the patient's laboratory tests showed: low-density lipoprotein (77 mg/dl), high-density lipoprotein (33 mg/dl), triglycerides (108 mg/dl), and HbA1c (5.5%). This finding revealed that the dipeptidyl peptidase-4 inhibitor, Sitagliptin is more likely to be the successful drug for the treatment of prediabetes with statin therapy.

## Keywords:

Afghanistan, Andkhoy, prediabetes, statins

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## Introduction

Statins are the best known and most widely used cholesterol-lowering drugs around the world [1]. Statins decrease cardiovascular morbidity and mortality in patients with and without ischemic heart disease [2]. Statins are generally well tolerated by most patients; however, some adverse effects are associated with this group of medications [3].

Recently, interest has been raised on the risk of new onset of diabetes mellitus (DM) with statin treatment [4]. In 2012, the US Food and Drug Administration made new safety label changes for cholesterol-lowering statins, the concerning increased risk of glycated hemoglobin (HbA1c) and fasting blood sugar [5]. This unique case report details treatment of prediabetes, which was associated with the statin in an outpatient clinic, Andkhoy, Afghanistan.

## Case history

A 41-year-old man was referred to our outpatient clinic for the management of his dyslipidemia 4.5 years ago. The patient was asymptomatic, nonsmoker, had no chronic diseases, and was not on medications. The patient had no family history of DM; however, he had a family history of hypertension and dyslipidemia.

On the first visit to the outpatient clinic, physical examinations revealed blood pressure 110/75 mmHg, heart rate 72/min, respiratory rate 20/min, and lungs were clear. He was 179 cm tall and weighed about 73 kg, with normal BMI of 23 kg/cm<sup>2</sup>. Blood tests at admission showed raised low-density lipoprotein (LDL) levels (155 mg/dl), low high-density lipoprotein (HDL) levels (34 mg/dl), normal triglyceride (TG) levels (82 mg/dl), normal fasting blood sugar levels (85 mg/dl), and normal HbA1c 5.3%. Electrolyte test, urea and creatinine, and liver function tests were normal.

He was prescribed 10 mg Atorvastatin once per day. Close follow-up for 1 year after initiating the treatment, the lipid profile showed LDL levels (88 mg/dl), HDL levels (36 mg/dl), TG levels (97 mg/dl), and the HbA1c was 5.7%. At the following yearly follow-up, blood investigations showed LDL levels of 83 mg/dl, HDL levels 34 mg/dl, TG levels 63 mg/dl, and an elevated HbA1c level of 5.9%. The 6-monthly reassessment of the patient's

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lipid profile and the HbA1c laboratory reports showed LDL levels of 49 mg/dl, HDL levels of 32 mg/dl, TG levels of 46 mg/dl, and HbA1c levels of 6.1%. The patient was prescribed Metformin 500 mg twice daily and Atorvastatin was replaced with Ezetimibe at 10 mg once per day. Six-monthly follow up of blood tests presented LDL levels of 70 mg/dl, HDL levels of 37 mg/dl, TG levels of 71 mg/dl, and the HbA1c was 5.9%. Blood reports did not show any change in patient's HbA1c. Sitagliptin was introduced at 25 mg once per day and Metformin was discontinued. Blood tests were then repeated 6 months after starting the Sitagliptin. It was observed that patient's HbA1c improved to 5.8%, and the LDL levels were raised to 121 mg/dl, HDL levels to 37 mg/dl, and to TG levels 108 mg/dl. Bile acid sequestrants supplement was added and follow up continued. Evaluation was done 6 months after bile acid sequestrants was added. The patient's laboratory results were as follows: LDL levels, 77 mg/dl; HDL levels, 33 mg/dl; TG levels, 108 mg/dl; and HbA1c, 5.5%. During this time, the patient had normal blood pressure and BMI and received lifestyle and dietary modifications for prediabetes and dyslipidemia. The patient provided informed consent to be described in this case report.

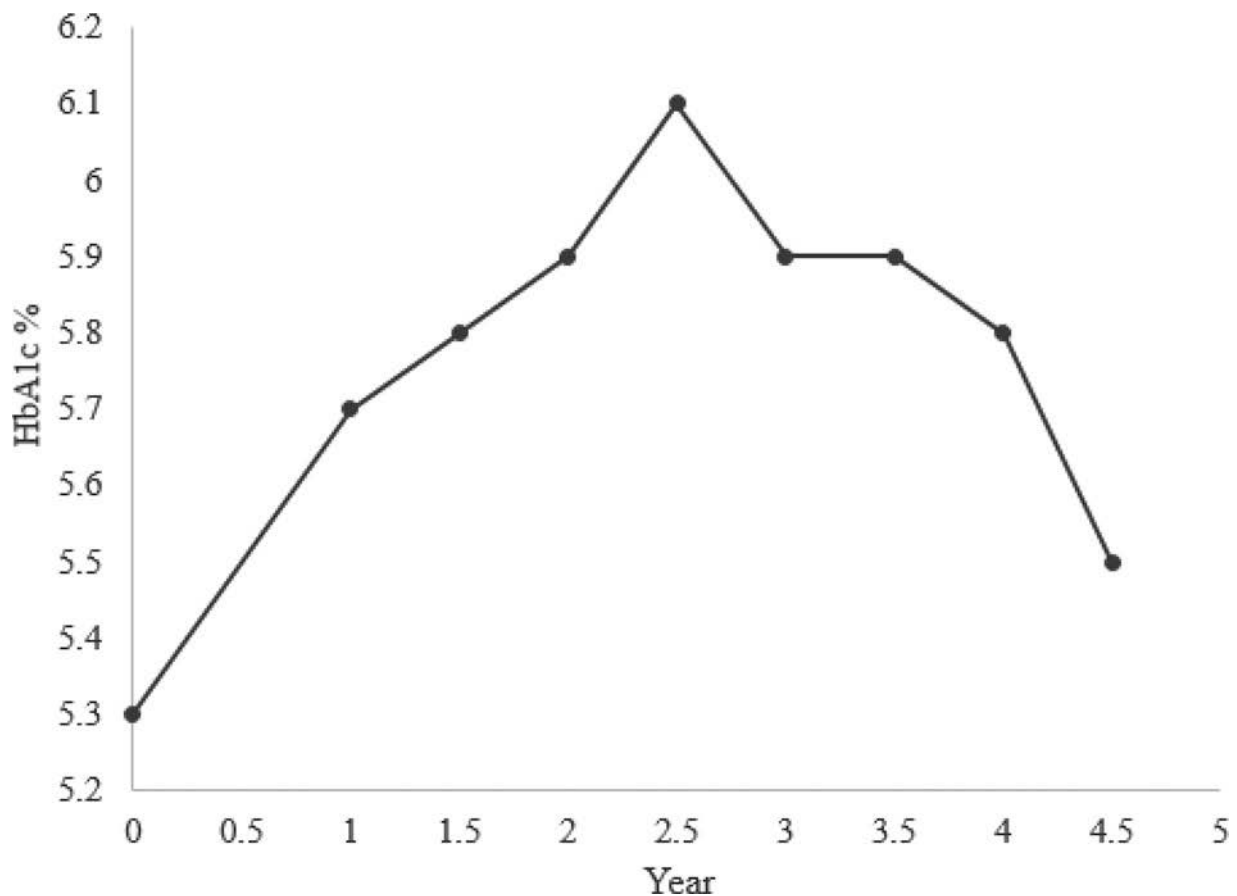
## Discussion

To our knowledge, this is the first case report to investigate the impact of statin therapy on HbA1c in an outpatient clinic in Afghanistan. This report illustrates a patient with prediabetes attributed to statin therapy, who was successfully treated with the dipeptidyl peptidase-4 (DPP-4) inhibitor, Sitagliptin. This case report may play a significant role in informing physicians of the potential benefits of blood screening for HbA1c between statin-treated patients and treatment of a patient with statin-induced DM.

Statins have been reported to increase the levels of HbA1c [6], which is consistent with the findings of this case. Statins therapy may have more diabetogenic effects among people with pre-existing risk factors for DM [7]. The effect of medications on the patient's lipid profile and HbA1c is demonstrated in Figs 1 and 2.

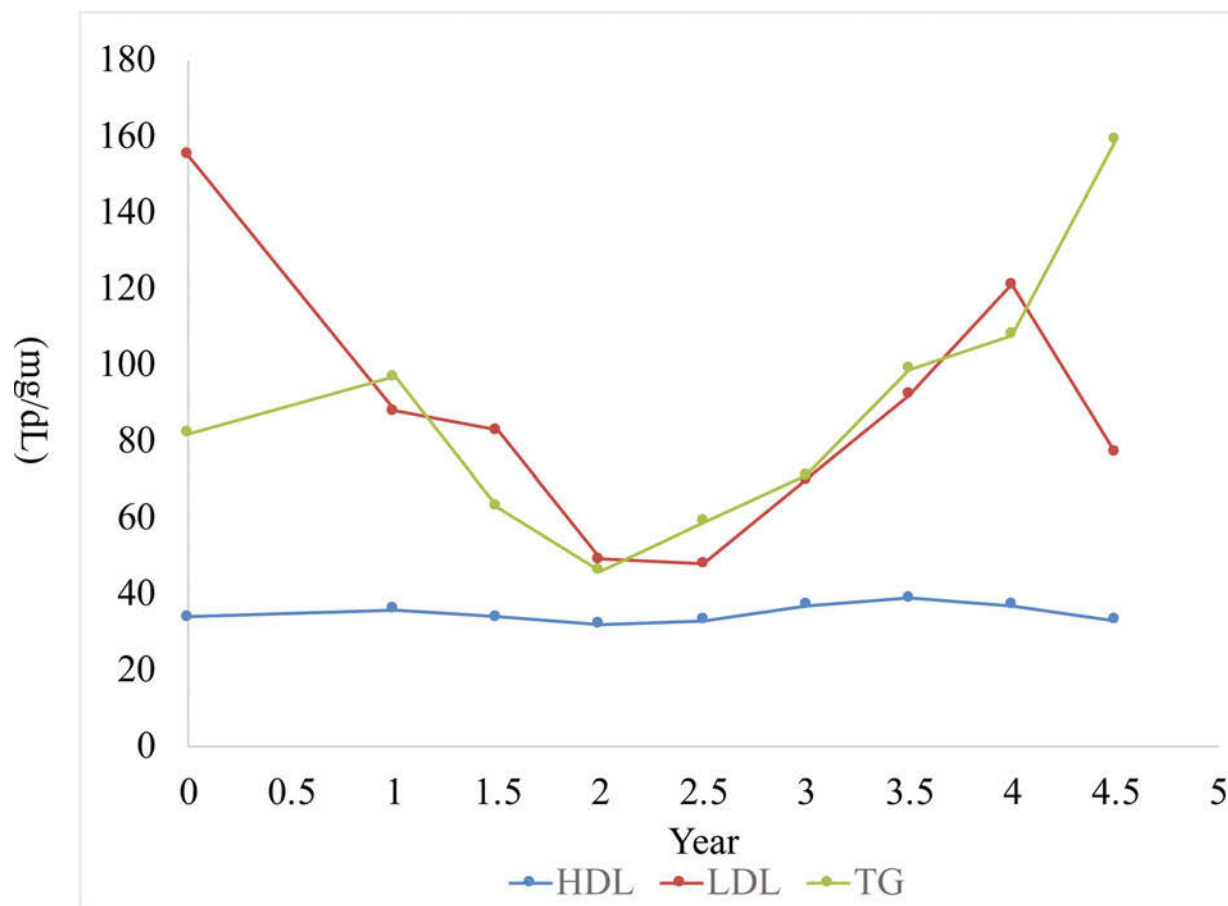
In the reported case, there was little improvement in the patient's HbA1c after 12 months of intensive lifestyle changes and using Metformin 500 mg twice per day. We replaced Metformin with DPP-4

Figure 1



Changes of HbA1c levels at a 4.5-year follow-up in a patient with dyslipidemia. HbA1c, glycated hemoglobin.

Figure 2



Changes of lipid levels in mg/dl over a period of 4.5 years. HDL, high-density lipoprotein; LDL, low-density lipoprotein; TG, triglycerides.

inhibitors, Sitagliptin 25 mg once per day. After adding Sitagliptin, the patient's HbA1c was maintained within the normal range, which is in line with a result from a previous research on the management of a prediabetes case by Sitagliptin [8]. It has been hypothesized that DPP-4 inhibitors may decrease beta cell apoptosis and preserve beta cell function. Consequently, Sitagliptin prevents the progression of prediabetes to DM [9]. In conclusion, this case report demonstrates that a statin-treated patient developed prediabetes; however, he was successfully treated with DPP-4 inhibitors, Sitagliptin. Therefore, we recommend that patients with statin treatment needs to be closely monitored for changes in HbA1c levels, which are a reliable biomarker for the diagnosis and progression of DM.

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Nil.

#### Conflicts of interest

There are no conflicts of interest.

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