THE LATENT POWER OF BITTER MELON ON DIABETES MELLITUS: A CASE STUDY AND LITERATURE REVIEW

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ABSTRACT

Momordica charantia (known as bitter melon) is a tropical and subtropical vine of cucurbitaceae plant group native to Africa. It is being widely used and advertised for its hypoglycemic effects. However, to date, no large clinical trial has been published on the efficacy of any type of such preparation. The main objective of this case report is to increase the awareness of the latent power of this commonly used herb.

Keywords: Momordica charantia, Bitter melon, Diabetes mellitus, Ischemic heart disease.

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INTRODUCTION
Diabetes mellitus (DM) is a growing problem for many nations in the world [1], and the effort to control it is taking a considerable size of the scientific and governmental attention.

Herbal medicine is a well-known practice worldwide, its effect and potency varies from case to case. Bitter melon is a traditional anti-diabetic supplement that is spreading from the Indian sub-continent to the far-east and to the rest of the world [2]. Although, published data is poor for its efficacy, however, patients still use it [3].

In this case study, we report the extreme effect of this herb that needs to be noticed for its potential effect and hazards.

CASE REPORT
A report of a 51 years old gentleman presented to the cardiology clinic complaining of intermittent chest discomfort associated with dizziness and sweating, but relived with rest and sweet intake to rule out ischemic heart disease. He is known to have type two DM diagnosed 17 years ago and peripheral neuropathy.

His blood sugar was reported as uncontrolled 10 months ago due to three events of Emergency Department visits with severe hyperglycemia; his fasting blood sugar at that time was 13.7 and HbA1c 10.3%.

On examination his blood pressure 140/80 mmHg, pulse 79 beat/min regular, respiratory rate 17/min and temperature 37.1°C. Chest, bilateral equal air entry, heart; normal first and second heart sounds and no added sounds. No lower limb edema.

Current medication; he was on oral hypoglycemic tablets (Glebenclamide 5mg po bid, Metformine 500 mg po tid) and insulin (NPH 12 units pm) for 4 years, Vitamin B complex and paracetamol as pain killer. He denied use of over-the-counter medications, tobacco, alcohol, or illicit drugs.

Results of a complete blood cell count, complete metabolic panel, and fasting lipid panel were within normal limits. Renal function and hepatic function were normal.

Fasting blood sugar: 5.1 mmol and HbA1c 7.2%. The normal blood sugar profile was not in keeping with his past history of uncontrolled diabetes, so the patient was asked to discontinue insulin, monitor his fasting blood glucose as he did previously (3–4 times per week), and report any further hypoglycemic events to the clinic.

One week later, he reported to the clinic with 2 readings for fasting blood sugar of 4.2 and 4.4 mmol and one attack of chest pain. At the time, he was asked to stop all his oral hypoglycemic medication in addition to insulin and to continue monitoring his fasting blood glucose as he did previously. Apart from his previously maintained medications, he was not started on any new medication that can affect the blood sugar.

Three weeks later the patient was seen for follow up. He denied any more hypoglycemic events despite reported fasting blood glucose readings of 5.1-5.3 mmol over the past 3–4 weeks.

During medication reconciliation, the patient stated that he had been consuming raw bitter melon tablets every day for the past 2 months, which correlated with the development of the hypoglycemia episodes.

Three months later, the patient denied any hypoglycemic events and reported marked improvement of his peripheral neuropathic pain and the other symptoms.

He was still off any pharmacological preparations as hypoglycemic agents, and was taking bitter melon tablets on daily bases; his fasting blood sugar was 5.5 mmol and HbA1c 6.8 and a follow up complete blood cell count, complete metabolic panel, fasting lipid panel, renal and hepatic function were normal.

DISCUSSION
Bitter melon (Momordica charantia) is a plant that grows in tropical areas, including parts of the Amazon, east Africa and Asia, known to be used as food and medicine [3,4]. The fruit looks like a warty gourd, resembling a small cucumber. The young fruit is emerald green, turning to orange-yellow when ripe [5]. The Latin name Momordica means “to bite,” referring to the jagged edges of the leaves, which appear as if they have been bitten. All parts of the plant, including the fruit, taste very bitter [5].

The plant has a long history of use for diabetes, tumors, to expel intestinal gas [6], to promote menstruation, and as an antiviral for measles, hepatitis [4,6], and feverish conditions. It is also used to induce abortions and as an aphrodisiac [7].

In addition, bitter melon contains an array of biologically active plant chemicals including triterpenes, proteins, and steroids [7]. Momordica charantia has been traditionally use in the dietary management of diabetes. It is to be effective in diabetes through both hypoglycemic and anti-inflammatory effects [9-11]. The hypoglycemic effect is due to insulin like properties of Momordica charantia and promotion of hepatic glycogen synthesis [12-14]. This effect has been illustrated by several previous animal and human studies [15-21].

In this report, the patient had symptomatic hypoglycemic attacks while he was taking Momordica charantia and at the same time, he was on his usual treatment for diabetes. As a result of that he had frequent symptomatic hypoglycemic attacks. This is very important because patients usually do not consider herbs as medicine, and therefore, he was not bothered to admit the use of Momordica charantia to improve his diabetes when he was frequently asked about his medications. In human studies Momordica charantia have been used in diabetics in small none randomized trials and this has supported its use in diabetic patients, as in this patient. Baldwa et al. has studied the effect of Momordica charantia on 14 Type 1 and Type 2 diabetic patients. They reported 21.5% reduction in the fasting blood sugar at 30 min. The optimal effect was at 4 hrs with 49.2% reduction.
in blood sugar. The effect is fairly long lasting as at 12 hrs, 18% of patients were still showing the hypoglycemic effect of the drug [19]. Welihinda et al. in a study of 18 Type 2 diabetics found that 13.973% had moderate improvement in the glucose tolerance test (GTT)[20].

Similarly Leatherdale et al. have demonstrated both immediate improvement in the blood sugar of diabetic patients and late effect 8% at 8-11 weeks in HbA1c after GTT testing[21]. Srivastava had shown that treatment with Momordica charantia when used alone without other hypoglycemia in 7 Type 2 diabetic patients was effective to cause 54% reduction in the mean serum glucose, and a significant reduction in HgA1C, p=0.01 as compared to control[22]. Fuangchan et al. has compared the hypoglycemic effect of Momordica charantia to metformin in 129 newly diagnosed diabetic patients; they showed that it has a moderate blood sugar lowering effect, though less than that produced by metformin[23]. One of the major concerns regarding the use of herbs for treatment of medical conditions is that patients consider them completely harmless. This will result in overlooking of their side effects, which could be fatal some times. For example, our patient had significant recurrent hypoglycemia. In fact, Huline et al. and Raman et al. reported cases of severe hypoglycemia with coma and convulsions as complication of the use of Momordica charantia for diabetes[24,25]. Others reported other side effects of Momordica charantia, such as hemolysis in patients with glucose-6 phosphate dehydrogenase deficiency and gastrointestinal side effect like abdominal pain and diarrhea[6,25,26]. Chest pain as in our patient was not commonly reported as a side effect, but in the report of Dans et al. of 40 patients treated with Momordica charantia for diabetes, one patient had chest pain[26]. One more important consideration with the use of Momordica charantia or other herbal medicine is there interaction with other medications[27]. Furthermore, they have demonstrated the ability to induce abortions in rats and mice, and its root has been documented as a uterine stimulant in animals[28]. Consequently Momordica charantia has been used as abortive and it is contraindicated in pregnancy[29]. It is also transferred through the breast milk; therefore, not advised in women with breast feeding[30]. In addition, it reduces fertility in both males and females and may not be appealing for those who have not completed their family[30]. Finally, the long-term use of this plant may result in the die-off intestinal flora with resulting opportunistic overgrowth Candida. The presented patient did not report most of the adverse effect to the plant. However, he has not use the bitter melon long enough to report long-term effects.

CONCLUSION

Diabetes mellitus as a common and chronic disease, patients tend to experiment multi-modality of treatment including herbal preparations. And the latent power of herbal medicine can show up individually, alarming physicians to educate patients and observe them closely. This treatment may be efficacious, but can lead to severe adverse effects. Therefore, there is a great need for further a well-designed trial to evaluate the use of this herb in diabetes.

REFERENCES


