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Case Series

Exploring the impact of mud pack therapy on blood glucose levels in type 2 diabetes: a case series

Yogapriya Chidambaram[1], Sabeetha Soundarapandiyan[2], Alkousar T. Mujeebullah[3], Abinaya Suresh[3], Kathiresan Natarajan[3], Maheshkumar Kuppusamy[4]*

[1]Department of Clinical Research, Sri Ramachandra Institute of Higher Education and Research, Chennai, Tamil Nadu, India
[2]Department of Acupuncture, JSS Institute of Naturopathy and Yogic Sciences, Navakkarai, Coimbatore, Tamil Nadu, India
[3]Department of Naturopathy, Government Yoga and Naturopathy Medical College and Hospital, The Tamil Nadu Dr. MGR Medical University, Chennai, Tamil Nadu, India
[4]Department of Physiology, Government Yoga and Naturopathy Medical College and Hospital, The Tamil Nadu Dr. MGR Medical University, Chennai, Tamil Nadu, India

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***Correspondence:**
Dr. Maheshkumar Kuppusamy,
E-mail: doctor.mahesh1985@gmail.com

ABSTRACT

Diabetes mellitus (DM) is characterized by persistent high blood sugar levels, which occur due to disruptions in insulin secretion, function, or both, leading to chronic hyperglycemia. Numerous pharmacological treatments are available to manage and treat diabetic individuals, however complete remission from diabetes has not yet been documented. Mud is a naturally occurring substance that contains varying proportions of organic and inorganic components. This case series aims to bring out the immediate effects of abdominal mud pack on patients with diabetes mellitus and its impact on RBGL. Three cases of type 2 diabetes (T2D) patients were included and underwent a single session of mud pack intervention for 20 minutes. Random blood glucose levels (RBGL) were measured before, and immediately after the intervention. Applying mud pack over the abdomen and eyes has effectively reduced the RBGL in patients with diabetes mellitus. In case one the RBGL has reduced from 189 mg/dl to 165 mg/dl, in case two the RBGL has reduced from 152 mg/dl to 137 mg/dl, in case three the RBGL has reduced from 217 mg/dl to 198 mg/dl after 20 minutes of mud pack over the abdomen and eyes. Mud-pack therapy has been shown a potentially effective and supportive treatment for lowering blood glucose levels in patients with T2D.

Keywords: Complementary and alternative medicine, Mud therapy, Random blood glucose level, Type 2 diabetes

INTRODUCTION

Chronic hyperglycemia resulting from a disturbance in insulin secretion and function is a hallmark of metabolic disease known as diabetes mellitus (DM).[1] According to the International Diabetes Federation, in 2015, approximately 415 million people were suffering from diabetes worldwide, and this number is expected to exceed 640 million by the year 2040.[2] In India, 77 million people were estimated to have diabetes in 2019, and by 2045, that number is projected to reach over 134 million.[3] Microvascular and macrovascular problems are the two main categories of long-term diabetic complications. Neuropathy, nephropathy, and retinopathy are examples of microvascular problems, whereas cardiovascular disease, stroke, and peripheral artery disease (PAD) are examples of macrovascular complications.[4] Numerous pharmacological treatments are available to manage and treat diabetic individuals, however complete remission from diabetes has not yet been documented.[5] Side effects of antidiabetic drugs are lactic acidosis, vitamin B12

deficiency, hypersensitivity reactions, blurred vision, Gastrointestinal (GI) disturbances and intrahepatic cholestasis, hypoglycemia, chronic cholecystitis, allergic reactions, weight gain, and GI disturbances include nausea, vomiting, heartburn, anorexia and diarrhea.[6] Complementary and alternative medicine (CAM) includes a variety of traditional treatments that are increasingly used as primary or secondary treatments for a variety of illnesses.[7]

Mud therapy is one of the conservative treatments for various diseases. Mud is a naturally occurring substance that contains varying proportions of organic and inorganic components.[8] Mud is applied externally to the body in the form of baths and packs, and has an effect on the autonomic nervous system.[9,10] A previous study showed the effects of mud pack to the abdomen and eyes along with lifestyle modification on blood glucose level in T2D patients.[11] Still, there is no scientific evidence to show the immediate effect of mud pack on random blood glucose level (RBGL). This case series aims to bring out the immediate effects of abdominal mud pack on patients with diabetes mellitus and its impact on RBGL.

CASE SERIES

Case 1

A 58-year-old female visited outpatient department (OPD) with the chief complaints of increased frequency of urination during the night along with tiredness for the past 12 days. She has been a known case of T2D for the past 10 years. Under medication, metformin hydrochloride (500 mg) in the morning and night, which is an oral antidiabetic drug under the biguanide class increases insulin sensitivity. On inspection, the patient has no pallor, icterus, clubbing, or cyanosis. On palpitation, no mass or tenderness was found. On auscultation, normal bowel sounds were heard. On percussion, no organomegaly was observed. Her vital data are stable with a pulse rate of 86 bpm, blood pressure of 134/85 mmHg, and respiratory rate of 19 cycles/min. Her weight was 55 kilograms and her body mass index (BMI) was 23.9 kg/m^2.

Case 2

A 52-year-old female who is a homemaker visited OPD with the chief complaints of a burning sensation in both feet for the past 6 months. She has been a known case of DM for the past 3 years. Under medication glimepiride (500 mg) in the morning and night, which is an antidiabetic drug under sulfonylurea class increases insulin secretion. On inspection, the patient has no pallor, icterus, clubbing, or cyanosis. On palpitation, no mass or tenderness was found. On auscultation, normal bowel sounds were heard. On percussion, no organomegaly was observed. Her vital data are stable with a pulse rate of 78 bpm, blood pressure of 128/76 mmHg, and respiratory rate of 20 cycles/min. Her weight was 65 kilograms and her BMI was 27.4 kg/m^2.

Case 3

A 50-year-old man who is an electrician visited OPD with the chief complaints of a sudden loss of body weight with a burning sensation in both feet for the past 6 months. He has been a known case of DM for the past 20 years. Under medication glycomet (gp1), a combination of both metformin and glimepiride used to increase insulin sensitivity and secretion, metformin hydrochloride (500 mg) in morning and night, which is an oral antidiabetic drug under biguanide class to increase insulin sensitivity.

On inspection, the patient has no pallor, icterus, clubbing, or cyanosis. On palpitation, no mass or tenderness was found. On auscultation, normal bowel sounds were heard. On percussion, no organomegaly was observed. Her vital data are stable with a pulse rate of 82 bpm, blood pressure of 125/70 mmHg, and respiratory rate of 17 cycles/min. Her weight was 51 kilograms and her BMI was 21.6 kg/m^2.

Intervention details

All three individuals provided both written and verbal consent to undergo treatment. The patients received a single session of mud pack therapy, which involved applying mud packs to their abdomen and eyes while lying down for a duration of 20 minutes. The procedure for the mud pack therapy was as follows. Locally accessible soil is excavated from a depth of 6 feet below ground level and must be completely devoid of impurities, compounds, or pebbles. The collected soil is then finely sifted and exposed to sunlight for 24 hours. An adequate amount of water is incorporated into the soil to create a paste-like consistency.

This pasty mixture is then placed inside a muslin cloth and applied to the abdominal region. It's essential to ensure that the mud does not slip off the body's surface and that no movement is allowed after application. The cloth size for the mud pack on the abdomen was approximately 22×15×1 cm, and the cloth size for the mud pack on the eyes was approximately 9×6×0.5 inches. There were no reported adverse events during or after the treatment.

Outcome measure

RBGL was measured using the APG01 blood glucose monitoring system before and immediately after the intervention.

Results

The application of mud pack over the abdomen and eyes has effectively reduced the RBGL in patients with diabetes mellitus. In case one the RBGL has reduced from 189 mg/dl to 165 mg/dl, in case two the RBGL has reduced from 152 mg/dl to 137 mg/dl, in case three the RBGL has reduced from 217 mg/dl to 198 mg/dl after 20 minutes of mud pack over the abdomen and eyes.

DISCUSSION

To the best of our knowledge, this is the first record of the immediate effect of mud pack on random blood glucose levels in patients with T2D. The findings from this series of cases indicate that mud packs have a positive effect in decreasing RBGL in individuals with T2D. A previous study with a 10-day application of abdominal mud pack in patients with T2D has been shown to effectively reduce fasting blood glucose levels (FBGL), postprandial blood sugar levels (PPBS), and HbA1c.[11] These findings align with our results and indicate that mud pack therapy has favorable effects in lowering RBGL. The application of cold reduces the temperature of the skin and causes the peripheral blood vessels to constrict through signals from the hypothalamus. This, in turn, leads to the dilation of deeper blood vessels. As a result of this action, there is an increase in blood flow to the tissues, accompanied by an enhanced metabolism and utilization of glucose.[12] The application of cold stimulates a temperature-sensitive ion channel known as the transient receptor potential melastatin-like 8-ion channel (TRPM8). This TRPM8 ion channel has a significant impact on the process of "browning" white adipose tissue, which could potentially increase energy expenditure. Brown adipose tissue is primarily responsible for non-shivering thermogenesis. It is believed that the application of cold can reduce blood sugar levels by enhancing energy utilization and non-shivering thermogenesis through the activation of the TRPM8 ion channel.[13] Exposure to cold temperatures may have influenced the activation of superficial cold receptors, potentially leading to an increase in parasympathetic activity. This, in turn, can result in an elevation of central pressure, which activates the baroreflex mechanism. The baroreflex is responsible for reducing sympathetic nerve activity while shifting the autonomic control of heart rate towards parasympathetic dominance.[11] The para-sympathetic nervous system plays a significant role in the pancreas by stimulating insulin secretion and reducing blood glucose levels by inhibiting the gluconeogenic pathway in the liver.[14,15] The application of cold was effective in enhancing insulin sensitivity by promoting the translocation of glucose transporter 4 (GLUT-4). GLUT-4 is the membrane channel responsible for facilitating the entry of glucose into muscle cells or adipocytes.[16]

One notable strength of this study is that this is the first-ever documentation of the immediate impact of mud pack therapy on RBGL in patients with T2D. Furthermore, the study observed remarkable changes in RBGL following the intervention. A limitation of this study is the absence of continuous monitoring of blood glucose levels throughout the duration of the study, along with a relatively small sample size.

Future directions of the studies could be conducted with a larger sample size, incorporating a control group, and implementing continuous monitoring of blood glucose levels throughout the study period.

CONCLUSION

Mud-pack therapy has been shown a potentially effective and supportive treatment for lowering blood glucose levels in patients with T2D.

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