Case study - An Integrated Approach in the management of diabetes related retinopathy & neuropathy, haemorrhagic ovarian cysts with menorrhagia, osteoarthritis related knee pain, and obesity

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ABSTRACT

The present case study refers to a 40-year old woman with a BMI of 31.6 kg/m^2. She was a pre-diabetic with fluctuating blood sugar levels, that resulted in diabetes related retinopathy and neuropathy. She suffered from haemorrhagic ovarian cysts with heavy menstrual cycles. Other comorbidities included osteoarthritis, knee pain, acidity and constipation, coupled with low immunity and stress. After taking her case history, an 'Integrated Approach' consisting of nutritionally adequate diet, Ayurvedic herbs, dietary supplements and regular physical exercise was prescribed to her. After 36 weeks of treatment, the subject lost 22 kg of body weight and her BMI came down to the normal range (22.7 kg/m^2). Simultaneously, she experienced improvement in pre-diabetic symptoms, her menorrhagia was brought under control, with reduction in knee pain and improved immunity, and total relief from acidity.

Keywords: Pre-diabetes, Nutrition, Ayurveda, Integrated Approach, Acidity

INTRODUCTION

According to the World Health Organization (WHO), the number of diabetic subjects in India was estimated to be around 31.7 million in the year 2000 [1]. Diabetes is associated with a broad spectrum of complications, such as diabetic neuropathy and diabetic retinopathy.

Diabetic neuropathy (DN) is a type of nerve damage that can happen due to diabetes, most commonly affecting the legs and feet. The symptoms of DN usually include loss of sensation in feet, burning or shooting pain in lower legs and foot complications such as infections and sores. 20-30% of DN patients suffer from neuropathic pain [2]. Moreover, several literature reports have shown a link between pre-diabetes to the risk of DN [3].

Diabetic retinopathy (DR) is another common diabetes related complication, that results in visual loss [4]. It has been observed that individuals with DR are 25 times more likely to become blind than

non-diabetics. According to two studies from South India, the prevalence of DR in type 2 diabetes patients was found to be 22.4% in the Andhra Pradesh Eye Disease Study (APEDS) [5], whereas in the Chennai Urban Rural Epidemiology Study (CURES), the prevalence was estimated to be 17.6% [6].In the study conducted by the Diabetes Prevention Program Research Group, about 8% of participants with pre-diabetes were found to have evidence of diabetic retinopathy [7].

Research suggests that by eating low glycemic index food and having control on the glycemic load, one can arrest the development and progression of DR, leading to decreased visual loss [8].

Osteoarthritis related pain results in a functional decline and a decreased quality of life. Although non-steroidal anti-inflammatory drugs (NSAIDs) and oral topical agents are available to treat osteoarthritis pain; however, non-pharmacologic options like weight loss and physical therapy should be considered as the first line of therapy [9].

Lifestyle modifications including appropriate dietary measures, ayurvedic support, vitamins and minerals, and exercise should be used as first line of treatment for subjects with acidity, constipation, type 2 diabetes and obesity [10].

CASE REPORT

The patient, a 40-year-old working professional presented at the centre in September 2014 for assessment and treatment of diabetes related retinopathy and neuropathy (since 2010). The patient reported having pre-diabetic blood sugar level fluctuations since 2012. She experienced tingling sensation in her legs due to diabetic neuropathy. For diabetic retinopathy, she was taking a herbal eye formula since 2013 and for diabetes neuropathy, she was taking a combination of B complex vitamins since the last 4-5 years.

Comorbidities included obesity and knee pain associated with osteoarthritis (since March 2013) and acidity (since August 2014). She would experience severe knee pain even in resting position and was taking celecoxib as a pain killer. She also complained about water retention leading to swelling in the hands. She had a history of liver abscess, for which she finished taking medicine in August 2014.

She had undergone ovarian cyst operation in 2011 and suffered from menorrhagia (heavy menstrual bleeding) since the last 6 years. She had heavy and painful menses, that lasted for 3-5 days. The ultrasound sonography (USG) test of the abdomen was performed in January 2014, which revealed haemorrhagic ovarian cyst in the right ovary, with tiny uterine fibroid. Post her ovarian cyst operation, from 2012 she was

taking a calcium, vitamin D3 and vitamin B12 supplement.

She suffered from constipation (she was taking isabgol every night for the last 15 days) and severe acidity (she was taking ranitidine for the same). Simultaneously, she complained of low immunity along with high levels of stress. She had a good appetite; however, she occasionally suffered sleep disturbance. She suffered from severe hair-fall, and was getting treatment for the same since March 2014 at RichFeel. Her family history revealed cancer in the mother and diabetes mellitus and hypertension in the father.

The patient's pathology test results showed elevated glycosylated haemoglobin (HbA1c) of 6.4 % (normal value= <5.7%). Her Hb was found to be on the lower side (11.7, as compared to normal range of 12-16). She weighed 78.46 kg and her height was 5'2". Her body mass index (BMI) calculated to be 31.6 kg/m^2, which reflects obesity.

She had a history of low blood pressure (BP) and her BP measured at 90/60 mmHg at the start of the programme, which was consistently in the hypotensive range throughout the programme. Her physician checked her cortisol and aldosterone levels to confirm the cause behind her low BP. On testing, the aldosterone levels were found to be low, which according to her physician was the reason behind low BP; therefore, low BP was normal for the patient. According to a research, hypotension related to hypoaldosteronism usually results from low blood sodium and high blood potassium levels [11].

Diet Recall

The patient started her day with two glasses of warm water with lemon and fenugreek seeds early in the morning. After that, she had a heavy breakfast- that consisted of tea with sugar, two almonds, two walnuts, one date, one fig, and milk at 7am, followed by a cup of milk with one spoon multi-mineral and vitamin powder and two egg whites at 7.30am. At 8.30am, she would either have poha, upma, idli, oats or dosa. As a mid-morning snack at 11am, she consumed tea with milk and sugar, plus two Marie biscuits. This was followed by 2 chapatis with vegetables and vegetable riata for lunch at 1pm. At 3pm, she would have green tea with bhel, chana and peanuts, one fruit as an evening snack at 5pm, and tea with chivda/chips at 6.30pm. At 8pm, she consumed a light dinner consisting of two chapatis with vegetables and curd. She would eat out at least 15 days in a month while travelling for work. She would eat non-veg, rice and sweets once a week, but would eat fried food almost daily. She consumed alcohol once a month.

DISCUSSION

Post review and assessment of the patient's medical history, she was put on a programme for pain relief, diabetes

management and weight management. The primary objective of the programme was to help lower the patient's HbA1c, reduce knee pain and inflammation associated with osteoarthritis, manage her digestive issues and simultaneously manage her body weight. The secondary objective was to help the patient with menorrhagia, boost her immunity levels, to restore normal sleep patterns, and as a result help lower her stress levels. For the above-mentioned objectives, we used nutritional therapy and ayurvedic herbs.

Dietary Intervention

Her diet recall consisting of heavy breakfast followed by snacking on processed foods and outside eating almost half the month was replaced with a high fibre, low-glycemic index (GI) complex carbohydrate and moderate protein diet, along with therapeutic lifestyle changes (TLC) to bring about the desired results. She was also given vegetable juices (containing mint, coriander, spinach), along with almonds, cinnamon powder and fresh vegetables.

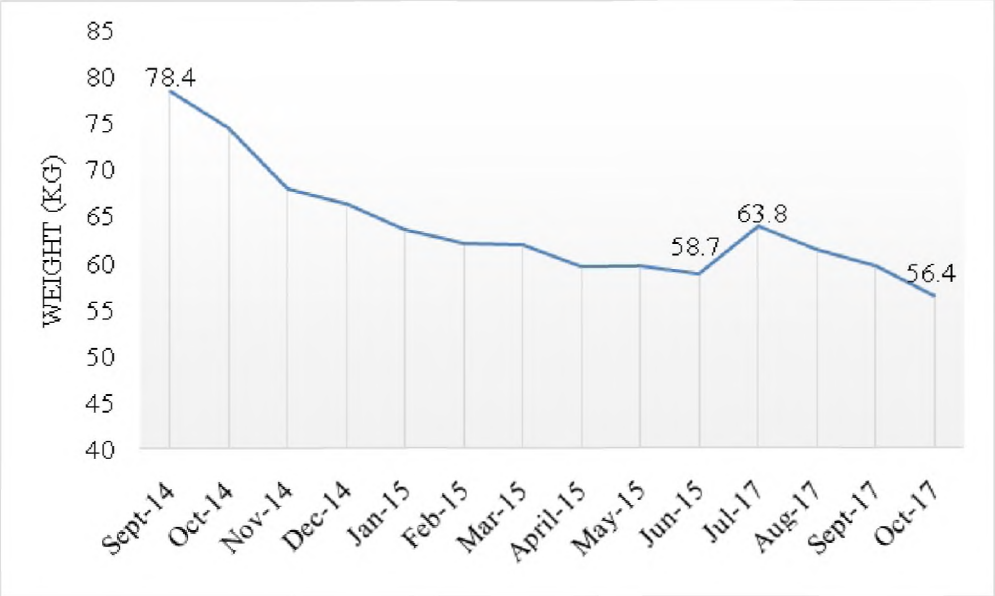
Ayurvedic Intervention

The patient was given Punarnava ghanvati (*Boerhavia diffusa*) for the treatment of oedema and water retention [12]. Triphala was used as a colon cleanser and for chronic constipation [13], while Triphala guggul was used for the management of obesity [14]. *Gymnema sylvestre* was given for its anti-diabetic effect [15]. Another traditional Ayurvedic formula containing *Pluchea lanceolate*[16] and *Tinospora cordifolia*[17] was given to ease pain and inflammation related to osteoarthrtis. A herbal formulation consisting of *Mimosa pudica* and *Aegle marmelos* was given for the management of heavy menstrual bleeding [18]. Amalaki was given for its immunomodulatory effect [19] and *Bacopa monnieri* was used for its anti-stress and sleep-inducing activity [20].

The patient was also given vitamins and dietary supplements that included essential oils, B-vitamins, D3 supplements, probiotics and antioxidants both in natural and supplement form. Therapeutic lifestyle changes (TLC) to bring about the desired results were also introduced simultaneously.

Progress report showed a gradual and sustained reduction in the patient's weight and BMI. After making dietary changes and putting the patient on a regular exercise regime as part of an Integrated approach, the patient lost 19.76 kg (from 78.46 kg to 58.7 kg) in 24 weeks. The patient took a break of around 2 years and she restarted the program in July 2017 for 12 weeks, with a weight of 64.7 kg. After 12 weeks, she lost 8.3 kg more. In total, the patient lost 22 kg (Fig. 1).Her BMI reduced from 31.6 kg/m^2 to 22.7 kg/m^2 (that lies within the normal BMI range).

Fig. 1: Effect of the 'Integrated Approach' on Body Weight management



The patient was non-compliant with the prescribed diet on a few occasions while being on the programme, and ate out due to work related travelling, having a variety of food items including idli, sweets, fried food, wheat roti, rice with dal, modak, and puri. She also skipped the exercise regimen given to her 2-3 times during the programme. Despite such occasional non-compliance, she still managed to lose weight with the use of herbs, vitamins and dietary regimen given to her.

The patient was a pre-diabetic when she came to us. Pre-diabetes is an intermediate state of hyperglycemia with glycemic parameters above normal but below the diabetes threshold. Pre-diabetes is defined as HbA1c of 5.7 - 6.4% according to the American Diabetes Association [3]. She also had diabetes related retinopathy and neuropathy since the last 3-4 years. After following the Integrated Approach, the patient's blood report showed improvement with respect to HbA1c (5.8%). The elevated HbA1c level at the start of the programme was brought down to near the normal value (Table 1). The tingling sensation that she experienced in her legs due to diabetic neuropathy, was rectified by the 6th week of being on the programme, as reported by her based on symptomatic relief. Similarly, she reported improvement in diabetic retinopathy by 86% by the end of the program (as told to her by her primary physician treating her for diabetic retinopathy).

Table 1: Reduction in HbA1c levels with the help of Integrated Approach

Parameter	26/09/2014	23/04/2015	03/07/2017	Normal range
HbA1c (in %)	6.4	6	5.8	< 5.7

She suffered from menorrhagia since the last 6 years, i.e. from 2008. By the 15th week of treatment with us, she saw slight improvement in her menstrual cycle, with only 2 days of profuse bleeding as opposed to the usual 3.5 days of heavy bleeding. Subsequently, the heavy menstrual bleeding was reduced, and her menorrhagia was under control. Her ovarian cyst and liver abscess problem was also resolved with the help of the 'Integrated Approach', where the USG report of the abdomen in March 2015 revealed reduced size of haemorrhagic ovarian cyst in the right ovary with no liver abscess.

The swelling in her feet and knee pain also reduced from the second week of treatment, along with improved energy and immunity, with the help of herbs and reduction in body weight. By the 1st week of November 2014, her knee pain was reduced by 50%, along with relief in tingling sensation, no swelling in hands and no water retention. By June 2015, knee pain was further reduced by 90%. And by the end of the program she felt no pain at resting position (that she used to feel at the start of the program).However, she felt pain on exertion.

Initially, the patient suffered from acidity every day, but within two weeks of being on the programme, she got relief in acidity along with no complains of flatulence and bloating, after that she did not complain of acidity throughout the entire program, her acidity was completely resolved. The patient reported remarkable relief in constipation from the third week of the programme, with on and off unclear motions a few times throughout the 24 weeks with us. Her energy levels improved considerably. All these changes brought in an overall positive impact, improving the quality of her life.

CONCLUSION

In the present case study, an Integrated Approach consisting of nutritional therapy, ayurvedic herb support, changes in lifestyle choices, and physical activity played an important role in the management of pre-diabetes symptoms, gastric problems, knee pain, menorrhagia and obesity, that ultimately resulted in an improved quality of life of the patient.

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