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A HOLISTIC APPROACH FOR EFFECTIVE MANAGEMENT OF DIABETES MELLITUS TO AID NATURAL CONCEPTION: A CASE REPORT

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Abstract
This case study presents the journey of a 27-year-old woman with type 2 diabetes who approached a private fertility clinic at Chennai and was anxious to achieve natural conception. The patient was well managed through a combination of lifestyle modifications, dietary changes, regular exercise, and medical management which enabled the patient to effectively control the diabetes leading to improved fertility. The case highlights the importance of diabetes management in enhancing fertility and overall health outcomes. It also underscores the potential impact of blood sugar control through personalized holistic approach and the achievement of natural conception.

Key words: Holistic medicine, Metabolic disorder, Diabetes mellitus, Natural conception, insulin resistance

INTRODUCTION

Diabetes mellitus, a chronic metabolic disorder characterized by elevated blood glucose levels, has far-reaching implications on various aspects of health and well-being. One intriguing area of study is the intricate relationship between diabetes control and fertility [1]. The impact of diabetes on reproductive health is a subject of growing interest, given its potential influence on fertility and conception. As the prevalence of diabetes continues to rise globally,[2] Understanding the interplay between diabetic control and fertility becomes paramount, particularly for individuals aspiring to start families. This case study delves into the multifaceted connection between diabetic control and fertility, exploring the underlying mechanisms, potential challenges, and the significance of meticulous blood sugar management in achieving successful conception. Through the lens of real-life experiences and scientific insights, this case study aims to shed light on how effective diabetic control can play a pivotal role in optimizing fertility outcomes, offering valuable guidance to both healthcare providers and individuals navigating the intricate path of family planning amidst diabetic conditions [3].

Case History

The present case is a a 27-year-old woman and her partner aged 32, who had had a marital history of five years and approached a private fertility centre for infertility treatment. Her obstetric history revealed that she had a miscarriage at her third month two years ago . Her past medical history revealed that she had been diagnosed with type 2 diabetes at the age of 21 and also had a family history of diabetes. Concerned about the potential impact of her diabetes on her fertility, she was referred to seek the help of an obstetrician, diabetologist and dietitian opinion.

Study setting

The study setting was BloomLife Hospital, which is a 24x7 multispeciality hospital with an expert team of gynecologists and obstetricians, diabetologists, reproductive medicine experts, dietician, physiotherapist and qualified naturopathic consultants for person-centred holistic work up for infertility treatment.

Diagnosis and Assessment:

Upon assessment, the subject's diabetes was classified as moderately controlled under insulin. Her HbA1c levels were averaging 7.5%, indicating room for improvement in glycemic control after significant dietary modification. She was also moderately overweight during initial counseling with a BMI of 26.5, which could further affect her fertility [4][5].

Treatment and Intervention

Table-1: Diet schedule

Meals	**Menu**	**Quantity**
Early morning (6-7 am)	Green tea/Lemon tea/fenugreek water(without sugar)	150ml
	Soaked almonds/Walnuts	8 no's
Breakfast (8-9 am) (Any of these menu)	Idly / Dosai / Chapathi/ Idyappam / Methi Moong dhal dhokla (fenugreek greens) /moong dhal dosa	2-3nos
	Brown bread/whole rolled Oats (steel cut) / Wheat uppma/Kichidi/channachat	2 slice 1 ½ cup
	(Channa+seasoning+tomato+onion+green chilli)	100 g
	Sambar / Dhal / Veg curry/ Tomato chutney /onion chutney/mint chutney curd/	1 Cup
	Multigrain dosa/chia pudding Paneer /Egg white	
	Cooked Sprout	1 bowl
Midmorning (10.30-11am) (Any of these menu)	Fruit(when sugar levels are under control)	1
	Buttermilk/soup/	150ml
	Cooked sprouts	1bowl
	Nuts	5-6 nos
	Mushroom & vegetable stew(sprinkle flax seeds)	
Lunch (1-1.30 pm)	Brown rice/hand pounded rice/millet Sambar/rasam/veg curry	1cup

(Any of these menu)	Roti /chapatti with flax seeds	2-3 nos
	Vegetables/greens(daily atleast one serving)	1cup
	Dhal	100g/1
	Curd/Buttermilk	150ml
	Paneer/Tofu/egg white(1)/soya chunkies (25gram)	100g
	grilled or gravy piece-skinless chicken/fish	3 piece(small)
Teatime (3-4 pm)	Ginger Tea/almond milk (skimmed and no sugar)/turmeric milk/chia pudding/lemon tea/green tea/ peppermint tea/methi water /soup (with no crème)	150 ml
Evening snacks (56 pm) (Any of these menu)	Roasted channa/green gram dhal sundal	85 g/ 100 g
	Brown bread / wheat bread sandwich	2 slice
	Rice flakes /wheat rava kichidi or barley	1 bowl
	vegetable kichadi/Millets or oats spinach Adai	1 cup or 1 nos
	makanas roasted/Humus salad or sandwich/ channa chat/cucumber salad	2-3 nos/15nos
Dinner (7.30-8.30 pm)	Same as breakfast – salad or soup (without crème can be taken as appetizer)	1 Bowl
Bed time (9-10 pm)	Skimmed turmeric Milk with a pinch of cinnamon/ Chamomile tea/warm water with a pinch of cinnamon (aim for early dinner)	150 ml

The following foods were adviced to be included

- Skimmed milk & milk products
- Use Herbs like oregano, turmeric, pepper, ginger, cinnamon ,basil,garlic,fennels and sesame seeds.
- Clear soups
- Blanched green leafy vegetables and sprouts in salads
- Fully cooked egg white
- Fruits and vegetables that are washed thoroughly (even those with skin that will be peeled or prewashed or use organic fruits and vegetables)
- Oils like sunflower oil/soybean oil/rice bran oil/corn oil/groundnut/mustard / sesame oil should be changed every month.
- Flaxseeds and chia seed and Makana(lotus seeds)
- Whole cereals like whole wheat, oats, ragi, bajra (kambu) , broken wheat rava , rice flakes (red) Red rice, Vargu, Samhai.
- Pulses (parupu), Sprouted legume (Payaru) – all variety especially kollu, fenugreek seeds.
- All green coloured vegetables & Green leafy vegetables.
- Fruits that are hard to chew which can eaten with skin (Guava, Pears, Amla) / which has lot of water content (water melon, Cantaloupe).
- Green tea, black coffee, black tea, butter milk, lemon juice without sugar, tomato juice (with salt) and vegetable / Mushroom soup.
- Oil: 25-30ml /day and Salt: 5g/day

Foods to be restricted :

- Roots & tubers like potato, sweet potato, and yam

- Nuts such as cashew, badam & Oil seeds like coconut
- Non-vegetarian foods like large fish, egg yolk

Foods to be avoided

• Sugar, honey, jaggery, sweets like laddu, barfi, payasam, chocolate, jams, jellies, ice creams
• All Sweet & Sweet related foods eg. Bakery foods like cake, puffs, doughnuts
• Sweetened – aerated / carbonated – beverages or soft drinks like aerated cool drinks, ready to drink
• Milk Products like Khoa, Cream, Cheese
• kanji / Porridge of any kind
• Mango, Sapota, jackfruit juice, Squashes
• Deep fried foods like papads, Samosa, Vadai, Salty foods like pickles, Chips etc.
• Non – veg foods like beef, mutton, prawns, organ meats, crab, egg yolk
• Thick forms of fat such as coconut oil, palm oil, vanaspathi, ghee, butter
• Alcohol.

General instructions

• Protein and fiber should be part of every meal.
• Wheat dosa, although often considered a healthier alternative , still has a moderate glycemic index, which means it can cause a spike in blood sugar levels.
• While preparing idly or dosa batter, mix in kerala rice (or unpolished rice) in preparation.
• Eat small and frequent meals-Chewing the food properly.
• Consume foods that are prepared only under hygienic conditions.
• Consume soft, and well- cooked food.
• Avoid skipping meals /fasting
• Avoid open foods, left over foods, reheated and refrigerated foods
• Do not use cooking soda.
• Avoid products in damaged packing and avoid buying unwrapped foods

Diabetes Management: The primary concern for the case was to control her sugar levels. The diabetologist worked with her to adjust her medications as necessary. A 24 hour dietary recall was taken from her and dietary modifications were informed accordingly. Additionally, she was educated about the importance of consistent blood glucose monitoring and how to make lifestyle adjustments to maintain stable levels.[6]

Dietary modifications: The subject's diet was tailored and personalized according to her needs that focused on low glycemic index foods, portion control, and balanced macronutrients. This diet aimed to improve her blood sugar control, reduce insulin resistance, and support healthy ovulation. Earlier most part of her diet contained kanji (poridge) of some kind and after nutrition therapy she was asked to avoid kanji / Porridge of any kind.[7]
She was encouraged to include all green coloured vegetables & Green leafy vegetables atleast one serving per day on regular basis. A variety of recipes that can include whole cereals like whole wheat, oats, ragi, bajra (kambu) , broken wheat rava , rice flakes (red) Red rice, Vargu, Samhai was added in the menu plan. Roots & tubers like potato, sweet potato, and yam are used in restriction. Oil utilization has been reduced to 15-25 ml per day. Deep fried foods like papads, Samosa, Vadai, Salty foods like pickles, Chips are strictly avoided from her meal plan.

Exercise Routine: The obstetrician and physiotherapist recommended to engage her in regular physical activity of 20 minutes of moderate walking atleast thrice a week. A tailored exercise routine was developed, including a mix of aerobic exercises and strength training, to help her achieve and maintain a healthy weight and improve insulin sensitivity.

Stress Management: Stress can have a significant impact on fertility and blood sugar levels. Sumathi was encouraged to practice relaxation techniques like yoga, meditation, or mindfulness to manage stress effectively[8].

Regular Monitoring: The subject was advised to schedule regular check-ups with both diabetologist and dietitian. These visits ensured that her blood sugar levels were consistently monitored and her overall health was assessed. After consumption since she was not able to travel much from her home town, her diet control was kept under check on call and through regular follow ups.

Results

Over the course of six months, the case diligently followed the prescribed treatment plan and meticulously followed her prescribed diet. Her dedication to managing her diabetes paid off as her HbA1c levels improved to 6% and was maintained throughout pregnancy indicating better glycemic control. She also lost significant amount of weight in the process, bringing her BMI down to 24.2, which further supported her fertility. Approximately three months after implementing the treatment plan, she was able to conceive naturally and the pregnancy progressed without any diabetic complications and her blood sugar levels remained within a healthy range throughout her pregnancy period.

Discussion

Elevated sugar levels can disrupt the balance of hormones like insulin, estrogen, and progesterone. This can lead to irregular menstrual cycles, anovulation (lack of ovulation), and difficulties in conceiving.[9] Also High-Fat, High-Sugar Diet Disrupts the Preovulatory Hormone Surge and Induces Cystic Ovaries in Cycling Female Rats[10] Previous reports also suggest that chronic high blood sugar levels can trigger inflammation in the reproductive organs, impacting their function and interfering with embryo implantation.[11] Therefore the case was advised to regularly follow up with the diabetologist for an effective control of her blood glucose levels. High blood glucose levels generate oxidative stress, which can damage reproductive cells and affect egg quality and embryo development,[12] and can harm blood vessels, reducing blood flow to the reproductive organs. This can hinder the supply of nutrients and oxygen necessary for proper reproductive function[13]. The case had followed the lifestyle and dietary modifications along with regular exercises to overcome these diabetic related reproductive issues as uncontrolled diabetes might trigger autoimmune reactions that target reproductive tissues, disrupting their normal functioning.[14] As elevated blood glucose levels can affect the uterine lining's receptivity to implantation, reducing the chances of successful pregnancy, the present personalized approach was holistic in order to aid successful pregnancy through a natural way of implantation and conception.[15]

Conclusion

This case study highlights the positive impact of controlling blood sugar levels on a woman's fertility and overall health. By actively managing her diabetes through lifestyle modifications, dietary changes, and medical interventions. These approaches significantly improved her chances of conceiving naturally. The successful outcome emphasizes the importance of early diabetes diagnosis and effective management, not only for fertility but also for the general well-being of women with diabetes. This case report warrants the healthcare professionals to encourage and support women with diabetes who wish to conceive, providing them with comprehensive protocol for better reproductive outcomes.

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