

Management of Hyperlipidemia, Obesity and Digestive Complaints Using the Integrated Approach

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Abstract: Childhood obesity not only increases the risk of obesity in adulthood, but is also a risk factor for cardiovascular disease and diabetes later in life. The subject of this case study was a 28-year old obese male who presented with a history of childhood obesity and cardiovascular risk factors (elevated homocysteine and TC/HDL ratio). He also had symptoms of acidity, flatulence, constipation with bleeding piles and complained of low immunity, low energy levels along with stress. The purpose of this case study was to determine the effect of an Integrated Approach, that included a healthy food plan, ayurvedic herb support, vitamins and dietary supplements, stress management and regular exercise programme, on the management of the patient's health complaints. This treatment regimen also helped ameliorate his gastric complaints, lower his blood cholesterol, improve immunity, increase his energy levels and helped him lose weight significantly.

Keywords: Integrated Approach, Childhood Obesity, Cholesterol, Nutrition, Ayurveda.

I. INTRODUCTION

Research shows that overweight or obese children and adolescents are more likely to become obese adults [1]. Obesity is strongly associated with metabolic disorders such as hypertension, diabetes and hypercholesterolaemia. A significant correlation exists between serum cholesterol and obesity [2]. Obesity can lead to an increase in cardiovascular risk factors, such as high triglycerides and low-density lipoprotein (LDL) cholesterol, low levels of high density lipoprotein (HDL) cholesterol and high blood pressure (BP) [3]. Therefore, prevention of obesity in childhood and its effective treatment in children is essential [4].

Studies have tracked obesity in children from their childhood to adulthood. One such longitudinal prospective study followed 164 subjects from one month of age until they turned 21. After compilation and studying the data from the study, it was found that 41% subjects who were lean since age one were still in the lean category at 21 years age. Similarly, 41% of fat infants were still in the fat category at 21 years of age [1].

A Finnish adult-population study found that the risk of developing cardiovascular disease was less among obese adults who were not obese as children than among the obese adults who had been obese as children [5]. However, it was the Bogalusa Heart Study that provided more concrete evidence for the linkage between increased cardiovascular risk in adulthood following a history of childhood obesity. This study examined 486 adults between 25 to 37 years of age and found a direct relationship between the presence of risk factors in childhood and cardiovascular pathology later in early adulthood [6].

Obesity is also associated with gastrointestinal complaints where population-based studies have demonstrated an increase in gastrointestinal symptoms such as acidity, flatulence, in obese individuals [7].

The current case study explores the effect of using an Integrated Approach in the management of obesity, gastrointestinal and cardiovascular disorders, low energy levels, low immunity, high uric acid levels, bleeding piles and hair fall.

The Integrated Approach is a combination of advanced patient-specific nutritional therapies, low glycemic index (GI) functional foods, Ayurvedic herbs, vitamin and minerals, dietary supplements, therapeutic lifestyle changes and moderate exercise to bring about improved health and reduction in the body weight of an individual.

II. CASE PRESENTATION

The subject of this study, ZK, was a 28-year-old male, who presented at the Health Total centre with the objective of losing weight, lowering his cholesterol levels and management of various other complaints. He had started gaining weight in early childhood. His weight on joining the programme was 125.32 kilograms with a height of 5 feet 10 inches. He had a body mass index of 39.6 kg/m², which put him in the morbidly obese range. His BP was 136/94 mmHg at the time of the visit. The patient also suffered from gastric issues (acidity and flatulence). He complained of low immunity and low energy levels along with stress. His appetite was good; he had disturbed sleep at night; and he had suffered from constipation since childhood. In the past, he used to take a herbal formulation for treatment of piles, as and when needed. He suffered from dust allergy and had had sinusitis since childhood.

According to his family history his mother had hypothyroid, hypertension and high cholesterol, and his father had hypertension and arthritis. As part of his routine check-up, his physician had prescribed some blood tests that included a cholesterol check. The results of the cholesterol check showed marginally elevated LDL levels (153 mg/dL). His HDL levels were on the lower side (36 mg/dL) along with very high homocysteine levels (22.9 µmol/L), therefore putting him at higher risk of cardiovascular disease. This increase in his LDL cholesterol levels could be attributed to obesity, persistent since childhood [8]. His serum uric acid levels were also marginally higher (7.8 mg/dL).

The patient had unhealthy eating habits, as described below under the Diet Recall section, leading to indigestion. He also had high levels of stress. Stress has been found to impair the immune response [9], along with impairing the digestive function too [10], and this is what was observed in the patient. There is also a significant correlation between a compromised immune system and poor nutrition [11]. Therefore, correct eating habits helps not only improve energy, but it improves immunity as well. In this particular case, despite an excess calorie intake, the subject continued to have low energy and low immunity and this can be attributed to inadequate nutrient absorption.

Diet recall

During his first appointment at the Health Total clinic in March 2016, the patient's diet recall showed that he consumed refined high-calorie carbohydrates in the form of foods like *samosa* that he had as snacks in the evening. He started his day with early morning tea, followed by two eggs, four toasts and tea for breakfast. He ate three *chapatis* with *dal* for lunch, usually followed by *samosa* or almonds and peanuts with tea in the evening. For dinner, he consumed *dal*-rice, two *chapatis* with vegetables and non-vegetarian food. He ate out once a month, rarely consumed aerated drinks, but did consume sweets once a week. He ate fruits very rarely, sometimes only once a week.

Treatment

The subject was treated for 28 weeks. His diet was regularly monitored and gradually modified and improved. A low glycemic index, high-fibre, complex carbohydrate and moderate protein diet was given. He was also advised to take ayurvedic herbs to manage his digestion, immunity, constipation, and he was advised to manage his weight by doing moderate physical activity. The health goals set for the patient were specific, measurable, and achievable.

III. DISCUSSION

Dietary changes and lifestyle interventions continue to be recommended as the first-line of treatment for obesity, dyslipidemia, digestive complaints and overall health [12]. The Integrated Approach includes a combination of functional foods, dietary modifications, along with ayurvedic herb support, lifestyle modifications and exercise protocols to achieve desired health results.

With hypercholesterolaemia, childhood obesity and a family history of dyslipidemia, optimization of the lipid profile was highly desirable in the subject's case. A lifestyle change was recommended to him and he was also advised to have his lipid profile checked after being on the Integrated Approach programme for 8 weeks.

Ayurvedic herbs used were Nishoth (*Operculina turpethum*) that was used to treat acidity [13] and Chitrak (*Plumbago zeylanica*) to treat flatulence [14]. A combination of Haritaki (*Terminalia chebula*), Vibhitaki (*Terminalia bellirica*) and Amla (*Emblica officinalis*) were together used as a laxative [15]. Guggul was given as a herbal preparation for cholesterol management [16]. *Berberis aristata* was given as an immunity booster [17] and *Tinospora cordifolia* was used to increase the excretion of uric acid in the urine [18]. The patient was also given multi-vitamins, multi-minerals and dietary supplements that included essential oils, B-vitamins, vitamin D3 supplements, probiotics and antioxidants, both in natural and supplemental forms.

Over a period of the first two weeks of treatment itself, the patient lost around 6.5 kg and he continued to lose weight gradually each week. By the end of the 28-week treatment period, the patient lost weight from 125.32 kg to 95.9 kg (lost a total of 29.42 kg) (Fig. 1), i.e., 23.47% of his initial body weight, bringing his BMI down from 39.6 kg/m² to 30.3 kg/m². Reduction in stress levels and improvement in energy levels was observed, and he was still highly motivated for further weight loss. There was improvement in his acidity symptoms and he also got relief from constipation.

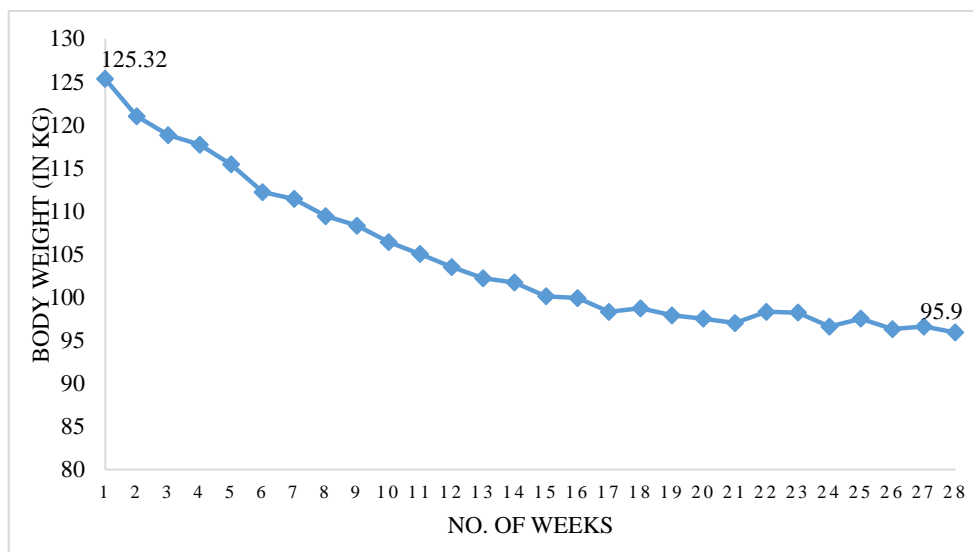


Fig. 1: Effect of Integrated Approach on the management of body weight

At the 9-week checkup, the patient’s LDL cholesterol decreased to within the normal range (i.e. 110-130 mg/dL) and his triglyceride levels also reduced, whereas the HDL cholesterol levels improved (Fig. 2). His TC/HDL ratio also fell within the normal range (3-5%) and his blood pressure showed to be well regulated (120/80 mmHg) by the end of the programme as shown below in Table I.

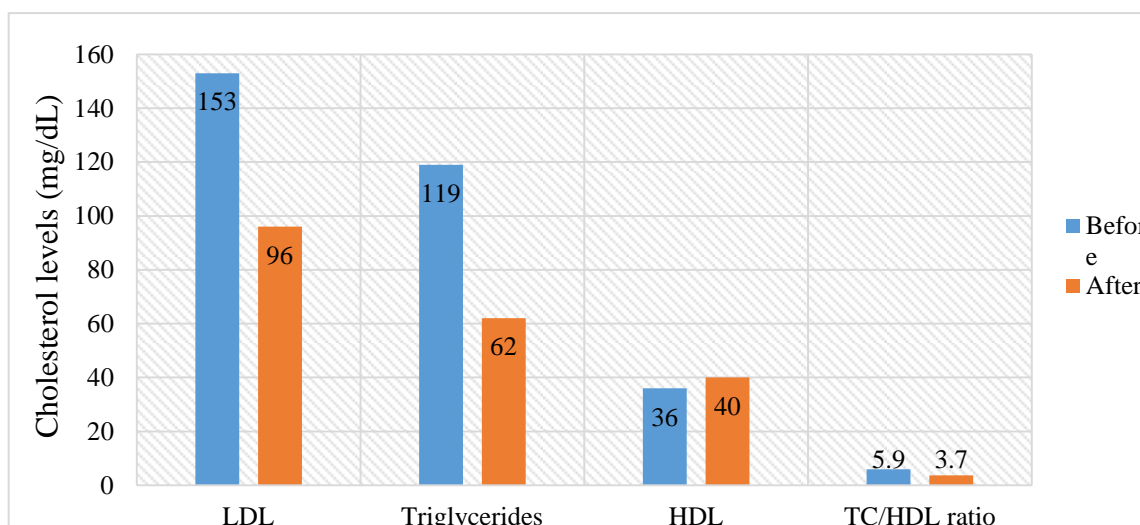


Fig. 2: Effect of Integrated Approach on the management of serum cholesterol levels

TABLE I: CORRECTION OF HEALTH PARAMETERS USING THE INTEGRATED APPROACH

Health parameter	Before (01/03/2016)	Date of correction (After 1-3 months of treatment)	After
BP (mmHg)	136/94 at 125.32 kg	05/05/2016	120/80 at 106.4 kg (in 2 months)
TC/HDL ratio	5.9 at 125.32 kg	07/05/2016	3.7 at 106.4 kg (in 2 months)
LDL (mg/dL)	153 at 125.32 kg	07/05/2016	96 at 106.4 kg (in 2 months)
Triglyceride (mg/dL)	119 at 125.32 kg	07/05/2016	62 at 106.4 kg (in 2 months)
Energy	Low at 125.32 kg	31/03/2016	Good at 115.4 kg (in 1 month)
Constipation	Motion- constipated with acidity, gas and burps at 125.32 kg	19/05/2016	Motion- clear No acidity, gas or bloating at 103.5 kg (in 2 months)
Sleep	Disturbed sleep at 125.32 kg	19/05/2016	Sound sleep at 103.5 kg (in 2 months)

The TC/HDL cholesterol ratio is an important indicator and has a great predictive capacity for cardiovascular risk. Individuals with a high TC/HDL cholesterol ratio have greater cardiovascular risk due to the imbalance between the atherogenic and protective lipoproteins [19]. Similarly, elevated homocysteine is an independent bio-marker indicating cardiovascular risk. Hyperhomocysteinemia can cause reduced blood vessel flexibility, endothelial cell damage, and inflammation, thus inducing cardiovascular risk [20].

Within 7 months the subject showed significant clinical improvement. The Integrated Approach regimen consisting of low-GI and functional foods, ayurvedic herbs, therapeutic lifestyle management and counselling, brought about significant weight loss, improvement in serum cholesterol and gastric issues in the subject. He also reported improved energy levels. Based on the patient's progress, the diet programme was further modified during subsequent visits.

IV. CONCLUSION

An Integrated Approach intervention comprising of low-GI foods, functional foods, ayurvedic herb support, vitamins and dietary supplements, stress management and a regular exercise programme can have a positive impact on energy levels, immunity, digestion, sleep, blood lipids and body weight and can help improve quality of life significantly.

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