



## Case Report

### Dietary Management of Ulcerative Colitis: Case Report

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#### ABSTRACT

Genetic makeup, gut microorganisms, autoimmunity and environmental factors are the major risk factors of ulcerative colitis; an inflammatory bowel disease. Because of its severe effects on nutritional status, this case was taken with an aim to improve the nutritional status; with dietary management. An 18 years old adolescent girl was presented to medicine ward of Sheikh Zayed Hospital Lahore with diagnosed ulcerative colitis and presently, she had the complaint of loose stools, nausea/vomiting, decreased appetite and micronutrient deficiencies. Patient's regimen was formulated on the basis of all presenting complaints to overcome the worsening symptoms and to improve her nutritional status. Planned regimen helped patient in obtaining satisfactory results, her baseline markers and symptoms were compared with her latest ones for proper evaluation. In current case report, consumption of white bread, rice and tapioca pearls was recommended from bread and cereals and the consumption of whole grain or bran products was severely restricted. Use of fibrous vegetables or leafy vegetables was also restricted and the consumption of starchy vegetables was recommended to the patients from the vegetables group. Consumption of fruits without peel was recommended to patient; preferably to consume banana and apple sauce to prevent aggravation in gastrointestinal symptoms whereas the consumption of fruits with high fiber content was restricted. In current case study consumption of lactose free milk and yogurt was recommended to patient whereas consumption of lactose containing milk and milk products was restricted. Dietary management played a very significant role on her nutritional status; thus proper medical nutritional therapy along with lifestyle modification can help in managing ulcerative colitis.

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#### INTRODUCTION

Ulcerative colitis; an idiopathic bowel disorder leads to the development continuous

mucosal inflammation; from the rectum to proximal colon. Genetics, environmental effects, autoimmunity and gut microbes are its

major contributing factors.<sup>1</sup> Ulcerative colitis is a relapsing mucosal disorder progressing to gut injury.<sup>2</sup> The severity of ulcerative colitis varies from moderate to severe with no gender and age cataloging.<sup>3</sup> Clinical manifestations of this diseases include frequent episodes of diarrhea with blood, cramps in lower abdomen, fatigue, decreased appetite and upon rectal muscle examination there may be presence of fissures, hemorrhoids, fistulas and abscesses. Other than these symptoms patients with this inflammatory bowel are at an increased risk of progressing to colon cancer.<sup>4</sup> Main focus in planning the dietary regimen for patients with ulcerative colitis is on screening nutrient's related deficiencies, limiting foods playing role in triggering negative symptoms, recommendations to be made on patients tolerance and current state of disease.<sup>5</sup>

## CASE REPORT

An 18 years old adolescent girl was presented to medicine ward of Sheikh Zayed Hospital Lahore with the complaint of loose stools, nausea and vomiting. Patient was a diagnosed case of ulcerative colitis for three years and now she was admitted with acute symptoms of ulcerative colitis.

**Patient's assessment:** Other than acute symptoms of ulcerative colitis upon assessment of nutritional status patient was underweight i.e. 18.3 kg/m<sup>2</sup>, biochemical profile showed she had hyponatremia, hypokalemia, hypocalcemia, hypoalbuminemia and iron deficiency anemia, clinical assessment showed patient's skin was dry and pale, hairs were thin, dry and rough, nails were pale, mouth and her lips were dry, dietary assessment showed her usual food intake i.e. 8 starch exchanges, 1 meat exchange, 1 vegetable exchange, 1 fruit exchange and 8 fat exchanges. Gastrointestinal assessment exhibited decreased appetite, 6-7 bowel outputs/day and

vomiting.

**Patient's Diagnosis:** Thus the nutritional diagnosis after patient's assessment concluded inadequate caloric intake, inadequate intake of macronutrients except fats, and inadequate intake of micronutrients except thiamin.

**Nutritional Goals/Objectives:** Nutritional goals and objectives included management of loose stools and vomiting, improve appetite, provision of adequate caloric intake, improvement of body mass index and improvement of nutrition related biochemical profile i.e. hyponatremia, hypokalemia, hypocalcemia, hypoalbuminemia and iron deficiency anemia.

**Medical Nutrition Therapy:** Type of diet to be high protein, fat modified, low residue, iron, vitamin C and calcium rich diet and mechanism of diet to be a progressive diet. Patient's energy expenditure was calculated by using ideal body weight for both in hospital diet plan and after hospitalization plan. In hospitalization plan stress factor was added and activity factor was adjusted as per activity where as in plan after hospitalization stress factor was removed and activity factor was adjusted as per activity and estimated energy requirements in both the plans was 1800 kcal.

**PLAN 1:** The objectives of plan 1 were to manage loose stools and vomiting to improve the electrolyte profile. At first, patient was kept nothing by mouth (NPO) and on the basis of calculated fluid requirement to manage losses patient was given with partial parenteral nutrition (PPN) containing dextrose, aminoplasmal, lipofundin and ringer lactate by maintaining the osmolality. Patient was kept NPO for three days and after this duration patient's body mass index remained constant, dryness was not recovered but her electrolyte profile was improved from her previous results, patient's vomiting and loose stools

were also controlled.

**PLAN 2:** The objectives of plan 2 were to introduce clear liquids by mouth to patient along with PPN, to improve symptoms of dryness and to improve electrolyte profile. Patient was administered with the same PPN plan but the amount of ringer lactate was reduced as improvement were seen in electrolyte profile of plan 1. Along with PPN oral clear liquids were also introduced to patient i.e. strained and fat free stock, strained and diluted home-made apple juice and oral rehydrating solutions; quantity and frequency of introducing these food items were planned as per patient's tolerance and acceptability to avoid any side effect. Patient was kept on plan 2 for one day after this duration patient's body mass index remained constant, patient's symptoms of oral dryness were controlled, no episodes of vomiting and diarrhea was seen, and electrolyte profile was improved from plan 1 as patient tolerated oral liquids because they were introduced were gradually from few sips to further increased quantities.

**PLAN 3:** The plan 3 was to introduce full liquids with clear liquids, to remove PPN, to increase caloric intake and to improve electrolyte profile. PPN was removed in this plan a combination of clear liquids and full liquids were to given i.e. oral rehydrating solutions, egg nog, chicken soup (blenderized chicken), branded and approved dietary supplement and potato puree (lactose free milk). Quantity and frequency was scheduled as per tolerance and estimated energy requirement. Patient was kept on plan 3 for three days after this duration patient's body mass index remained constant, her appetite was improved, no episodes of vomiting and diarrhea were seen, electrolytes were normalized, symptoms of dryness were also recovered and patient's tolerance for accepting foods via mouth was also improved. Approved dietary supplement was introduced to increase

the caloric content and as lactose is an osmotically active sugar<sup>6</sup>; lactose free products were specified to prevent any disturbance.

**PLAN 4:** The objectives of plan 4 were to introduce soft diet with full liquid diet, to improve tolerance for soft to semi solid foods, to increase caloric content, to improve appetite, to manage iron deficiency anemia, hypocalcemia, hypoalbuminemia and body mass index. In this plan patient was introduced with tapioca pearls, white bread (softened in lactose free milk), soft boiled egg, mashed banana, khichri (boiled rice and lentil mixture), chicken and vegetable cutlets (bottle gourd) and approved dietary & nutritional supplements. Quantity and frequency was scheduled as per tolerance and estimated energy requirement. Patient was kept on plan 4 for seven days after this duration body mass index remained constant, her appetite was improved, no episodes of vomiting and diarrhea were seen, due to nutritional supplements and provision of diet hemoglobin and calcium levels were improved when compared from baseline data but the symptoms of pallor were not recovered. Patient and her guardians were properly educated about the cooking techniques, quantity/frequency of foods and the doses of supplements.

**PLAN 5:** The plan 5 was to introduce regular low residue diet along with soft diet, to increase the caloric content, to improve tolerance of regular diet, to manage iron deficiency anemia, hypocalcemia, hypoalbuminemia and body mass index. In this plan patient was introduced with white bread, homemade jam, lactose free milk, without peel fruit shake/smoothie, soft boiled egg, boiled rice, white flour chapatti, chicken and vegetable cutlets (bottle gourd) and approved dietary & nutritional supplements. Quantity and frequency was scheduled as per

tolerance and estimated energy requirement. Patient was kept on plan 5 for the period of thirty days after this duration patients body mass index was improved to 19.1kg/m<sup>2</sup>, her appetite was improved, no episodes of vomiting and diarrhea were seen, due to nutritional supplements and provision of diet her hemoglobin, calcium and albumin levels were also improved as compared to the results of plan 4 but symptoms of pallor were still present as hemoglobin levels still required to be increased. Patient and her guardians were properly educated about the cooking techniques, quantity/frequency of foods and the doses of supplements.

## DISCUSSION

Ulcerative colitis's pathophysiology is multifactorial i.e. genetic makeup, dysregulated immunity, epithelial defects and environmental defects. Many epidemiological studies have reported an association between ulcerative colitis and dietary intake. Increased risk of ulcerative colitis has been seen among who consume more sucrose, soft drinks and red meat. Consumption of high fat and high sugar intake have associated with the increased production of pro inflammatory bacteria and a decrease production of protective bacteria. Whereas, consumption of fruits, vegetables and omega 3 have associated with decreasing the risks for the development of ulcerative colitis.<sup>7</sup>

The European Society for Clinical Nutrition and Metabolism stated that there are no specific dietary guidelines for patients with ulcerative colitis, to maintain the nutritional status patients are commended to be placed on nutritional support plans i.e. enteral or parenteral nutrition; providing tube feedings where oral ingestion is not sufficient. Due to absence of rational guidelines for patients with ulcerative colitis, their dietary recommendations are entirely on their

nutritionist depending on current symptoms and underlying nutritional deficiencies. In current case report consumption of white bread, rice and tapioca pearls was recommended from bread and cereals and the consumption of whole grain or bran products was severely restricted. Consumptions of fibrous vegetables or leafy vegetables was also restricted and the consumption of starchy vegetables was recommended to the patients from the vegetables group.

Consumption of fruits without peel was recommended to patient; preferably to consume banana and apple sauce to prevent aggravation in GI symptoms whereas the consumption of fruits with high fiber content was restricted. In 2015 Shah et al. stated that patients with ulcerative colitis are usually undergoing with abdominal distress i.e. flatulence, diarrhea and cramping; thus are recommended to be on low residue or low fiber diets to minimize the flares in symptoms of gastrointestinal distress and ultimately to minimize malnutrition and nutritional deficiencies.<sup>8,9</sup>

Apple is great composite of phytochemicals i.e. quercetin, flavonoids, catechin, gallic acid and chlorogenic acid; all providing therapeutic mediators for patients with ulcerative colitis.<sup>10</sup> In this current patient report, patient was recommended to consume apple juice in plan 2 with a goal to provide calories and phytochemicals necessary for the disease management course, other than apple patient was also recommended to consume banana for proper recovery. Pulp of banana contains polyphenolic compounds and resistant starches supportive against ulcerative colitis; modulates oxidative stress, intestinal flora, incrementing short chain fatty acids and up regulating immune response.<sup>11</sup> In current case study consumption of lactose free milk and yogurt was recommended to patient whereas consumption of lactose containing milk and

milk products was restricted. According to a study by Mahan & Raymond in 2016, the intake of osmotically active sugars i.e. lactose, sorbitol and fructose are not recommended as they may have a role in promoting diarrhea, abdominal cramping and gas. Patients who do not have any symptoms of lactose intolerance can have lactose containing milk products but patients who have intolerance must avoid.<sup>12</sup>

A literature cited in American journal of gastroenterology quoted that if patients with ulcerative colitis have milk intolerance it will further aggravate their negative symptoms, thus the authors in the article recommended not to consume lactose containing milk and its products by the patients who have its intolerance.<sup>13</sup> Consumption of red meat is positively associated with the development of ulcerative colitis. Various factors are responsible for this positive association i.e. cooking of meat at high temperatures leads to the formation of carcinogenic by products formed due to the combination animal fat and heme content of red meat.

Some portion of amino acids from red meat is not absorbed via small bowel and is moved unabsorbed to the colonic lumen where they are then metabolized by the flora, ultimately producing end products toxic to the colon health and exogenous factors include the use hormones for cattle breeding. Though the consumption of red meat, organ meats and processed meats are positively associated with ulcerative colitis and no association is found in other protein sources with ulcerative colitis.<sup>2</sup> In Current case report patient was recommended to avoid red meat, organ meat and processed and was recommended to consume other protein sources i.e. lean meat and poultry. Mahan & Raymond in 2016 stated that fats restriction is very much important in ulcerative colitis with fat malabsorption, they must be given medium chain triglycerides (MCTs) to improve the

caloric content but as these are very expensive many patients can have them in their regular routine. Consumption of red meat, alcohol and altered ratio omega 3 and omega 6 fatty acids is associated with ulcerative colitis<sup>12</sup> whereas, consumption of polyunsaturated fatty acids have been associated with decreasing odds of ulcerative colitis development.<sup>7</sup>

Relapse of ulcerative have been seen in patients who have increased consumption of red meat and alcoholic beverages.<sup>14</sup> In the current case study patient had no symptoms of fat malabsorption and was given 30% fats in plan 4 and plan 5 to assist in increasing caloric content of meals. In the current case report patient was given progressive diet with small and frequent meals to improve the tolerance, to minimize the symptoms and ultimately to improve the nutritional status. Patient was prescribed with the combination of PPN and enteral feeding following progressive meal plans including isotonic and multi-mineral supplements to improve the calorie content and to overcome nutritional deficiencies.

Brown, Rampertab and Mullin in 2011 stated that patients who were undergoing ulcerative colitis must be properly screened for nutritional deficiencies, must be recommended with small and frequent meals, avoid food stuffs causing aggravation in worsening symptoms, avoid alcohol and caffeine, limit their consumption of fatty and fibrous foods, avoid lactose if intolerant and must be recommended with nutrient supplements.<sup>5</sup> The European Crohn's and Colitis Organisation (ECCO) guidelines quotes that patient with inflammatory bowel disease must be keenly observed for anemia; a common metabolic complication also known as anemia of crohn's disease; oral or intravenous treatment should be administered to manage iron deficiency anemia (IDA).<sup>9</sup> In current study patient had iron deficiency anemia and was prescribed with oral iron supplements as per requirement



to manage the gap. Osteoporosis a very common disorder seen in patients with ulcerative colitis; patients with this disease usually avoid lactose containing products due to adverse symptoms and are recommended to consume calcium supplements or lactose free products to overcome calcium deficiency.<sup>15</sup> In current study patient also avoided lactose containing products and was recommended calcium supplements and lactose free products to manage respective deficiency.

## DECLARATIONS

**Consent to participate:** Written consent had been taken from the patient. All methods were performed following the relevant guidelines and regulations.

**Availability of data and materials:** Data will be available on request. The corresponding author will submit all dataset files.

**Competing interests:** None

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**Authors' contributions:** All authors read and approved the final manuscript.

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