



Dietary Recommendations for Cancer Patients Undergoing Pelvic Radiotherapy Treatment

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Pelvic cancer is a devastating disease that affects millions of people worldwide. Although radiotherapy (RT) is one of the standard treatments prescribed for pelvic tumours, it may trigger side effects that significantly impact a patient's quality of life [1]. Frequent gastrointestinal toxicities, including constipation, vomiting, nausea, pain, and diarrhoea, may be experienced as consequences of treatment. These toxicities often decrease patients' appetite and hinder the digestive system's efficacy, causing malnutrition, painful digestion, incontinence, proctitis, and altered bowel habits [2]. Therefore, implementing an appropriate diet can alleviate these side effects and improve the patients nutritional status during treatment.

Up to 80% of patients receiving radiation for pelvic malignancies experience gastrointestinal issues. Inflammation brought on by repeated radiation damage to the small and large intestines, which is made worse by the gut's quick cell turnover, is the assumed cause of GI tract toxicity [3]. The inflammatory response makes the bowels more vulnerable to radiation damage, which can decrease the available absorptive surface area and diminish enzyme activity. Food moves through the digestive system more quickly, which frequently leads to inadequate absorption of vital nutrients and fluids [4]. Although many patients also undergo chemotherapy at the same time as their radiation therapy, toxicities may become worse because some chemotherapy chemicals can also harm the bowel's epithelium [5].

In one NHS Trust hospital, patients receiving radical pelvic radiotherapy over a 15-week recruitment period were asked to respond anonymously to a survey as part of a service review. A response rate of 48% was achieved with a total of 31 patients re-

sponding [3]. Gas and flatulence were the most often reported gastrointestinal symptoms, followed by diarrhoea, nausea, and abdominal discomfort. The main dietary adjustments made by respondents and advised by healthcare specialists refraining from caffeine, and drinking more water to compensate for fluid loss. Omitting foods high in insoluble fibre and fats is also recommended [3].

Patients with pelvic tumours scheduled for radical radiotherapy were randomly assigned to a low-fat (20% total energy from long-chain triglycerides), modified-fat (20% from long-chain triglycerides and 20% from medium-chain triglycerides), or normal-fat (40% total energy from long-chain triglycerides) diet in a controlled trial to assess the effectiveness of a low or modified fat diet for the prevention of gastrointestinal toxicity group [6]. The Inflammatory Bowel Disease Questionnaire-Bowl score used to measure gastrointestinal toxicity did not substantially differ across groups. The results may have been tainted by the fact that only 9% of the normal-fat diet group fully complied with the fat content recommendation, compared to 93% of the low-fat diet group [6]. Fat oxidation is normal or even boosted, indicating that it is advantageous to consume more fat than carbohydrates. The majority of treatment advice for cancer anorexic patients centre on increasing energy intake, which is easier to do when fat is the primary energy source. Hence, the recommendation for carbs is 40–50% of the total energy intake when taking into account the protein intake that must be ensured in these patients [7].

Cancer patients may also be deficient in vitamins and minerals depending on their dietary status, the severity of the disease, and the course of treatment. In a prospective analysis of radiotherapy-treated rectal cancer patients, a transient drop in vitamin and min-

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eral intake was noted. Following radiotherapy, patients consumed less calcium, magnesium, retinol equivalents, thiamin, riboflavin, and niacin, while continuing to consume the same amounts of iron, vitamins C and D, and -tocopherol. By the end of therapy, magnesium, thiamin, riboflavin, and niacin were at the lower range but within the DRI, whereas fibre, calcium, iron, and vitamins D and E were below the Dietary Reference Intake (DRI). Supplementation of these vitamins is indicated if steatorrhea is present as it may reduce the absorption of fat-soluble vitamins [8]. A clinical investigation found that 400 mg/day of Vitamin E supplementation reduced the peripheral neurotoxicity brought on by cisplatin treatment, with a relative risk of 0.14. As a result, individuals undergoing chemotherapy based on cisplatin should receive vitamin E supplementation [9]. So, in the absence of specific dietary shortages, the National Academy of Sciences' suggested daily intake of vitamins and minerals is a helpful and secure recommendation. Nonetheless, cancer-associated malnutrition is widely accepted to be accompanied by reduced food intake and hypercatabolism; as a result, in severely malnourished patients, daily requirements for micronutrients may be derived from guidelines for critically ill patients [7].

Apart from bowel symptoms that can have an impact on a patient's nutritional status and quality of life, losing weight is a warning sign of a nutritional deterioration after pelvic radiation treatment. 59% of patients who received 50 Gy of radiation to the pelvic area over six weeks lost 10% of their body weight [10]. In a randomized clinical study, the effectiveness of nutritional intervention adhering to the American Dietetic Association (ADA) medical nutrition therapy standard for radiation oncology was evaluated. For patients receiving pelvic radiotherapy, the protocol recommends the consumption of 1.1-1.3 g/kg/day of protein and 28-31 kcal/kg/day of energy daily. Patients who underwent this intervention shed 400g in weight, improving their nutritional status, as opposed to the control group, which merely received a general nutrition discussion and pamphlet and lost an average of 4.7 kg [11].

Due to the potential effects toxicities may have on treatment compliance and completion, the management of gastrointestinal toxicities in radiation is crucially important. Due to toxicities, scheduled RT sessions may be interrupted or not completed, which could affect how well the treatment works overall. Patients who skip two or more treatments run a higher risk of recurrence, have worse recurrence-free survival, and have worse overall survival, according to a retrospective examination of 1227 individuals undergoing curative RT for a variety of illness locations [12].

Throughout the duration of pelvic cancer treatment, patients should maintain appropriate nutrition that facilitates their health and alleviates the consequences of radiotherapy. Nutritional guidelines must be comprehensive to guarantee comfort and avoid di-

etary restrictions that may hinder a patient's status. Additionally, studies assessing the effectiveness of dietary-counseling interventions are necessary to address the significant impact of gastrointestinal toxicities on patients undergoing pelvic radiotherapy considering modern radiotherapy techniques, organ at risk (OAR) dose reporting, and concurrent or adjuvant chemotherapy and pre-surgical status. Abiding by nutritional recommendations can optimize patient healing during cancer treatment and maintain their health afterwards.

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