

## Nutritional Challenges During Treatment for Lung Cancer

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A 60-year-old female smoker named M.P. developed a chronic cough about two months prior to scheduling a visit with her primary physician. She was evaluated by her physician for probable bronchitis and treated with antibiotics and inhalers. She had a brief improvement of symptoms before her cough became increasingly worse. Computed tomography scans were performed and demonstrated extensive mediastinal and hilar adenopathy. M.P. was referred to pulmonary medicine and underwent a bronchoscopy with a biopsy that showed small-cell lung cancer. Her past history included smoking a pack of cigarettes per day for about 40 years and she continued to smoke about a half of a pack per day after diagnosis. Her oncologist recommended cisplatin and etoposide chemotherapy combined with radiation therapy.

### Nutrition Assessment

Following her first cycle of cisplatin, etoposide, and concurrent radiation therapy, M.P. was referred to the oncology dietitian for a nutrition consultation. At the time of this consultation, M.P. presented with acute nausea and vomiting, diarrhea,odynophagia, fatigue, and weight loss. Past medical history revealed prior gastroesophageal reflux disease and colitis. She also had a history of vitamin B<sub>12</sub> and vitamin D deficiencies as well as fibromyalgia and depression. In addition to her chemotherapy and antiemetic medications (aprepitant, ondansetron, and prochlorperazine), medications documented in M.P.'s electronic medical record included the following dietary supplements: 1 g of vitamin C daily, 50,000 units of vitamin D<sub>2</sub> weekly, 40 mg of soy isoflavones daily, and monthly injections of 1,000 mcg of vitamin B<sub>12</sub>.

After her diagnosis, M.P. and her family consulted a commercial, free-standing nutrition clinic and she was encouraged to follow a meal plan that excluded meats, wheat, sugar, and dairy products. In addition, 12 dietary supplements were

recommended and sold to her that contained a high-dose multivitamin, a vitamin B-100 complex, 50 mcg of sublingual vitamin B<sub>12</sub>, 200 mcg of selenium, 500 mg of magnesium, 2,000 mg of calcium, 5,000 units of vitamin D<sub>3</sub>, 5 g of fish oil, 40 mg of soy isoflavones, 300 mg of epigallocatechin gallate, 10 mg of coenzyme Q10, 1,000 mg of St. John's wort (*hypericum perforatum*), and 30 g of Berry Green® powder. These supplements were not documented in M.P.'s medication list in the electronic medical record.

A review of M.P.'s diet history and food intake records revealed a usual breakfast of a nonwheat cereal with rice milk and a supplemental drink with whey protein and Berry Green powder mix. Medications and other dietary supplements were taken with breakfast. She reported eating one regular meal per day in the evening. Discussion with M.P. and her family revealed their commitment to use dietary supplements to enhance M.P.'s immune system, decrease the side effects of treatment, and prolong survival. They were hopeful that the supplements would support these goals during treatment. However, M.P. reported difficulty swallowing supplements and thought they may be contributing to nausea. Therefore, her nutrient intake from food was compromised.

Anthropometric measures were taken: M.P.'s height was 167.7 cm, her weight was 84 kg, and her body mass index was 30. Serum B<sub>12</sub> and 25(OH)D<sub>3</sub> levels were normal. Her muscle mass appeared adequate on physical examination. Her nutrient intake from food alone was about 1,100 kcal per day, with 50 g of protein and 35 g of fat. Her dietary intake was low in calcium, vitamin D, B vitamins, and potassium. Fluid intake was inadequate. M.P. had experienced a 9 kg weight loss following her first cycle of treatment. Her body mass index remained in the obese range despite losing 10% of her body weight. To maintain her current body weight and lean body mass (LBM), M.P. had an estimated caloric requirement of 1,800–2,000 per day

and a daily protein requirement of about 70–90 g per day. Her dietary supplement regimen was providing most of the daily requirements for vitamins and minerals. However, her intake of macro- and micronutrients from food alone was deficient. In addition, her dietary supplement intake was providing micronutrients above the recommended upper limit of intake for safety and known efficacy (Suitor & Meyers, 2006).

### Nutrition Counseling

Immediate goals for nutrition counseling were to (a) assist M.P. and her family in following their preferred nutritional approach with education and strategies that would enable them to meet M.P.'s nutrient needs with a combination of food intake and safe use of dietary supplements, (b) preserve LBM and improve physical functioning and quality of life (QOL), (c) decrease the rate of weight loss and decrease the amount of chemotherapy-induced adverse effects, (d) provide education regarding the safety of dietary supplements during treatment, and (e) document details of supplement use in the electronic medical record to inform M.P.'s healthcare team.

Dietary protein and caloric intake must be adequate to prevent muscle breakdown and preserve LBM in patients with cancer. To accomplish this goal, the timing of antiemetic medications in relation to meals was reviewed. A daily meal schedule was developed to provide set times for several small frequent feedings throughout the day. M.P. understood the importance of changing her current meal schedule to meet her protein and caloric requirements to improve her strength and QOL. An oral glutamine supplement was recommended to support gastrointestinal function and mucosal health and to decrease neurologic side effects (Cerchiatti et al., 2006; Choi et al., 2007; Vahdat et al., 2001). High-calorie, high-protein recipes and commercial clear liquid supplement samples were provided. M.P. was