

# The Use of Nutritional Support in Cancer Treatment



Rebecca McManamon, MNutr, Specialist Dietitian and CN Editorial Team Member

One in two people born in the UK after 1960 will get cancer in their lifetime.<sup>1</sup> Nutrition has a role in the prevention and treatment of cancer, especially when solid tumours are present in the gastrointestinal tract and/or cancer cachexia is present.

This article will explore the impact of a cancer diagnosis on physical and psychological health, and how aggressive treatments needed to treat cancer can further weaken nutritional resilience in the short and long-term if not addressed appropriately.

It is acknowledged that the dietary and other risk factors for cancer, prevalence of different site cancers, as well as the treatment pathways and prognosis vary internationally, and the article will mainly focus on the UK perspective, citing international research where relevant.

## Impact of cancer on the body

Cancer impacts physical health, fatigue, resilience and quality of life. Those surviving cancer frequently report ongoing or new symptoms of physical impairment, weeks, months or years after their treatment has been completed.<sup>2</sup> Psychological health is also impacted and will be further discussed.

For some cancers, the primary site causes an impact on nutritional status, sometimes even before a diagnosis

has been made. In particular upper gastrointestinal (GI) cancers, affecting the oesophagus or stomach, may cause nausea and/or vomiting. With oesophageal cancers, where the tumour physically obstructs the normal movement of food down the oesophagus (also referred to as the gullet), dysphagia (swallowing difficulties) and odynophagia (sensation of food sticking) occur. Therefore, many adults experience significant weight loss prior to a diagnosis being made.<sup>3</sup>

Pancreatic cancer is also associated with weight loss, diarrhoea, bloating and other gastrointestinal symptoms, which have been discussed in further detail in a previous issue of this publication.<sup>4</sup> Pancreatic cancer is strongly linked to pancreatic enzyme insufficiency.<sup>4</sup> Even when pancreatic enzyme insufficiency is treated, data from pancreatitis, a similar and frequently co-existing condition, demonstrates that those with pancreatic enzyme insufficiency are at high risk of fat soluble vitamin deficiencies and a higher risk of osteopenia and osteoporosis.<sup>5</sup> Vitamin and mineral supplementation should be considered to prophylactically mitigate for deficiencies, especially when dietary micronutrient intake is limited due to the symptoms of the condition.

Weight loss is a common symptom among many cancer types, and the role of cancer cachexia in this will be further explored. Despite weight loss being well studied, much less data is known about the impact cancer has on the nutritional quality of the diet.<sup>6</sup> Where research has sought to analyse this further, often those with cancer are eating a limited range of food and more than half of energy needs were met with milk, cereals, soups and oral nutritional supplements.<sup>6</sup> Even less is known about the micronutrient content of the diets of those with cancer and where dietary patterns are limited, if oral nutritional intake cannot meet vitamin and mineral needs, vitamin and mineral supplementation may need to be considered. This is supported by the European Society of Parenteral and Enteral Nutrition (ESPEN) guidelines on cancer, which state that vitamin and mineral supplementation at a dose equal to the recommended daily allowance is useful and safe, including during radiation and chemotherapy.<sup>7</sup>

## Side effects of treatments

### Radiotherapy

Prostate cancer, the most common cancer amongst men,<sup>1</sup> is linked to gastro-intestinal symptoms when treated with pelvic radiotherapy. Lower gastrointestinal, bladder and gynaecological cancers may also be treated with pelvic radiotherapy. It has been reported that up to 80% of those receiving this treatment modality can experience gastro-intestinal side effects.<sup>7</sup>

Historically, those undergoing pelvic radiotherapy may have been advised to follow a low fibre diet, more restrictive in nature, to minimise gastrointestinal symptoms. This advice evolved from theory,

rather than clinical studies. A recent randomised controlled trial has, in fact, demonstrated the opposite; a high fibre diet reduced gastrointestinal symptoms during treatment and after one year, compared to a low or habitual fibre intake.<sup>8</sup>

In head and neck cancer, radiotherapy is frequently associated with mucositis (inflammation and ulceration) and often significantly reduces food intake and causes further weight loss.<sup>7</sup>

There has been much debate about the prophylactic use of feeding tubes in adults having chemo-radiation for head and neck cancers, due to the high prevalence of symptoms. Despite this being common practice in the 2000s, in the UK, there remains little evidence for prophylactic feeding tube placement in head and neck cancer. Current opinion aligns to an individual assessment and monitoring of nutritional status and symptoms, and consideration of nasogastric or gastrostomy feeding in individual cases as needed.<sup>7</sup>

### Chemotherapy

Oral mucositis and diarrhoea are common side effects of chemotherapy. Taste changes, and the fatigue associated with the treatment, as well as travelling to attend daily treatment, can all impact nutritional status. Individual counselling is needed, according to the person's symptoms, energy levels and how this may impact their ability to shop and prepare food. Some chemotherapy agents can further precipitate weight loss as a consequence of the side effects experienced.<sup>7</sup> Catabolic muscle loss is common, especially in chemoradiation regimens.<sup>3</sup>

### Stem cell transplantation

Stem cell transplantation may be used as a treatment for blood cancers alongside chemoradiation. Decreased nutrient absorption and losses in the gastrointestinal tract due to the transplantation can further compound the nutritional impact of the side effects of treatments.<sup>9</sup> Bone marrow needs to be reconstituted and this further drives an increased demand for some micronutrients such as zinc.<sup>9</sup>

Whilst many patients receive enteral or parenteral nutrition, which includes micronutrients, these increased nutrient demands highlight the need for micronutrient supplementation. This may be in addition to artificial nutrition and/or once oral intake restarts.

Longer term, there is a higher risk of bone fracture following transplantation.<sup>10</sup> Whilst calcium and vitamin D supplementation is recommended post transplantation,<sup>11</sup> magnesium, zinc and vitamin K also play

a role in bone metabolism and their supplementation may also need to be considered. In the short-term, following stem cell transplantation, magnesium supplementation may be indicated.<sup>12</sup>

### Surgery

Surgery for upper gastrointestinal cancers and pancreatic cancer can further challenge a person with cancer to meet all their nutritional needs. These patients can often be nutritionally compromised before surgery,<sup>3</sup> and surgery involving the removal of part of the oesophagus or all, or part, of the stomach can limit the capacity of food that can be eaten, as well as increase the risk of dumping syndrome and pancreatic enzyme insufficiency. Nutrition support may be through oral diet, oral nutritional supplementation or enteral feeding, e.g. jejunostomy. Following gastrectomy or pancreatic resection, despite pancreatic enzyme supplementation, supplementation of fat-soluble vitamins and other micronutrients, such as zinc and selenium, may be necessary.<sup>13</sup>

Life-long vitamin B12 supplementation following gastrectomy is indicated due to the lack of intrinsic factor, which has often been prescribed as an injection, however, recent data suggests a daily oral vitamin B12 maybe sufficient.<sup>14</sup> There is also a high risk of deficiency of other vitamins and minerals. Folate, iron and vitamin D levels need ongoing monitoring and supplementation, especially in the context of the increased risk of bone fracture.<sup>15</sup>

## Anorexia and cachexia

An international definition of cancer cachexia was reached in 2011, stating that cancer cachexia was 'a multifactorial syndrome defined by an ongoing loss of skeletal muscle mass (with or without loss of fat mass) that can be partially but not entirely reversed by conventional nutritional support'.<sup>16</sup>

Sarcopenic obesity occurs when a person is both obese (with a body mass index equal to or greater than 30 kg/m<sup>2</sup>) and has loss of lean body tissue. Cancer cachexia can therefore co-exist with obesity, and sarcopenic obesity has been linked to increased toxicity of treatment – for example, in neo-adjuvant chemotherapy for oesophageal cancer, meaning potentially curative treatment may need to be stopped.<sup>17</sup> Early nutrition screening, monitoring and referral to a specialist dietitian can aid the treatment of cancer cachexia, and facilitate discussion about when nutrition may be unable to ameliorate the symptoms and condition entirely, i.e. in refractory cachexia.<sup>16</sup>

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## Stress, anxiety, quality of life relating to diagnosis

The news of a cancer diagnosis is likely to cause significant psychological distress.<sup>18</sup> The worry about the side effects of cancer treatments and loss of independence compound this distress.<sup>18</sup>

Difficulty in eating and weight loss – common symptoms of cancer cachexia – have been cited as great burdens to those diagnosed with cancer, and further to this are also a source of conflict between family members.<sup>19</sup>

Bereaved family members of cancer patients commonly stated that they did not receive enough explanation about cancer cachexia and weight loss, and that a deeper understanding may aid them through this difficult journey.<sup>19</sup> Feelings of burdening the person with cancer with food and feeling confused about what the person should eat were also relatable to some relatives.<sup>19</sup>

Dietitians have a role to clarify what diet an individual with cancer will benefit from, and the impact that cancer treatments and cancer cachexia will have on their nutrition intake. With the patient's permission, their families should also be involved, to enable their understanding and to empower them to support their loved one.

## Nutrition in the role of prevention of some cancers

Many adults diagnosed with cancer may change their diets in the belief that foods that increase the risk of cancer may increase disease progression. It is important to discuss that the data around prevention does, unfortunately, not translate to a slowing of cancer progression. For example, someone struggling to meet their energy and protein needs may be ill-advised to reduce

their intake of processed meats, if this is what is accessible and/or palatable to them.

As more adults reach survivorship, it is appropriate to talk about dietary prevention strategies. Although, again, not all the data may focus on secondary prevention. Approximately 38% of cancers are preventable,<sup>1</sup> smoking is still the biggest risk factor, accounting for 15% of all cancer cases.<sup>1</sup>

There is strong probable evidence that whole grains and fibre reduce colorectal cancer, and suggestive evidence that fruit and vegetables reduce many sites of cancer, including lung and oesophageal.<sup>20</sup>

Processed meats have convincing evidence that they are linked with an increased risk of colorectal cancer and limited-suggestive evidence that they may increase the risk of lung and some upper GI cancers.<sup>20</sup>

A large prospective population-based cohort study published in 2018, demonstrated that adhering to the above dietary guidelines for cancer prevention, cited in the international cancer guidelines,<sup>20</sup> could make a significant contribution to reducing the incidence of cancer.<sup>21</sup>

## Summary

Nutrition has a role in the prevention and treatment of cancers, as well as managing the long-term consequences of some cancer treatments, such as osteoporosis post gastrectomy, or managing diarrhoea with a high fibre diet during pelvic radiotherapy. Referral to a dietitian can be of benefit at all stages of a patient's journey – to counsel and support the person with cancer and their family, and guide if specific nutrition treatments, such as artificial nutrition or vitamin and mineral supplementation, are likely to benefit them.

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