



## Weight loss and quality of life in patients surviving 2 years after gastric cancer resection

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### Abstract

**Background:** Malnutrition is common in patients undergoing gastric cancer resection, leading to weight loss, although little is known about how this impacts on health-related quality of life (HRQL). This study aimed to explore the association between HRQL and weight loss in patients 2 years after curative gastric cancer resection.

**Methods:** Consecutive patients undergoing curative gastric cancer resection and surviving at least 2 years without disease recurrence were recruited. Patients completed the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) and the specific module for gastric cancer (STO22) before and 2 years postoperatively and associations between HRQL scores and patients with and without  $\geq 10\%$  body weight loss (BWL) were examined.

**Results:** A total of 76 patients were included, of whom 51 (67%) had  $\text{BWL} \geq 10\%$ . At 2 years postoperatively,  $\text{BWL} \geq 10\%$  was associated with deterioration of all functional aspects of quality of life, with persistent pain (21.6%), diarrhoea (13.7%) and nausea/vomiting (13.7%). By contrast, none of the patients with  $\text{BWL} < 10\%$  experienced severe nausea/vomiting, pain or diarrhoea.

**Conclusions:** Disabling symptoms occurred more frequently in patients with  $\geq 10\%$  BWL than in those with  $< 10\%$  BWL, with a relevant negative impact on HRQL. A cause–effect relationship between weight loss and postoperative outcome remains unsolved.

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**Keywords:** Gastric cancer; Surgery; Quality of life; Weight loss

### Introduction

Surgical resection, either alone or in combination with perioperative chemotherapy or adjuvant chemotherapy, or chemoradiation is the main curative treatment for locally advanced gastric cancer.<sup>1–3</sup> Malnutrition has been widely recognized in gastric cancer patients because of the disease itself or because of the surgical and oncological treatments.<sup>4,5</sup> Gavazzi et al.<sup>5</sup> analysed the nutritional status at

the beginning of gastric cancer treatment and reported a body weight loss (BWL)  $\geq 10\%$  of usual weight in 17% of patients, having a negative influence on health-related quality of life (HRQL). Several studies have defined HRQL as an important additional outcome measure in gastric cancer patients undergoing resection, showing differences between surgical techniques<sup>6–8</sup> as well as providing prognostic information.<sup>9–11</sup>

A greater than 10% baseline BWL has been considered as a severe nutritional risk indicator in patients with gastrointestinal cancer.<sup>12,13</sup> Previous studies have found that patients undergoing total gastrectomy will lose 7%–15% of their body weight, usually within the first year of surgery, and will not return to a preoperative weight.<sup>14–16</sup> The

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reduction in calorie intake as well as malabsorption are considered the main factors responsible for BWL.<sup>14</sup> The extent of postoperative BWL seen postoperatively has been related to a deterioration of HRQL after oesophageal cancer resection.<sup>17</sup>

Little is known, however, about long-term HRQL after gastrectomy and especially, how postoperative BWL may affect HRQL. In this study we assessed HRQL in patients surviving at least 2 years after curative gastric cancer resection. It was hypothesised that the magnitude of BWL may be related to HRQL impairment.

## Methods

### Study population

Consecutive patients undergoing curative gastric cancer resection were recruited between October 2004 and May 2014 at Hospital Universitari del Mar (Barcelona, Spain). Total or subtotal gastric resection, depending upon the location and the extent of the tumour, with modified D2 lymphadenectomy was undertaken. A 70 cm Roux-en-Y loop reconstruction was performed in all cases. In the context of clinical trials carried out during the study period, perioperative chemotherapy or adjuvant chemoradiation was offered to a subgroup of patients with clinical stage II/III disease. Tumour stage was defined according to the system of the International Union Against Cancer.<sup>18</sup> Postoperative complications were categorised according to a modified Clavien-Dindo classification.<sup>19</sup> Sepsis was defined as an infection that had evoked a systemic inflammatory response syndrome (SIRS).<sup>20</sup>

Patients who had survived for at least 2 years without recurrence, and had completed the HRQL questionnaires were eligible for the study. Excluded were those who do not survive for 2 years after surgery with or without recurrence. Other exclusion criteria were concurrent malignancy, multivisceral resections, cognitive deterioration, and those who declined to complete the study questionnaires. The Ethics Committee of Hospital Universitari del Mar approved the study and written informed consent was obtained from all participants.

All patients were seen at the outpatient clinic by a medical oncologist and a surgeon at 3 months intervals during the first 2 years after surgery; and every 6 months until they completed 5 years postoperatively. After surgery, patients were referred to the Nutrition and Dietetic Outpatient Clinic for nutritional guidance, although no specific strategy for the provision of oral nutritional supplements was instituted.

### Assessment of preoperative and postoperative weight

Height and weight were measured at the first visit (less than 2 weeks) before the operation. Preoperative BWL was calculated using the formula average weight (kg) minus

weight at time of surgery (kg)/average weight (kg).<sup>14</sup> Body mass index (BMI), using the standard formula weight (kg)/height (m<sup>2</sup>), was calculated at baseline and at 6, 12 and 24 months after surgery. The percentage of postoperative weight change was calculated using the formula weight at time of surgery (kg) minus current weight (kg)/weight at time of surgery (kg) at 6 months, 12 months and 2 years postoperatively.

### Health-related quality of life

HRQL was assessed with the validated European Organisation for Research and Treatment of Cancer (EORTC) core questionnaire, EORTC Quality of Life Questionnaire (QLQ-C30) (version 3.0) and the specific module for gastric cancer EORTC QLQ-STO22. Permission from EORTC was obtained in order to use them. EORTC QLQ-C30 is a 30-item questionnaire composed of multi-item scale and single items that reflects the multidimensionality of the quality of life in patients with cancer. It incorporates five functional scales (physical, role, cognitive, emotional and social), three symptom scales (fatigue, pain and nausea and vomiting) and a global health scale. It also includes single items commonly reported by cancer patients.<sup>10,21</sup> The validated EORTC QLQ-STO22 contains 22 items structured in five scales (dysphagia, eating restrictions, pain, reflux and anxiety) and three single items.<sup>22</sup> Patients were asked to complete the questionnaires by themselves at home. If patients showed difficulties to understand questionnaires, additional help was provided. Baseline HRQL assessment was performed less than 2 weeks before surgery. Subsequent assessments during the follow-up period were carried out at 6, 12, and 24 months after surgery. When questionnaires were completed or returned, they were checked for missing response. If answers were absent, patients were asked to respond.<sup>9,11</sup> If responses were still missing from more than half of the questions within a scale, these questionnaires were excluded from the analyses, according to EORTC recommendations.<sup>21,23</sup>

All responses to the EORTC QLQ-C30 and STO22 questionnaires were linearly transformed into scores from 0 to 100 to standardise the raw score. In the functional scales, high scores represent better quality of life (better function), whereas high scores in symptom scales and items represent worse problems with symptoms.<sup>9</sup>

### Data analyses

Baseline characteristics and HRQL scores were analysed in relation to BWL <10% or ≥10% at 2 years. Based on previous studies, a cut-off of 10% was chosen because this percentage of BWL is considered as a severe nutritional risk marker.<sup>12–14,16</sup> Mean scores and 95% confidence intervals (CIs) for HRQL were calculated preoperatively and at 2 years after surgery. Changes of 10 or more points

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