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Original Research

Discrepancies in the use of chemotherapy and artificial nutrition near the end of life for hospitalised patients with metastatic gastric or oesophageal cancer. A countrywide, register-based study

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Abstract ***Aim:*** To evaluate the frequency and the factors associated with the use of chemotherapy and artificial nutrition near the end of life in hospitalised patients with metastatic oesophageal or gastric cancer.
Methods: Nationwide, register-based study, including all hospitalised adults (≥20 years) who died with metastatic oesophageal or gastric cancer between 2010 and 2013, in France. Chemotherapy and artificial nutrition during the final weeks of life were considered as primary outcomes.
Results: A total of 4031 patients with oesophageal cancer and 10,423 patients with gastric cancer were included. While the proportion of patients receiving chemotherapy decreased from 35.9% during the 3rd month before death to 7.9% in the final week ($p < 0.001$ for trend), the use of artificial nutrition rose from 9.6% to 16.0% of patients. During the last week before death, patients with stomach cancer were more likely to receive chemotherapy (adjusted odds ratio (aOR) = 1.35, 95% CI = 1.17–1.56) but less likely to receive artificial nutrition (aOR = 0.80, 95%CI = 0.73–0.88) than patients with cancer of the oesophagus. The adjusted rates of chemotherapy use during the last week of life varied from 1.6% in rural hospitals to

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11.2% in comprehensive cancer centres, while the adjusted probability to receive artificial nutrition varied from 12.1% in private for-profit clinics up to 19.9% in rehabilitation care facilities ($p < 0.001$).

Conclusions: Our study shows that in hospitalised patients with metastatic oesophageal or gastric cancer, the use of chemotherapy decreases while the use of artificial nutrition increases as death approaches. This raises important questions, as clinical guidelines clearly recommend to limit the use of artificial nutrition in contexts of limited life expectancy.

1. Introduction

Oesophageal and gastric cancer account for 1.1 million annual deaths worldwide [1]. Despite recent improvements in the diagnosis and treatment [2], these cancers remain associated with a poor survival. In Europe, the 5-year relative survival rate of patients diagnosed with oesophageal cancer in 2000–2007 was estimated to be about 12% [3].

In addition to life-prolonging treatments, these patients need adequate symptom management, psychological support and advance care planning. Recent findings suggest that, for patients with advanced lung cancer, the early integration of palliative care and the discontinuation of overly aggressive anticancer treatments may even improve patients' outcomes [4,5]. Aggressive care in cancer patients near the end of life impairs the overall quality of life, increases healthcare costs and has a limited impact on overall survival [6,7]. The use of chemotherapy close to death has, for instance, been found to be associated with a high burden of toxicity and more aggressive treatment procedures [8], and is now widely deemed non-beneficial [9,10]. Assessing the risk-benefit ratio of cancer care in the context of limited life-expectancy is a challenge (both clinically and ethically) that physicians have to face in their daily practice [11].

Unintentional weight loss is one of the main symptoms leading to the diagnosis of upper digestive tract cancer [12]. In patients with advanced cancer, previous gastrectomy or peritoneal carcinomatosis are also responsible for malnutrition. Half of the patients with upper digestive tract cancer suffer from malnutrition, which can be severe in up to 23% of cases [13,14]. Artificial nutrition is therefore a key component of cancer care for these patients [13,15], as it might for instance decrease the side-effects of active anticancer treatments [16]. Enteral nutrition is recommended when the patient's digestive tract is functional, while parenteral nutrition remains a second-line option because of increasing toxicity [17]. The use of artificial nutrition is, however, not recommended in patients with an expected life-expectancy shorter than 3 months because of unclear clinical benefit [18,19].

Our study aimed to evaluate the prevalence of aggressive cancer treatments over the course of the last 3 months of life of hospitalised patients with metastatic oesophageal or gastric cancer, and to identify the factors associated with the use of chemotherapy and artificial nutrition near the end of life.

2. Methods

2.1. Study design and population

We conducted a countrywide, retrospective cohort study based on data extracted from the French national hospital register. Created in 1997 and integrated into the activity-based payment scheme in 2005, this register collects administrative and medical information about every inpatient admission and outpatient visit in France, in both public and private facilities. Diagnoses are coded with the International Classification of Diseases, 10th revision (ICD-10).

We included all adult patients aged ≥20 years who died with metastatic oesophageal or gastric cancer in hospital facilities in metropolitan France between 1st January 2010 and 31st December 2013. We categorised patients with a primary malignancy of the lower-third of the oesophagus (ICD-10 code C15.5) or of the stomach (C16) as '*gastric cancer*' patients because of a likely similar histology, and those with a primary malignancy of the upper two-third of oesophagus (ICD-10 code C15.0 to C15.4 and C15.6 to C15.9) as '*oesophageal cancer*' patients [20]. Individuals aged 0–19 years at time of death, cancer patients with overlapping primary malignancies and patients who died in long-term care units were excluded.

2.2. Outcomes

The receipt of chemotherapy and the use of artificial nutrition over the course of the last 3 months of life were selected as primary outcomes. The first was defined as the existence of at least one encounter for chemotherapy (oral or intravenous) during a hospitalisation, an outpatient visit or *via* a hospital-at-home service. The latter was defined as the use of enteral or parenteral nutritional support, regardless of the route of administration and daily intake. In addition, we measured three secondary outcomes related to the administration of invasive treatments in the last 3 months before death,