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Original Research

Survival of patients with colorectal peritoneal metastases is affected by treatment disparities among hospitals of diagnosis: A nationwide population-based study

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Abstract ***Background:*** In the Netherlands, surgery for peritoneal metastases of colorectal cancer (PMCRC) is centralised, whereas PMCRC is diagnosed in all hospitals. This study assessed whether hospital of diagnosis affects treatment selection and overall survival (OS).
Methods: Between 2005 and 2015, all patients with synchronous PMCRC without systemic metastases were selected from the Netherlands Cancer Registry. Treatment was classified as cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (CRS/HIPEC), systemic therapy or other/no treatment. Hospitals of diagnosis were classified as: (1) non-teaching or academic/teaching hospital and (2) HIPEC centre or referring hospital. Referring hospitals were further classified based on the frequency of CRS/HIPEC as high-, medium- or low-frequency hospital. Multivariable regression analyses were used to assess the independent influence of hospital categories on the likelihood of CRS/HIPEC and OS.
Results: A total of 2661 patients, diagnosed in 89 hospitals, were included. At individual hospital level, CRS/HIPEC and systemic therapy ranged from 0% to 50% and 6% to 67%, respectively. Hospital of diagnosis influenced the likelihood of CRS/HIPEC: 33% versus 13% for HIPEC centres versus referring hospitals (odds ratio (OR) 3.66 [2.40−5.58]) and 11% versus 17% for non-teaching hospitals versus academic/teaching hospitals (OR 0.60 [0.47−0.77]). Hospital of diagnosis affected median OS: 14.1 versus 9.6 months for HIPEC centres versus referring hospitals (hazard ratio (HR) 0.82 [0.67−0.99]) and 8.7 versus 11.5 months for non-teaching hospitals versus academic/teaching hospitals (HR 1.15 [1.06−1.26]). Compared with diagnosis in medium-frequency referring hospitals, median OS was increased in high-frequency referring hospitals (12.6 months, HR 0.82 [0.73−0.91]) and reduced in low-frequency referring hospitals (8.1 months, HR 1.12 [1.01−1.24]).
Conclusion: Treatment disparities among hospitals of diagnosis and their impact on survival indicate suboptimal treatment selection for PMCRC.
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1. Introduction

A growing body of evidence suggests that cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) is gaining acceptance as standard of care for selected patients with limited peritoneal metastases of colorectal cancer (PMCRC) [1]. Overall survival (OS) of patients with PMCRC doubled in the last two decades, which was at least partly attributed to the increased use of both modern systemic therapy and locoregional treatment combining CRS/HIPEC [2]. Given the complexity of CRS/HIPEC, this treatment is centralised in a restricted number of high-volume HIPEC centres in the Netherlands and several other European countries.

Since all hospitals in the Netherlands treat patients with colorectal cancer, PMCRC is often diagnosed in hospitals that do not offer CRS/HIPEC. A recent Dutch survey among 185 physicians treating colorectal cancer in 71 hospitals demonstrated that approximately 25% of surgeons and 50% of medical oncologists did not regard CRS/HIPEC as standard of care in limited PMCRC [3]. Taking these results into account, the tendency to refer a patient for CRS/HIPEC may vary among hospitals of diagnosis, which may affect survival. This nationwide population-based study investigated the influence of hospital of diagnosis with potentially resectable synchronous PMCRC on treatment selection and OS.

2. Methods

2.1. Patient selection

Between 1st January 2005 and 1st January 2015, all patients diagnosed with synchronous peritoneal metastases (C48) of colorectal origin (C18−C20) in the Netherlands were selected. Subsequently, to create a cohort with potentially resectable PMCRC, all patients with synchronous systemic metastases were excluded (Appendix A). Finally, patients were excluded in case of an unspecified primary tumour, a primary sarcoma, a primary neuroendocrine neoplasm, a primary carcinoma of other/unspecified histology, a primary tumour of appendiceal origin, an unspecified primary tumour location and an unknown hospital of diagnosis (Appendix A).

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