



Improved survival after an educational project on colon cancer management in the county of Stockholm – A population based cohort study

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Abstract

Introduction: Outcomes in rectal cancer have improved dramatically after the introduction of total mesorectal excision (TME). Recently, the TME concept has been transformed into that of complete mesocolic excision (CME) in an attempt to improve prognosis for patients with colon cancer.

Patients and methods: Multidisciplinary team (MDT) workshops including the CME concept were held annually between 2004 and 2008 at the Karolinska University Hospital. The workshops focused on preoperative staging, surgery and histopathology and included lectures and live surgery sessions. To compare survival before and after the “Stockholm Colon Cancer Project” all patients diagnosed with a right sided colon cancer between January 1, 2001 and December 31, 2003 (Group 1) and from January 1, 2006 until December 31, 2008 (Group 2) in Stockholm were identified from the Swedish ColoRectal Cancer Registry (SCRCR).

Results: The proportion of patients having a tumour resection and the proportion having emergency surgery was higher in Group 1. There were more early tumours and more R0 resections in Group 2. Overall survival in all diagnosed patients and disease free survival after tumour resection was improved in the second time period.

Discussion: Surgical teaching programmes may have an impact on the management and outcome in colon cancer. The exact impact from the “Stockholm Colon Cancer Project” cannot be established, however it is likely that it contributed to the improved survival.

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Introduction

The management of patients with rectal cancer has changed dramatically in the recent two decades with the introduction of MRI based local staging, neoadjuvant treatments, improved surgical technique and pathological assessment. Specifically, total mesorectal excision (TME)

has become the accepted gold standard for rectal cancer surgery, ensuing improved local control and survival in population based reports on outcomes in rectal cancer.^{1–3}

More recently, a similar aim to improve the management and prognosis for patients with colon cancer has evolved. As in rectal cancer, a multidisciplinary team (MDT) approach has also been applied to patients with colon cancer, focussing on quality control including improved preoperative staging, surgery and pathological assessment of the specimen. The TME concept has been translated into that of complete mesocolic excision (CME) which is described as the complete mobilisation of the entire mesocolon with

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an intact covering fascia and in addition, central ligation of the blood vessels resulting in an increased retrieval of lymph nodes.^{4–7}

The Stockholm Colorectal Cancer Study Group has previously completed and reported a collaborative educational project which resulted in a significantly improved local control and 5-year disease free survival for patients with rectal cancer in the Stockholm population.^{1,8} In 2004, a similar educational project focussing on colon cancer was launched with the aim of introducing the MDT concept and CME-based surgery to colorectal surgeons, oncologists, radiologists and pathologists in the county of Stockholm. The live surgery workshops in this ‘Stockholm Colon Cancer Project’ mainly focused on CME in right-sided hemicolectomy procedures.

As reported earlier, there was an increase in the number of analysed lymph nodes and a decrease in metastatic index after surgery for right sided colon cancers within the Stockholm population, corresponding with the “Stockholm Colon Cancer Project” and the introduction of the CME concept.⁹ The surgical technique, referred to as CME, although first described on right sided colon resections, is also applicable to left sided resections. The principle of central vascular ligations and dissection along embryonic planes has earlier been addressed in rectal cancer surgery. The aim of the present population based cohort study was to assess the impact of the “Stockholm Colon Cancer Project” on survival for patients with right sided colon cancer in the Stockholm population.

Patients and methods

The county of Stockholm, together with the Island of Gotland, has a population of about 2 million inhabitants. Since 1996, clinical data on all patients with adenocarcinoma of the colon and rectum are prospectively reported to a registry at the Regional Cancer Centre in Stockholm. The reporting is mandatory and the database contains information on patient characteristics, tumour location, tumour stage, type of surgery performed, postoperative morbidity and mortality, tumour histopathology (including number of lymph nodes and lymph node status), oncological treatment, and follow-up data on recurrence and survival. The regional database, in turn, reports to a national database, the Swedish ColoRectal Cancer Registry (SCRCR).

In 2004, the Stockholm Colorectal Cancer Study Group launched a new educational project with the aim of introducing the MDT concept and CME-based surgery to colorectal surgeons, oncologists, radiologists and pathologists working in the county of Stockholm. MDT workshops were held annually between 2004 and 2008 at the Karolinska University Hospital. The workshops, led by international expertise, focused on preoperative staging, surgery and histopathology and included lectures and live surgery sessions and assessments of resected specimens. Specifically, the live demonstrations aimed to show the new

CME technique and how to create and evaluate a “perfect” CME specimen.

For the purpose of this study and to compare survival before and after the “Stockholm Colon Cancer Project” all patients with a right sided colon cancer (including the caecum, ascending colon and hepatic flexure) diagnosed from January 1, 2001 until December 31, 2003 (Group 1) and from January 1, 2006 until December 31, 2008 (Group 2) in Stockholm were identified from the SCRCR. Data were obtained regarding age, sex, tumour stage (TNM), whether resection of the tumour had been done or not, type of surgery, whether surgery was performed as an emergency or planned procedure, neoadjuvant and adjuvant oncological treatments, failure events (local recurrence, metastases and death) and survival times.

Overall survival at three years after diagnosis was compared for all patients in Group 1 and Group 2. Overall survival was also compared between the two groups in all patients having had a resection for stage I–III disease and in patients with stage IV disease or where the tumour was not resected. In patients without distant metastases having had a resection of the tumour, clinical characteristics and disease free survival (the proportion of patients alive without evidence of local or distant failure) at three years was compared between the two groups. The database does not include detailed information on whether the surgeon had performed a CME procedure or not. Time period was used in a multivariate analysis to estimate the impact of the educational project on disease free survival, after adjustment for other relevant factors that differed between the two groups.

Statistical methods

Proportions were compared using the χ^2 test and the Students t-test was used to compare patient age between the two groups. Overall survival was calculated from the date of diagnosis. Disease free survival was calculated from the date of tumour resection and patients were considered to be at risk until the diagnosis of local recurrence, metastases or death from any cause. Survival was estimated using the Kaplan–Meier method and differences between the two groups were assessed with the log-rank test. Death specific hazards’ modelling was performed using Cox’s proportional hazards regression model which included potential confounding factors. Hazard ratios were calculated along with 95 per cent confidence intervals and were analysed statistically by means of likelihood ratio tests.

Results

In all, 1716 patients were diagnosed with right sided colon cancer during the two time periods, 819 patients in Group 1 and 897 patients in Group 2. The tumour was resected in a significantly larger proportion of all diagnosed patients in Group 1 than in Group 2; 96.6% vs. 91.2%

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