

Differences in pre-operative treatment for rectal cancer between Norway, Sweden, Denmark, Belgium and the Netherlands



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Abstract

Several studies have shown remarkable differences in colorectal cancer survival across Europe. Most of these studies lacked information about stage and treatment. In this study we compared short-term survival as well as differences in tumour stage and treatment strategies between five European countries: Norway, Sweden, Denmark, Belgium, and the Netherlands.

For this retrospective cohort study all patients aged 18 years or older and operated on adenocarcinoma of the rectum without distant metastases and diagnosed in 2008 and 2009 were selected in national audit registries from Norway, Sweden, Denmark, Belgium, and the Netherlands.

Differences in pre-operative treatment between the countries were compared using univariable and multivariable logistic regression. One year relative survival and one year relative excess risk of death (RER) were compared between the five countries.

Large variation in the use of preoperative radiotherapy and chemoradiation was found between the countries. Even though, there was little variation in relative survival between the countries, except Sweden, which had a significant better one year RER of death among the elderly patients after adjustment. The differences in survival are expected to be caused by differences in peri-operative care, selection of patients, and especially management of elderly patients. The effects of preoperative treatment are expected to be seen on long term follow-up.

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Keywords: Rectal neoplasms; Quality assurance; Audit; Population-based; Preoperative treatment; Mortality

Introduction

Several studies have shown remarkable differences in colorectal cancer survival across Europe.^{1,2} For rectal cancer, five-year relative survival in the period 2000–2007 ranged from 38.8% to 59.9% between European nations.³ The variation in outcome could be explained by case mix variation, differences in socioeconomic status and variation in registration. More importantly, many countries have their own guidelines resulting in variation in treatment plans. Different treatment strategies may lead to differences in survival.^{4–6} Currently it is unknown which country has a better treatment strategy compared with the other countries.

In the last two decades clinical audits have been initiated in several European countries to improve the outcome of rectal cancer patients. A clinical audit is a quality instrument that collects detailed clinical data from different health care providers, which can be adjusted for baseline risk and subsequently fed back to individual hospitals and doctors. The European rectal cancer audits have not only successfully identified best practice and underperforming hospitals, but also achieved amongst others, a rise in survival, nationally.^{7–9} However, variation in outcome between the European countries remains.¹⁰ The European REgistration of Cancer CAre (EURECCA) project was initiated by the European CanCER Organisation (ECCO) in order to decrease these differences and to improve cancer care through Europe.^{10,11} This project has the aim to generate the best care for all cancer patients by combining national audit structures.

Most of the previous studies concerning European survival differences lacked information about stage of disease and treatment strategies within countries and therefore, results should be interpreted with caution. The present study was undertaken to compare preoperative treatment of rectal cancer patients including the differences in tumour stage between five European countries participating in the EURECCA-project: Norway, Sweden, Denmark, Belgium, and the Netherlands.

Patients and methods

Patients

Patients diagnosed with rectal cancer in 2008 and 2009 were extracted from the Norwegian Colorectal Cancer Registry (NO), the Swedish Colorectal Cancer Registry (SE), the Danish Colorectal Cancer Group database (DK), Project on Cancer of the Rectum [PROCARE] of the Belgian Cancer Registry (BE) and the Netherlands Cancer Registry (NL). All registrations include roughly the entire national

population except for the Belgian procare registration that represented <50% of the Belgian rectal cancer patients in 2008–2009. From these national registrations, all patient were included that were aged 18 years and older with adenocarcinoma of the rectum (ICD-10 C20) without distant metastases, operated upon with a rectal resection, known age, stage of disease and treatment strategy, and a vital status known at date of follow-up.

Tumour stage was based on pathology reports (pathological stage). In case pathological stage was not available, clinical stage was used. Clinical stage is based on the results of echoendoscopy and magnetic resonance imaging (MRI). If neither pathological nor clinical stage was registered, patients were defined as having an unknown stage and were excluded. Preoperative treatment was divided into four groups: no preoperative treatment, preoperative radiotherapy, preoperative chemoradiation and unknown treatment. Patients were categorized in three age groups (<65 years, 65–74 years, and ≥ 75 years).

Statistical analyses

Differences in the characteristics between the countries were calculated using a chi squared test. Univariable and multivariable logistic regressions were performed to compare the use of preoperative treatment between the countries, and to compare the operative 30-days mortality between the countries. Time of follow-up was calculated from the day of surgery until death or the last day of follow-up. One year univariable relative survival analyses were made using the Hakulinen definition¹² as the ratio of the survival observed among the patients and the survival that would have been expected based on the corresponding (age, gender, and year) general population. National life tables from the website www.mortality.org were used to estimate expected survival. Expected survival was estimated with Ederer II method.¹³ Relative Excess Risk (RER) of death were estimated using a multivariable generalized linear model with a Poisson distribution, based on collapsed relative survival data, using exact survival times. Multivariable analyses were adjusted for age (in 1 year groups, used as continuous variable in the model), gender, and stage. Follow-up was truncated at 30 days or 1 year, respectively. Stratified multivariable RER of death analyses were performed for the three age groups. Sensitivity analyses have been performed to compare whether this would change the outcomes. Belgium was excluded from the sensitivity analyses because bias cannot be ruled out when <50% of the national population is included. All analyses have been tested for statistical interaction. In all analyses, a *p*-value of <0.05 was considered to be statistically significant.

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