CIRUGÍA ESPAÑOLA

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Original article

Effect of Hospital Caseload on Long-term Outcome After Standardization of Rectal Cancer Surgery in the Spanish Rectal Cancer Project☆

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ARTICLE INFO

Article history:
Received 30 April 2016
Accepted 5 June 2016
Available online 28 September 2016

Keywords:
Rectal cancer
Local recurrence
Overall survival
Comparison of departments
Case-load
Education

ABSTRACT

Introduction: The purpose of this prospective multicentre multilevel study was to investigate the influence of hospital caseload on long-term outcomes following standardization of rectal cancer surgery in the Rectal Cancer Project of the Spanish Society of Surgeons.

Methods: Data relating to 2910 consecutive patients with rectal cancer treated for cure between March 2006 and March 2010 were recorded in a prospective database. Hospitals were classified according to number of patients treated per year as low-volume, intermediate-volume, or high volume hospitals (12–23, 24–35, or ≥36 procedures per year).

Results: After a median follow-up of 5 years, cumulative rates of local recurrence, metastatic recurrence and overall survival were 6.6 (95% CI 5.6–7.6), 20.3 (95% CI 18.8–21.9) and 73.0 (95% CI 74.7–71.3) respectively. In the multilevel regression analysis overall survival was higher for patients treated at hospitals with an annual caseload of 36 or more patients (HR 0.727 [95% CI 0.556–0.951]; P=.02). The risk of local recurrence and metastases were not related to the caseload. Moreover, there was a statistically significant variation in overall survival (median hazard ratio [MHR] 1.184 [95% CI 1.071–1333]), local recurrence (MHR 1.308 [95% CI 1.010–1.668]) and metastases (MHR 1.300 [95% CI 1.181; 1.476]) between all hospitals.

Conclusions: Overall survival was higher for patients treated at hospitals with an annual caseload of 36 or more patients. However, local recurrence was not influenced by caseload.

☆ Please cite this article as: Ortiz H, Codina A, Ciga MÁ, Biondo S, Enríquez-Navascués JM, Espín E, et al. Influencia del volumen quirúrgico en los resultados oncológicos después de estandarizar la cirugía en el Proyecto Español del Cáncer de Recto. Cir Esp. 2016;94:442–452.

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Influencia del volumen quirúrgico en los resultados oncológicos después de estandarizar la cirugía en el Proyecto Español del Cáncer de Recto

Palabras clave:
Cáncer de recto
Recidiva local
Supervivencia global
Comparación de hospitales
Volumen quirúrgico anual
Educación médica

RESUMEN

Introducción: Determinar la influencia del volumen quirúrgico en los resultados oncológicos del Proyecto del Cáncer de Recto de la Asociación Española de Cirujanos.

Métodos: Se incluyeron 2.910 pacientes consecutivos tratados con una operación curativa entre marzo de 2006 y marzo de 2010 en 36 hospitales. Los hospitales se clasificaron según el número de pacientes operados por año en: pequeños (12-23), intermedios (24-35) y grandes (≥ 36).

Resultados: Con un seguimiento de al menos cinco años la incidencia acumulada de recidiva local fue 6,6 (IC 95% 5,6-7,6), la de metástasis 20,3 (IC 95% 18,8-21,9) y la de supervivencia global 73,0 (IC 95% 74,7-71,3). En el análisis de regresión multinivel, la supervivencia global fue mayor en los hospitales que operaban 36 o más pacientes [HR 0,727 (IC 95% 0,556-0,951); p = 0,02]. El riesgo de recidiva local y metástasis no se relacionó con el volumen quirúrgico. Además, hubo una variación significativa en las tasas de supervivencia global (mediana hazard ratio [MHR] 1,184 [IC 95% 1,071-1,333]), recidiva local (MHR 1,308 [IC 95% 1,010-1,668]) y metástasis (MHR 1,300 [IC 95% 1,181-1,476]) entre todos los hospitales.

Conclusiones: En los grupos multidisciplinares seleccionados e incluidos en el proyecto de la Asociación Española de Cirujanos, que incluye la enseñanza de la escisión total del mesorrecto y la realimentación de los resultados, la supervivencia global es mayor en los hospitales con mayor volumen quirúrgico, y la variabilidad interhospitalaria de la tasa de recidiva local no se explica por el volumen quirúrgico.

Introduction

The influence of the surgical volumes of hospitals and surgeons, as well as surgeons' specialties, on the oncological results of colon and rectal cancer surgery has been the focus of several studies. The latest meta-analysis[1] published about this topic, which included 51 European and American studies, demonstrated that hospitals with higher surgical volumes had better 5-year survival rates. However, the results also suggested great variability among the hospitals of the countries included. Studies done in countries that have established teaching programs with multidisciplinary groups and registries of rectal cancer surgery outcomes have demonstrated the influence of surgical volume on survival and local recurrence.[2,3] The aim of this study was to assess the influence of surgical volume on the oncological results at hospitals participating in the Rectal Cancer Project of the Spanish Association of Surgeons (AEC).

Methods

This multicenter observational study has been conducted with the prospective database of the Rectal Cancer Project of the AEC. This teaching initiative was started in 2006 with the aim to initially compile the results from mesorectal excision surgery (which later included extended abdominoperineal amputation) from multidisciplinary groups at hospitals of the National Healthcare System that requested inclusion and met the required conditions: coloproctology units with the means for essential diagnostic techniques that performed 12 or more resections per year.

The data collected prospectively at the hospitals by surgeons in charge of the project were sent to a centralized registry, which made annual reports for each of the hospitals of the outcomes of their activity compared to the overall results of the participating hospitals. A more detailed description of the project has been published previously.[4]

Inclusion and Exclusion Criteria of the Patients

We included patients who underwent one of the three following elective surgeries: anterior resection (AR), abdominoperineal resection (APR) and Hartmann's procedure. The study was conducted from March 1, 2006 to March 1, 2010 at the first 36 hospitals included in the project that met the required conditions.

Excluded from the study were patients treated with emergency surgery, those for whom no results were available for one of the variables of interest, and those with incongruent results.

Study Variables

The outcome variables studied were: local recurrence (LR), metastasis (M) that appeared during follow-up and overall survival (OS). Confounding variables were defined as either set or random. The following were considered set confounding variables: age, categorized in 3 groups (<65, 65–80, >80 years); sex; severity of surgical risk (measured by the