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The United Kingdom National Bowel Cancer Project – Epidemiology and surgical risk in the elderly

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ABSTRACT

Objective: To evaluate the epidemiology and risk of surgery in the treatment of colorectal cancer in the elderly.

Methods: Patients undergoing colorectal cancer surgery were identified from the Association of Coloproctology of Great Britain and Ireland (ACPGBI) bowel cancer database, comprising 47,455 patients treated over a 5-year period. Demographic characteristics and outcomes were compared between patients aged <75 and those 75 or above. The primary endpoint was 30-day mortality. Secondary endpoints were the length of hospital stay, abdominoperineal excision (APER) rates and lymph node harvest.

Results: Elderly patients were likely to be female and have higher American Society of Anaesthesiology (ASA) grade, while Dukes' stage was lower. They underwent surgery less often (81% versus 88%, $p < 0.001$), but more frequently needed urgent or emergency procedures ($p < 0.001$) and non-excisional surgery (7.7% versus 6.6%, $p < 0.001$). Operative mortality was significantly higher for the older age group (10.6% versus 3.8%, $p < 0.001$), and their median length-of-stay was 2 days longer ($p < 0.001$). Mortality has improved over time for elderly patients with ASA grade III, and Dukes' stage A and D disease, but not for other subgroups.

Conclusion: Significant differences in the demographic characteristics and operative risk-factors between under-75s, and those aged 75 or above exist. These variations are reflected in the inferior outcomes experienced by elderly patients.

1. Introduction

Colorectal cancer is among the most common malignancies in Europe,[1] and is the third most commonly diagnosed cancer and third leading cause of cancer-related deaths (for both genders) in the United States.[2] The incidence of colorectal cancer (CRC) increases with advancing age, with more than 90% of patients being diagnosed after the age of 55.[3] As a result of an aging population in developed countries the management and outcome of CRC in the elderly population is becoming an increasingly important issue.

When assessed as a potential predictor of outcome, age has not been shown to have an effect on the long-term cancer-specific survival of patients with CRC.[4,5] However, postoperative morbidity and mortality following surgical resection for CRC have been shown to be significantly higher in those over 70 years of age compared with younger patients.[6] In another study, in-hospital mortality for patients over 85

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years of age was shown to be nine-times as high as that for those aged 65 and under.[7] Additional factors that were previously identified to have significant bearing on colorectal cancer mortality include American Society of Anesthesiology (ASA) grade, operative urgency (emergency or elective), metastatic disease, no cancer excision versus resection,[8] existing chronic obstructive airway disease and past history of thromboembolic disease.[9]

Survival is frequently considered to be the most important end-point of studies addressing patients with CRC.[10] However, functional results after surgery, as well as quality of life (QoL) have gained prominence in recent years. Many studies have suggested that the QoL of stoma patients is worse than that for non-stoma patients,[11,12] while others suggested the converse to be true[13,14] or identified no difference.[15,16] The nature of the operative procedure performed may therefore be important in QoL, as well as oncological in terms.

The purpose of the present study was to examine the epidemiology and risk of surgery for elderly patients undergoing colorectal surgery by reviewing data over a five-year period across hospitals in Great Britain and Ireland.

2. Methods

2.1. Data source

Data on newly diagnosed patients with colorectal cancer were extracted from the Association of Coloproctology of Great Britain and Ireland (ACPGBI) bowel cancer database, comprising information from patients with bowel cancer diagnosed between March 31st, 2000 and April 1st, 2005. Participation in this multicentre study was voluntary and its conduct has been described previously.[17] Data were collected locally by data managers dedicated to colorectal cancer or by participating surgeons, using the standardised ACPGBI Dataset[18] on all new patients presenting locally with a new diagnosis of colorectal cancer. Electronic media were used to submit data centrally and information was recorded on a Microsoft® Access 2000 database (Microsoft® Corporation, Seattle, USA). This proforma-style entry system minimised the potential for variability in the submissions. Data submitted were extensively checked for missing values, and values which were out of range or inconsistent between data fields.

2.2. End-points

The primary endpoint considered was the 30-day mortality rate and represents the proportion of patients dying within 30 days of the date of their surgery from all causes, whether death occurred as an inpatient or following discharge. Secondary endpoints compared were[1] the length of post-operative hospital stay (defined as the number of days between the date of surgery and the date of hospital discharge),[2] the abdominoperineal excision (APER) rate (the number of APERs performed divided by the sum of APERs, anterior resections and Hartmann's procedures for tumours located in the rectum or rectosigmoid junction), and[3] the proportion of excised cancers in which the reported lymph-node yield was 12 or more. APER rate and lymph node yield have been identified as surrogate end-points by the National Institute for Clinical Excellence (NICE), UK, in their guidelines for improving the outcomes in colorectal cancer surgery.

2.3. Risk factors and definitions

Patients were divided into two age groups,[1] those younger than 75 years of age at the time of surgery and[2] those aged 75 or above. Risk factors for operative mortality following colorectal cancer surgery, which have previously been identified in relation to the general population[17] and specifically in elderly patients,[8] were compared between the two age-groups overall, and for the subgroup of those undergoing APER, anterior resection (AR) or Hartmann's procedure (HP) for rectal and rectosigmoid cancer. The impact of 'the year' in which surgery was performed on the demographic characteristics and operative mortality, stratified by operative risk factors, was assessed for elderly patients. Comorbidity was assessed by the American Society of Anaesthesiology (ASA) grade,[19] tumour stage defined by the Turnbull modification to Dukes' classification,[20] and operative urgency classified into elective, urgent and emergency according to the National Confidential Enquiry into Perioperative Death (NCEPOD).[21] Postoperative (pathological) staging was used in patients who underwent surgery, while the stage for those not undergoing surgery was clinical/radiological. In comparing the procedure performed between the two age groups of interest, operations for all tumours up to the splenic flexure were considered as a single group and termed 'right-sided' resections.

2.4. Statistical analysis

Categorical data such as gender were compared between groups using the χ^2 test or Fisher's exact test as appropriate. The length of post-operative hospital stay was compared using the Mann–Whitney U test and trends within ordered categorical data, and over time, were assessed using the χ^2 test for trend (γ correction). Multivariate logistic regression analysis was undertaken to identify those factors that may be significant predictors of 30-day mortality, and length of hospital stay (categorised into normal and extended hospital stay with the cut-off point set at the 75th centile for each operative procedure across the study population).

2.5. Statistical software

The following software packages were used for the statistical analysis: Statistical Package for the Social Sciences, version 14 for Windows (SPSS®, Chicago, Illinois, USA) and Microsoft® Excel (Microsoft® Corporation, Seattle, USA).

3. Results

There were 47,455 patients extracted from the ACPGBI colorectal cancer database diagnosed with colorectal cancer between April 2000 and March 2005. Of these 21,030 (44%) were aged 75 or above. The rate of patients undergoing surgery of any kind for their cancer was significantly higher for patients below 75 compared to those aged 75 and above (88% versus 81%, $p < 0.001$). Overall 40,349 patients (85%) underwent surgery. Further analysis considered only those patients undergoing surgery for colorectal cancer.