European Journal of Oncology Nursing 17 (2013) 570–577

Contents lists available at SciVerse ScienceDirect

European Journal of Oncology Nursing

journal homepage: www.elsevier.com/locate/ejon

Long term effect of surgery and radiotherapy for colorectal cancer on defecatory function and quality of life

Gillian Knowles [a,*], Rachel Haigh [a], Catriona McLean [a], Hamish A. Phillips [a], Malcolm G. Dunlop [b], Farhat V.N. Din [b]

[a] *Edinburgh Cancer Centre, Lothian University Hospitals Division, Western General Hospital, Crewe Road, Edinburgh EH4 2XU, Scotland, UK*
[b] *Colon Cancer Genetics Group and Academic Coloproctology, MRC Human Genetics Unit, MRC IGMM University of Edinburgh, Western General Hospital, Crewe Road, Edinburgh EH4 2XU, UK*

Keywords:
Rectal cancer
Surgery
Radiotherapy
Late effects
Quality of life
Cancer survivors

ABSTRACT

Purpose: Survival from rectal cancer has improved substantially. Understanding the consequences of treatment is important to optimise patient support and minimise impact on daily life. We aimed to define the long-term prevalence of pelvic dysfunction following curative rectal cancer surgery (+/− radiotherapy) within the context of overall quality of life.
Methods: We evaluated bowel, urinary and sexual function and quality of life using three validated questionnaires in patients treated for rectal cancer. This group was compared to patients undergoing abdominal surgery without pelvic dissection for colon cancer during the same time period.
Results: The response rate was 57% (381/667) with a median time interval of 4.4 years. A subset of rectal patients documented persistent problems with faecal leakage (16%); requiring to alter daily activities (18%); always needing to wear a protective pad (17%); rarely or never emptying their bowels fully (31%); difficulty controlling the passage of gas (32%) and requiring to modify diet (30%). Altered bowel function was found to impact on overall quality of life. Men reported increased erectile function difficulties. Pre-operative radiotherapy was associated with increased defecation problems as was low level of anastomosis ($\leq$6 cm).
Conclusion: In keeping with emergent evidence, this study has quantified the extent of late adverse effects with a sub-set of rectal cancer patients reporting persistent bowel function problems. The implications are now to consider current follow-up services and to ‘trial’ new models of comprehensive assessment and interventions in patients who are ‘at risk’ of experiencing late adverse effects of treatment.

Introduction

Over the past two decades there has been substantial improvement in survival from rectal cancer as a result of earlier detection, technical surgical advances such as total mesorectal excision (TME) (Heald et al., 1982; Kapiteijn and van de Velde, 2002) and improved radiotherapy scheduling and planning (Bosset et al., 2006). From the 1990s onwards, there has been a decline in colorectal cancer mortality rates in most European countries and the United States (Cancer Research UK, 2011; Information Services Division (ISD), 2011; National Cancer Institute, 2011), translating to a larger population of rectal cancer ‘survivors’. A recent U.K. based study indicates that cancer survivors appear to have ongoing health problems, poorer general health and physical well being, increased pain, greater financial worries and reduced ability to work than individuals without a cancer diagnosis (Elliott et al., 2011). Understanding the consequences of treatment is increasingly important to optimise patient support and minimise impact on daily life.

While is has been widely recognised for some time that patients can experience bowel function difficulties within the first few months following rectal cancer treatment with a gradual improvement by a one year (Camilleri-Brennan and Steele, 2001) we are beginning to see a shift change. With the greater use of neoadjuvant treatment and surgical techniques and as survival from rectal cancer continues to improve, the later consequences of treatment are unfolding. There is now a growing body of evidence highlighting the distressing symptoms that patients may experience at a later date such as faecal urgency, leakage, urinary stress incontinence, impotence, male infertility, dyspareunia and premature menopause (Marijnen et al., 2005; Lange et al., 2007; Stephens et al., 2010). Such

---

* Corresponding author.
E-mail address: Gillian.knowles@luht.scot.nhs.uk (G. Knowles).

1462-3889/$ – see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.ejon.2013.01.010

symptoms have the potential to significantly impact on quality of life (QoL), social functioning and ability to work.

In order to help develop future intervention strategies aimed at informing and supporting patients who are 'at risk' of experiencing late adverse effects of treatment we set out to describe the long-term outcome and prevalence of pelvic dysfunction after rectal cancer treatment. To determine the site-specific issues, we compared the rectal cancer patient group to a cohort of patients who had undergone abdominal surgery but without pelvic dissection or radiotherapy for colon cancer during the same time period.

Materials and methods

Study design and setting

We evaluated bowel, urinary, sexual function and QoL in all surviving patients treated for rectal and colon cancer within NHS Lothian during the period January 2002 to December 2006 to give a minimum follow up period of two years. The study was conducted at the Western General Hospital, Edinburgh, Scotland between 2010 and 2011. Ethical approval was obtained from NHS Lothian Research Ethics Committee and LUHT Research Management approval.

Patients

All patients with primary colon or rectal cancer treated during the period January 2002 to December 2006 were identified from the South East Scotland Cancer Network (SCAN) Audit Department for comprehensive ascertainment. The total number of patients treated for rectal and colon cancer between January 2002 and December 2006 and documented alive at time of recruitment was 1041 (rectal $n = 272$, colon $n = 769$). Inclusion criteria were; patients two years or more from resection and had undergone surgery for colorectal cancer (Dukes A, B and C). Those with a liver metastasis resected with curative intent were also included. Exclusion criteria were: metastases where treatment was considered palliative and English not first language as the Memorial Sloan Kettering Cancer Centre (MSKCC) questionnaire (Temple et al., 2005) is only validated for English speakers. The final number of patients eligible for study was 667 (colon $n = 474$; rectal $n = 193$). Reasons for ineligibility included death, recurrent/metastatic disease at the time of recruitment, residence out-with Lothian region and onset of significant memory impairment. Patients out-with Lothian were excluded on the basis of incomplete information on disease status. All individual treatment plans had been discussed at a multidisciplinary meeting in line with the national clinical guidelines.

Data collection

Recruitment and data collection took place over a seven-month period. Bowel function and quality of life were assessed using three self-administered questionnaires that have been previously validated: the Memorial Sloan-Kettering Cancer Centre (MSKCC) Bowel Function Instrument (Temple et al., 2005), the European Organisation for Research and Treatment of Cancer Quality of Life (EORTC-C30) (Aaronson et al., 1993) and the European Organisation for Research and Treatment of Cancer Quality of Life Colorectal Cancer Module (EORTC QLQ-CR38) (Sprangers et al., 1999). The MSKCC Bowel Function Instrument consists of 18 items grouped into three subscales (frequency, urgency/soilage, dietary). The frequency subscale includes questions relating to the number of bowel movements per 24 h, stool consistency and the ability to get to the toilet on time. Questions relating to the impact of certain food/drink items on bowel movements are included in the dietary subscale. The urgency/soilage subscale comprises questions concerning faecal leakage and the impact of bowel function on activity.

The EORTC QLQ-C30 incorporates multi-item scales to assess levels of functioning (physical, role, cognitive, emotional, and social), symptoms, overall health and QoL. The EORTC QLQ-CR38 measures symptoms specifically related to patients with colorectal cancer such as sexual, urinary and bowel function. Permission to use all three instruments was granted from the authors.

Questionnaires were completed on one occasion only using a postal return service. Scoring manuals for the CR38, C30 and MSKCC were used to calculate the raw scores. Scores for the EORTC questionnaires fall in a range of 0–100 with higher scores indicating better functioning, whereas for symptom subscales a higher score indicates worse symptoms. In contrast, a high score on the MSKCC indicates good function. Within the three MSKCC subscales, scores for diet and urgency/soilage range from 5 to 20, whilst the frequency score is calculated from 6 to 30.

Data analysis

Comparisons were made between patients who had undergone pelvic dissection (rectal cancer patients) with those who underwent abdominal surgery without pelvic dissection (colon cancer patients) and between patients with rectal cancer who received radiotherapy and those who did not. Comparisons of demographic details were made between responders and non-responders. The Chi-squared test was applied for categorical data and the Mann–Whitney test for non-normally distributed continuous data. For all tests the level used to determine statistical significance was 5%. Statistical analysis was by SAS (v. 9.2).

Results

Questionnaires were sent to 667 patients, of whom 381 responded giving an overall response rate of 57%, 72% (138/193) for rectal cancer and 51% (243/474) for colon cancer. The median time from surgery to completing the questionnaires was 53 months (interquartile range 38–68 months).

Patient demographics and management

Those who declined to participate were older, with median age of responders 67.3 years (interquartile range 60.1, 74.3) compared to 72.2 years (interquartile range 61.7, 79.0) in non-responders ($P < .001$). There was no association between gender or tumour staging and participation in the study. There were more patients with rectal cancer in the participant group which may reflect ongoing symptoms. The patient groups studied are presented in Table 1. There were no demographic differences between patients with rectal and colon cancer. Overall there were more men than women in both groups.

The operative and oncological management of the participating patients is outlined in Table 2. Table 3 outlines the sample characteristics of rectal cancer patients who received pre-operative radiotherapy and those who did not with no significant differences noted. Forty-six rectal cancer patients underwent ileostomy closure, of which the median length of time from surgery to stoma reversal was 8.66 months (range 2 months–24 months). Within this group, the median length of time from ileostomy closure to completing the questionnaires was 41 months (range 12 months–74 months).

Bowel function

A subset of rectal cancer patients documented persistent problems with leakage of stool (8% reported as 'always'; 8% 'most of the