Quality of care indicators in rectal cancer

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Abstract

Quality of health care is a hot topic, especially with regard to cancer. Although rectal cancer is, in many aspects, a model oncologic entity, there seem to be substantial differences in quality of care between countries, hospitals and physicians. PROCARE, a Belgian multidisciplinary national project to improve outcome in all patients with rectum cancer, identified a set of quality of care indicators covering all aspects of the management of rectal cancer. This set should permit national and international benchmarking, i.e. comparing results from individual hospitals or teams with national and international performances with feedback to participating teams. Such comparison could indicate whether further improvement is possible and/or warranted. (Acta gastroenterol. belg., **2011**, 74, **445-450**).

Key words : quality of care, quality assurance, standard of care, rectum, adenocarcinoma.

Introduction

Quality of healthcare can be defined as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (1). This is a hot topic, especially for cancer care.

Rectal carcinoma is, in many aspects, a model oncologic entity. Major milestones in rectal cancer treatment during the past 25 years were the introduction of total mesorectal excision (TME) (2) and the development of a multimodal neo-adjuvant therapy concept (3). Nevertheless, there seem to be substantial differences in quality of care between countries, hospitals and physicians (4-6). To reduce hospital variation, most initiatives aim on selective referral, encouraging patients to seek care in high-volume hospitals, where cancer care is concentrated to site-specialist multidisciplinary teams (7). There is, however, a growing awareness that population-based audit of cancer services is essential to ensure high quality cancer care : as an alternative to volume-based referral, hospitals and surgeons can also improve their results by learning from their own outcome statistics and those from colleagues treating a similar patient group.

Although this is widely recognized, the vast majority of reports on the relation between quality and outcome of rectal cancer focuses on surgical outcomes mainly related to surgeon or hospital volume (8-10), level of surgical training (11), ethnicity or socio-economic status (12,13) of the patients. Those are in fact basically structural factors. The number of initiatives developing indicators to measure the quality of rectal cancer care taking into account the whole process from patient presentation to postoperative follow-up are scarce (14,15).

Quality of care indicators identified by the PROCARE workgroup

PROCARE (PROject on CAncer of the REctum), a Belgian multidisciplinary national project to improve outcome in all patients with rectum cancer (4,16,17), has been launched in 2006. Guidelines were made by a multidisciplinary group (18) and are also available on the web (19). Decentralised implementation of guidelines was organised by the scientific and professional organisations. Overall quality of care is assured by registration in a specific national database starting in 2006. Through feedback all centres are able to position themselves in comparison to national indicators. The quality of care indicators cover the following domains : diagnosis and staging, preoperative treatment, surgery, adjuvant treatment, palliative treatment, follow-up and histopathologic examination. Some indicators cover most if not all of these items, and can be considered general quality indicators.

General quality indicators

In this group five indicators are considered : overall survival by stage, disease-specific survival by stage, disease-free survival, relative survival and proportion of patients with local recurrence.

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Both survival and local recurrence rate are affected by most processes of rectal cancer care (18). Therefore, survival, disease-free survival and local recurrence are frequently used in clinical studies on rectal cancer (18, 20-23).

Diagnosis and staging

With regard to these indicators, PROCARE considers proportion of patients (a) with a documented distance from the anal verge, (b) in whom a CT of the abdomen and X-ray or CT thorax was performed before any treatment, (c) in whom a CEA was performed before any treatment, (d) in whom complete large bowel-imaging was performed before undergoing elective surgery, (e) in whom a transrectal ultrasonograpgy (TRUS) and pelvic CT and/or pelvic MRI were performed before any treatment and (f) with cStage II-III rectal cancer that have a reported cCRM (clinical circumferential resection margin). Other indicators taken into account are time between first histopathologic diagnosis and first treatment, accuracy of cM0 staging, accuracy of cT/cN staging in case of no or short radiotherapy, use of TRUS in cT1/cT2 stages, and use of MRI in cStage II or III.

The distance from the lower edge of the tumour to the anal verge is an important clinical parameter, since it co-determines the indication for preoperative treatment, the type of surgery and the outcome (18,24,25). The aim of imaging techniques such as CT, MRI and PET is to detect hepatic and extrahepatic metastatic disease (18). A combined thorax and abdomen/pelvis spiral contrast-enhanced CT is recommended for routine use (14). Pre-treatment CEA levels have been related to cancer stage and survival independent of pTN stage in nonmetastatic colorectal cancer (18). Therefore, the serum CEA level should be determined in all patients before the start of any treatment (25). It is recommended that patients with rectal cancer undergo a total colonoscopy with resection of concomitant polyps if possible (18). However, if colonoscopy is judged to be too risky or if colonoscopy is refused, a high-quality double contrast barium enema or CT-colonoscopy should be performed (14,24-26). Patients with rectal cancer should have locoregional cTN staging. TRUS and high-resolution MRI (or CT) play an important role in the staging of rectal cancer (18). An important outcome of the preoperative staging is the CRM, which is a predictor of local and distant recurrence as well as survival (27-32). The CRM can be reliably predicted by preoperative high-resolution MRI (18). According to the guidelines of the Association of Coloproctology of Great Britain and Ireland (ACPGBI), the interval between making a diagnosis of cancer and the start of treatment should be less than 4 weeks (18,33).

Preoperative treatment

In this category seven indicators are considered : proportion of cStage I patients that received preoperative radio(chemo)therapy, proportion of cStage II-III patients (a) that received a preoperative pelvic radiotherapy (RT), (b) treated with preoperative 5-FU based chemoradiation that received a continuous infusion of 5-FU, (c) treated with a long course of preoperative pelvic RT or chemoradiation that completed this preoperative treatment within the planned timing and (d) treated with a long course of preoperative pelvic RT or chemoradiation that was operated 4 to 12 weeks after completion of the (chemo)radiation, the proportion of patients with cCRM < or = 2 mm on MRI/CT that received long course preoperative radio(chemo)therapy, and the rate of acute grade 4 radio(chemo)therapy-related complications.

Preoperative (chemo)radiation therapy has become a common practice for stage II and III rectal cancers (34). It has been well documented that preoperative chemoradiation induces tumour regression and downstaging, and therefore increases tumour resectability and the rate of sphincter preservation (35-37). Furthermore, as shown by a large, prospective, randomised trial conducted by the German Rectal Cancer Study Group (3), this treatment modality results in a significantly reduced rate of local recurrence and treatment toxicity when compared with postoperative chemoradiation, while preoperative chemoradiation does not seem to offer survival advantage. Although many quality indicators on chemotherapy and radiotherapy are identified in the literature (24-26), none of these specifically address preoperative treatment. Therefore, the PROCARE recommendations on preoperative treatment were used as a basis to formulate additional indicators (18).

Surgery

The list of surgery-related quality of care indicators includes 10 items : (a) proportion of R0 resections, (b) (y)p distal margin involved (positive) after sphincter-sparing operation (SSO) or Hartmann's procedure for low rectal cancer (< or = 5 cm), (c) mesorectal (y)pCRM positivity after radical surgical resection, (d) proportion of abdominoperineal anorectal excision (APR), Hartmann's procedure or proctocolectomy with definitive ileostomy, (e) proportion of patients with stoma 1 year after sphincter-sparing surgery, (f) major leakage after partial mesorectal excision (PME) + SSO + reconstruction, (g) major leakage after TME + SSO + reconstruction (global, i.e. with or without primary derivative stoma), (h) inpatient or 30-day mortality, (i) rate of intraoperative rectal perforation and (j) postoperative major surgical morbidity requiring reintervention under narcosis after radical surgical resection.

Curative resection rate is used very often as a quality indicator (14,25,26). Indeed, the main emphasis of surgery is to obtain clear surgical margins yielding a curative R0 resection (no residual tumour) (15). TME has been considered the optimal surgical modality for the treatment of rectal cancer since Heald *et al*. reported TME in 1982 (2) ; therefore, the proportion of APR and

Hartmann's procedure is considered a very important quality indicator (being an outcome of importance to patients) (26). Surgeons should aim, wherever possible and desirable, to preserve the anal sphincter (18). A temporary defunctioning stoma should be considered each time the anastomosis is at risk for leakage after sphincter-sparing surgery (18). In general, a temporary stoma is closed within 1 year after surgery, i.e. after the end of adjuvant chemotherapy. Inpatient or 30-day mortality is an outcome that is affected by many factors (14,18,26), such as stage, age, comorbidity, mode of surgery i.e. elective/scheduled vs. urgent/emergency. These factors need to be taken into account at risk-adjustment for appropriate interpretation of this indicator (26). Intraoperative perforation increases local recurrence and decreases survival ; it occurs more frequently during APR as compared with anterior resection (18).

Adjuvant treatment

For this item the PROCARE Workgroup selected five quality indicators : (a) proportion of (y)pStage III patients with R0 resection that received adjuvant chemotherapy within 3 months after surgery, (b) proportion of pStage II-III patients with R0 resection that received adjuvant radiotherapy or chemoradiotherapy within 3 months after surgery, (c) proportion of (y)pStage II-III patients with R0 resection that started adjuvant chemotherapy within 12 weeks after surgical resection, (d) proportion of (y)pStage II-III patients with R0 resection treated with adjuvant chemo(radio)therapy, that received 5-FU based chemotherapy and (e) rate of acute grade 4 chemotherapy-related complications.

The rationale for early adjuvant therapy is that it is able to treat micrometastatic disease at a time when tumour burden is at a minimum. 5-FU given by intravenous injection for 5 days every 4 weeks for 6 cycles is the regimen for which the most evidence is available and that is clearly effective in prolonging survival in patients with stage III (18). Treatment with chemotherapy is associated with an acceptable complication rate. However, the occurrence of complications is dose-dependent and can be kept low artificially by lowering the dose.

Palliative treatment

The proportion of cStage IV patients receiving chemotherapy is the only quality indicator that was retained in this setting. The aim of palliative systemic therapy is to improve survival and quality of live in patients with metastatic disease (18).

Follow-up

In this domain, the rate of curatively treated patients that received a colonoscopy within 1 year after resection, and late grade 4 complications of radiotherapy or chemoradiation were selected.

For curatively treated patients it is recommended to perform a colonoscopy within 1 year after resection ; the aim is to detect local recurrence at an early potentially (surgically) curable stage, and to detect new primary tumours (18,26).

Histopathologic examination

The list of quality indicators in the domain of histopathologic examination includes (a) the use of a specific pathology report sheet, (b) the quality of TME according to Quirke (38,39) mentioned in the pathology report, (c) the distal tumour-free margin mentioned in the pathology report, (d) the number of lymph nodes examined, (e) the (y)pCRM mentioned in mm in the pathology report, and (f) the tumour regression grade (40) mentioned in the pathology report (after preoperative treatment).

The quality of TME according to Quirke, the harvested lymph nodes and the status of the circumferential resection margin illustrate the quality of TME and affect the patient's oncological outcome (38,41-44). The pathologist should find as many lymph nodes as possible. The median number found is an indication of the quality of the pathological examination. According to the current TNM guidelines at least 12 lymph nodes need to be examined in rectal cancer specimens (45), but higher numbers are desirable and achievable in most cases, even after preoperative radiotherapy (46). Examining a greater number of nodes increases the likelihood of proper staging (47). Yields will vary in relation to many factors ; they can, however, be maximised through high-quality surgery and diligent pathological examination (48). Examination of 6 or fewer lymph nodes is related to poor prognosis (49). Best practice demands the reporting of CRM by radiologists and pathologists alike (28,29,38). Grading of tumour regression is important since outcome is better in case of complete regression than in case of residual microscopic disease which, in turn, is associated with better prognosis than cases without or with only minor regression (40,50-52).

Conclusions and prospects

Patients deserve consistent standards regardless of where they live or are treated. The pursuit of excellence requires the definition of standards and the search is on to find what parameters best guarantee equal patient outcome and care.

Based on literature search and expert opinions, the PROCARE Workgroup has identified a set of quality of care indicators (summarised in the table) covering all aspects of the management of rectal cancer. Ideally a population-based audit should be risk-adjusted ; such approach requires intensive collaboration between clinicians and statisticians. In order to provide teams with simple, userfriendly but relevant feedback information, it might be useful to construct one quality index for the

GENERAL QUALITY INDICATORS
Overall survival by stage
Disease-specific survival by stage
Disease-free survival
Relative survival
Proportion of patients with local recurrence
DIAGNOSIS AND STAGING
Proportion of patients with a documented distance from the anal verge
Proportion of patients with abdominal CT and thoracal X-ray or CT before any treatment
Proportion of patients in whom a CEA was performed before any treatment
Proportion of patients with complete large bowel-imaging before elective surgery
Proportion of patients with TRUS and pelvic CT and/or pelvic MRI before any treatment
Proportion of patients with cStage II-III rectal cancer that have a reported cCRM
Time between first histopathologic diagnosis and first treatment
Accuracy of cM0 staging
Accuracy of cT/cN staging in case of no or short radiotherapy
Use of TRUS in cT1/cT2 stages
Use of MRI in cStage II or III
PREOPERATIVE TREATMENT
Proportion of cStage I patients that received preoperative radio(chemo)therapy
Proportion of cStage II-III patients that received a preoperative pelvic radiotherapy
Proportion of cStage II-III patients with preoperative chemoradiation that received a continuous 5-FU infusion
Proportion of patients completing long course preoperative pelvic RT or chemoradiation within planned timing
Proportion of patients operated 4 to 12 weeks after completion of long course pelvic RT or chemoradiation
Proportion of patients with cCRM < or = 2 mm that received long course preoperative radio(chemo)therapy
Rate of acute grade 4 radio(chemo)therapy-related complications
SURGERY
Proportion of R0 resections
(y)p distal margin involved (positive) after SSO or Hartmann's procedure for low rectal cancer (< or = 5 cm)
Mesorectal (y)pCRM positivity after radical surgical resection
Proportion of APR, Hartmann's procedure or proctocolectomy with definitive ileostomy
Proportion of patients with stoma 1 year after sphincter-sparing surgery
Major leakage after partial mesorectal excision + SSO + reconstruction
Major leakage after TME + SSO + reconstruction (global, i.e. with our without primary derivative stoma)
Inpatient or 30-day mortality
Rate of intra-operative rectal perforation
Postoperative major surgical morbidity requiring reintervention under narcosis after radical surgical resection
ADJUVANT TREATMENT
Proportion of (y)pStage III patients with R0 resection receiving adjuvant chemotherapy within 3 months
Proportion of pStage II-III patients with R0 resection receiving adjuvant (chemo)radiotherapy within 3 months
Proportion of (y)pStage II-III patients with R0 resection that started adjuvant chemotherapy within 12 weeks
Proportion of (y)pStage II-III patients with R0 resection treated with adjuvant chemotherapy receiving 5-FU
Rate of acute grade 4 chemotherapy-related complications
PALLIATIVE TREATMENT
Proportion of cStage IV patients receiving chemotherapy
FOLLOW-UP
Rate of curatively treated patients that received a colonoscopy within 1 year after resection
Late grade 4 complications of radiotherapy or chemoradiation
HISTOPATHOLOGIC EXAMINATION
Use of a specific pathology report sheet
Quality of TME according to Quirke mentioned in the pathology report
Distal tumour-free margin mentioned in the pathology report
Number of lymph nodes examined
(y)pCRM mentioned in mm in the pathology report
Tumour regression grade mentioned in the pathology report

outcome (aggregating e.g. overall survival, proportion of R0 resections and postoperative major surgical morbidity with reintervention under narcosis after radical surgical resection) and one quality index for the process of treating rectal cancer (with e.g. time between first histopathological diagnosis and first treatment, proportion of APR and Hartmann's procedure or total excision of colon and rectum with definitive ileostomy, and number of lymph nodes examined).

In addition to national benchmarking, i.e. comparing results from individual hospitals or teams with national performances with feedback to participating teams, we should also aim for international benchmarking. This comparison could indicate whether further improvement is possible and/or warranted.

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