

The management of rectal cancer in Belgium : a survey of our practice

M. Beauduin, J. M. Deneufbourg, W. De Neve, J. Hermans, M. T. Hoornaert, P. Scalliet, P. Spaas, J. Vanderick, M. Van Dijcke, P. Van Houtte, S. Vynckier, C. Weltens

Algemeen Ziekenhuis Sint-Maarten, Duffel, Belgium

Introduction

In 1995, a Peer Review Commission Radiotherapy was installed at the initiative of the Belgian Ministry of Health as part of a larger pilot project on quality assurance. This commission was composed of 14 members, 8 radiation oncologists (appointed by the Belgian Association of Radiation Oncology) and 6 physicists (appointed by the Belgian Association of Hospital Physicists). Peer review is only one of the activities within the Quality control of the medical performance aiming to improve quality in diagnostic and therapeutic procedures (1). Other activities in Quality assurance are development of standards and guidelines, continuous education and measurements of the treatment process (2,3,4). Radiation oncologists and physicists have already a long tradition in evaluating the existing infrastructure and measuring the treatment process.

In 1998, the Peer review has proposed to make a survey of rectal cancer management including diagnostic procedures and therapeutic approaches. Rectal cancer is an excellent example of the multidisciplinary requiring a collaboration between surgeons, radiation oncologists, gastro-enterologists and medical oncologists. The questionnaire was designed in close collaboration with our surgeon colleagues. Furthermore, radiotherapy is only one part of the treatment that may be directly influenced by the referring physician. So, those are the reasons why the study was extended to the surgeons.

In recent years, some changes in the general management of rectal cancer proved to be beneficial. The surgeons extended their resections to what is called TME or total mesorectal excision, resulting in lower figures of local recurrences. As for the radiotherapy, the highest influence on these figures of local recurrence and survival seem to come from preoperative schedules (5-10). Although chemotherapy seems to have a supplementary role in improving survival of patients with rectal carcinoma, the exact way of combining it with the other treatment modalities is still in question (11-15).

That is why we felt the importance of doing this survey.

Material and Methods

In February 1999, the Peer Review Commission Radiotherapy-Oncology sent the questionnaire first to

the chairman of the 25 Belgian radiotherapy departments, asking them to have it filled in by the radiation oncologist in charge of rectal cancer treatment in their department. Questions involved diagnostic and staging procedure, radiation techniques, the use of chemotherapy, indications for adjuvant treatments, the place of surgery... Out of the 25 centers, we received back 24 questionnaires.

Later, the same questionnaire was sent to the surgeons to be able to compare two different groups of physicians in charge of rectal cancer. This work was carried out with the collaboration of the Belgian Society of Surgical Oncology. A questionnaire was sent to all the known surgeons from a list provided by the Ministry of Health. So, more than 1300 questionnaires were sent : 168 answers were collected and 100 surgeons claimed to perform rectal surgery. In this last questionnaire more technical questions regarding the surgery were included and the answers analyzed by the Belgian Society of Surgical Oncology. They might be the subject of a separate publication.

Results

a) *General practice*

The first part of the questionnaire reviewed some administrative figures to have an idea of the department : age of the answering radiation oncologist, the number of patients treated per year, kind of hospital (private practice, academic institution...), the pattern for referring the patients, the physician in charge of the staging procedures, the type of practice. Most of the 25 radiotherapy departments are treating between 20 and 50 rectal cancer patients a year. Twenty out of 24 departments used a staging procedure and 19 out of 24 have a systematic multidisciplinary tumor board. Nevertheless, the radiation oncologists are often not seeing primarily the patients and they just checked and completed the staging procedure.

Corresponding author : P. Spaas, Algemeen Ziekenhuis Sint-Maarten, Radiotherapie-Oncologie, Rooienberg 25, 2570 Duffel, Belgium

Table I. — Recommended staging procedures

	Radiation oncologist	Surgeons
Biopsy	24/24	97/100
Proctosigmoidoscopy	24/24	96/100
Colonoscopy	20/24	96/100
CT pelvis	24/24	97/100
Imaging liver	24/24	99/100
Chest RX	23/24	97/100
CEA	24/24	97/100
CT thorax	5/24	6/100
CT brain	0/24	3/100
Barium enema	5/24	48/100
MRI	0/24	1/100
PET scan	1/24	0/100
Intrarectal ultrasound	15/24	38/100
Bone scintigraphy	6/24	16/100

Table II. — Preoperative treatment for rectal cancer according to tumor extent

Tumor extent	Radiation oncologists	Surgeons
T2N0	5/22	18/100
T3N0	21/22	60/100
T2N1	20/22	52/100
T3N1	21/22	71/100
T4 (fixed tumors)	22/22	89/100

The majority of the answering surgeons are performing a surgical procedure on between 5 and 20 rectal cancer patients a year. This means that probably more than half of the rectal cancer patients in Belgium are treated by the 100 responding surgeons ; those figures seems to be more reliable than initially suggested by the poor response of 100/1300. Although three specialized surgeons claim to treat more than 50 patients, the number of patients treated is equivalent between general surgeons and surgeons specialized in abdominal and/or oncological surgery.

b) Staging procedure

Regarding the staging procedure, there is a wide consensus between radiation oncologists and surgeons to recommend rectoscopy, proctosigmoidoscopy or total colonoscopy, pelvic CT, imaging of the liver, chest radiography and CEA tumor marker (table I). Only, surgeons seem to perform more total colonoscopy and barium enemas. Other procedures seem to be more questionable : thoracic and brain CT, bone scan. The choice

of some tests might be influenced by their local availability : MRI, PET scan, and intrarectal ultrasound. The latter is usually performed by a gastroenterologist making it unclear if this procedure is restricted to patients scheduled for a preoperative treatments : two thirds of radiation oncologists are recommending this procedure in contrast to only one surgeon out of three.

c) Preoperative therapy

Tumor extent is a major determinant in the choice of a preoperative treatment : almost all radiation oncologists are proposing a course of preoperative radiotherapy with or without chemotherapy for T3 or N1 tumors. Two thirds of surgeons are recommending such an approach for the same tumor extent (table II).

For the preoperative treatment, eleven centers are using an exclusive preoperative radiotherapy while 11 are using a combined chemoradiotherapy approach (table III). For the 11 departments using an exclusive radiotherapy approach, 6 are using a short schedule (25 Gy in 5 fractions or 30 Gy in 10 fractions) while the other 5 used the classical longer treatment (45-50 Gy in 25 fractions). Some departments used both schedules but the longer treatment is chosen with the aim of tumor shrinkage to avoid an amputation. In case of a combined preoperative radiochemotherapy treatment, the majority is delivering 45-50 Gy in 25 fractions.

For the tethered and fixed (T4) tumors that are primarily unresectable, 17 centers preferred a combined radiochemotherapy approach delivering 45-50 Gy while 5 departments used only radiation (3 out of 5 used a short 30 Gy schedule) (table III).

d) Postoperative therapy

Once again, there is a great consensus between radiation oncologists and surgeons for the indication of an adjuvant postoperative treatment : all pT3 and/or pN1 staged patients should be treated with a combined radiochemotherapy approach but there is a variety of combinations (sequential as well as concomitant schedules) (table IV). The main difference between surgeons and radiation oncologists is seen in the type of postoperative treatment : almost all radiation oncologists are advocating postoperative radiochemotherapy for T3 or N1 tumors while 40 out of 84 surgeons are proposing only adjuvant chemotherapy.

Table III. — Type of preoperative treatment (chemotherapy and radiation schedule) according to non and fixed tumors

Treatment	Non fixed tumors		Fixed tumors	
	Radiation Oncologists	Surgeons	Radiation Oncologists	Surgeons
5 x 5 Gy	4/22	16/100		8/100
10 x 3 Gy	4/22	10/100	3/22	6/100
45-50 Gy	13/22	36/100	19/22	56/100
Not specified	1/22	6/100		19/100
RT + chemotherapy	11/22	42/100	17/22	45/100

Table IV. — Postoperative adjuvant treatment according to tumor extent

Tumor extent	Radiations oncologists	Surgeons
T2N0	2/24	11/100
T3N0	22/24	65/100
T2N1	24/24	84/100
T3N1	24/24	84/100
Type of adjuvant treatment		
RT+ chemotherapy	23/24	44/100
CT alone	0/24	40/100

Table V. — Radiation therapy technique

Prone position	18/24
Use of contrast medium at simulation	20/24
Number of fields (3 or 4)	24/24
Number of fields treated daily (3 or 4)	23/24
Custom blocks	21/24

e) Radiotherapy

Considering the radiation technique, most of the departments are treating their patients in prone position, using contrast medium at the time of the simulation to better delineate the target volume and organs at risk, using wedges and custom (individual) blocks and treating a minimum of 3 fields a day (tableV). Also to mention is, that new techniques using belly board (treatment table with a hole for the abdomen to have more displacement of the small bowel out of the lateral treatment fields) and three-dimensional reconstruction and dose planning are already routinely being used in most centers (16).

f) Follow up

The last part of the questionnaire consisted of questions concerning follow up of patients treated for rectal cancer. Here also, some variety was found (table VI), although most of the centers are quite close to using the colorectal cancer surveillance guidelines issued by the American Society of Clinical Oncology (17).

Discussion

The results in full detail were published in the Report of the Activities of the Peer Review Commission Radiotherapy in 1999 (18). For the purpose of this article a selection was made of the most reliable, contributory and interesting results. The results of the questionnaire sent to the 25 Belgian radiotherapy departments point out a nice uniformity. It is already worth mentioning that on many questions in this questionnaire there is still a lot of debate in the literature and differences in opinions on these questions were expected. In some departments most of the patients are included in randomized studies where more progressive treatments are evaluated requiring more sophisticated staging procedures and radiation techniques.

The variety in the treatment combinations and the techniques used is only a reflection of the different questions and opinions found in the literature.

For T3 or N1 tumors, preoperative treatment is recommended by almost all radiation oncologists and the majority of surgeons. This is in accordance with the results of the preoperative studies (5-10). For the choice of the preoperative treatment schedule some differences still remain, although more centers are accepting short schedules of exclusive radiotherapy when tumor shrinkage is not an issue. This shift of treatment follows the results of the studies done in Sweden and France (7,19). If tumor shrinkage is an issue (to avoid amputation or make fixed tumors operable) most centers choose combined radiochemotherapy (the majority of them use a long radiation schedule) according to the results of the postoperative studies (13-15). According to the same studies the majority of patients that had no preoperative treatment and prove to be pT3 and/or pN1 will have postoperative combined radiochemotherapy, although almost half of the surgeons proposed adjuvant chemotherapy alone.

Another interesting finding is the great efforts made in radiation centers to improve the quality of the

Table VI. — Follow up visits and tests

Follow-up	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1 st year	3m	3m	3m	3m	3m		3m	3m	4m		2m	3m	3m	3m	3m			3m			3m		6m	
2 nd year	4m	4m	4m	3m	3m		6m	3m	6m		3m	6m	4m	4m	3m			3m			6m		6m	
3 rd year	6m	6m	4m	6m	4m		6m	4m	6m		6m	1y	4m	6m	6m			4m			6m		6m	
4 th year	6m	6m	6m	6m	6m		6m	4m	6m		6m	1y	4m	1y	6m			4m			6m		1y	
5 th year	6m	6m	6m	6m	1y		6m	6m	6m		1y	1y	6m	1y	6m			6m			6m		1y	
TEST																								
CEA	6m		4m	6m	1y		6m	4m	6m		3m	6m	4m	4m	4m			4m			6m		6m	
chestXR	6m		1y	1y				1y	6m		1y	1y	1y	1y	1y			1y			1y		1y	
USLiver	6m		1y	1y				1y	6m		1y	1y	1y	1y	6m			4m			1y		1y	
Ctup abd															1y								3m	
Ctlow abd				1y			1y	1y				1y	1y		1y						1y			
SIGM SCOP																					1y		1y	
COL SCOP			1y	2y		2y	2y			6m													1y	
Liv funct			4m	6m	1y		4m				1y	1y	2y	2y	1y			1y			6m		6m	

radiation treatment in spite of the rising workload and the lack of funding for those new procedures. We know from a lot of studies on radiation therapy technique in rectal cancer that not only results of treatment might be better, but certainly high quality radiation treatment lowers the risk for acute as well as long term side effects (NTCP : normal tissue complication probability) (20-32).

The results of the questionnaire sent to the Belgian surgeons show a larger disparity in opinions. The remarks on the technical questions made by the surgeons who analyzed these answers can be found in the original Report of the Activities of the PRCR in 1999 (8,18,33-37). The results and analysis of these questions could be the subject of a separate publication by the Belgian Society of Surgical Oncology.

The most striking difference between the results of the radiation oncologists and the surgeons is that, although 83% of radiation oncologists are member of a systematic multidisciplinary tumor board and are using protocols to treat their patients, 93% of them give (neo) adjuvant therapy to patients from stage T3N0, while 71% of surgeons claim to work with protocols or in a multidisciplinary team, only 60% of them will refer patients with the same stage for (neo) adjuvant treatment.

One should conclude that, to ameliorate the quality of treatment by preventing under- and over treatment of patients with rectal cancer, the use of guidelines and treatment protocols written by a multidisciplinary tumor board, evidence based and in agreement between the different specialties concerned, can be very helpful.

Peer review is a powerful quality assurance tool and predominantly profession driven Peer review is well accepted as long as it is based on education rather than repression (38). Peer review and feedback of the data has also been shown to bring the physicians to a critical reflection on their own practice and, if necessary, to urge them to adjust their practice.

To evaluate any adjustments in treatment as a result of the feedback of the data and intermediate publications in the literature (8,15,39,40), the aim is to repeat this questionnaire in the near future together with other projects of quality assurance in cooperation between the Belgian Society of Surgical Oncology and the Peer Review Commission Radiotherapy-Oncology. Another road to be explored is certainly to extend this questionnaire next time to the gastroenterologists who often are the first to see the patient.

References

- BATHIA A., SINGH N., ARORA V., GUPTA K. Prospective Peer Review in fine needle aspiration cytology, another step toward quality assurance. *Acta Cytol.*, 1998, **42** : 865-868.
- BRUNDAGE M., DIXON P., MACKILLOP W. A real time audit of radiation therapy in a regional cancer center. *Int. J. Radiat. Oncol. Biol. Phys.*, 1999, **43** : 115-124.
- DUTREIX A., VAN DER SCHUEREN E., DERREUMAUX S., CHAUDAUDRA J. Preliminary results of a quality assurance network for radiotherapy centers in Europe. *Radiother. Oncol.*, 1993, **29** : 97-101.
- WELTENS C., LEUNENS G., COSSET J.M., DUTREIX A., ESCHWEGE F., VAN DER SCHUEREN E. Accuracy in mantle field irradiations : treated volume and daily dose. *Radiother. Oncol.*, 1993, **29** : 18-26.
- GOLDBERG P.A., NICHOLLS R.J., PORTER N.H., LOVE S., GRIMSEY J.E. Long-term results of a randomized trial of short-course low-dose adjuvant preoperative radiotherapy for rectal cancer : reduction in local treatment failure. *Eur. J. Cancer*, 1994, **30A** : 1602-1606.
- MARSH P.J., JAMES R.D., SCHOFIELD P.F. Adjuvant preoperative radiotherapy for locally advanced rectal carcinoma. Results from a prospective, randomized trial. *Dis. Colon Rectum*, 1994, **37** : 1205-1214.
- GÉRARD A., BUYSE M., NORDLINGER B. *et al.* Preoperative radiotherapy as adjuvant treatment in rectal cancer. Final results of a randomized study of the European Organization for Research and Treatment of Cancer (EORTC). *Ann. Surg.*, 1988, **208** : 606-614.
- MARIJNEN C.A., NAGTEGAAL I.D., KLEIN-KRANENBARG E. *et al.* No downstaging after short-term preoperative radiotherapy in rectal cancer patients. *J. Clin. Oncol.*, 2001, **19** : 1976-1984
- ARNAUD J.P., NORDLINGER B., BOSSET J.F. *et al.* Radical surgery and postoperative radiotherapy as combined treatment in rectal cancer. Final results of a phase III study of the EORTC. *Br. J. Surg.*, 1997, **84** : 352-357.
- TREURNIET-DONKER A.D., VAN PUTTEN W.L. *et al.* Postoperative radiation therapy for rectal cancer. An interim analysis of a prospective, randomized multicenter trial in the Netherlands. *Cancer*, 1991, **67** : 2042-2048.
- FISHER B., WOLMARK N., ROCKETTE H. *et al.* Postoperative adjuvant chemotherapy or radiation therapy for rectal cancer : results from NSABP Protocol R-01. *J. Natl. Cancer Inst.*, 1988, **80** : 21-29.
- TVEIT K.M., GULDVOG I., HAGEN S. *et al.* Randomized controlled trial of postoperative radiotherapy and short-term time-scheduled 5-fluorouracil against surgery alone in the treatment of Dukes B and C rectal cancer. Norwegian Adjuvant Rectal Cancer Project Group. *Br. J. Surg.*, 1997, **84** : 1130-5.
- O'CONNELL M.J., MARTENSON J.A., WIEAND H.S. *et al.* Improving adjuvant therapy for rectal cancer by combining protracted infusion fluorouracil with radiation therapy after curative surgery. *N. Engl. J. Med.*, 1994, **331** : 502-507.
- MANSOUR E.G., LEFKOPOULOU M., JOHNSON R., DOUGLASS H. A comparison of postoperative adjuvant chemotherapy, radiotherapy or combination therapy in potentially curable resectable rectal carcinoma. An ECOG study Est 4276 (abstract). *Proc. Am. Soc. Clin. Oncol.*, 1991, **10** : 154.
- WOLMARK N., WIEAND H.S., HYAMS D.M. *et al.* Randomized trial of postoperative adjuvant chemotherapy with or without radiotherapy for carcinoma of the rectum : National Surgical Adjuvant Breast and Bowel Project Protocol R-02. *J. Natl. Cancer Inst.*, 2000, **92** : 388-396.
- DAS I.J., LANCIANO R.M., MOVSAS B., KAGARVA K., BARNES S.J. Efficacy of a belly board device with CT-simulation in reducing small bowel volume within pelvic irradiation fields. *Int. J. Radiat. Oncol. Biol. Phys.*, 1997, **39** : 67-76.
- American Society of Clinical Oncology : Recommended Colorectal Cancer Surveillance Guidelines by the American Society of Clinical Oncology. *J. Clin. Oncol.*, 1999, **17** : 1312-1321.
- Verslag van de Commissie Peer Review in de Radiotherapie, 1999 : 24-61.
- Swedish Rectal Cancer Trial. Preoperative irradiation followed by surgery vs surgery alone in resectable rectal carcinoma - postoperative morbidity and mortality in a Swedish multicenter trial. *Br. J. Surg.*, 1993, **80** : 1333-1336.
- LESCHERT J.G., LEBESQUE J.V., DE BOER RW, HART A.A., BARTELINK H. Dose-volume correlation in radiation-induced late small-bowel complications : a clinical study. *Radiother. Oncol.*, 1990, **18** : 307-320.
- FRYKHOLM G.J., GLIMELIUS B., PÅHLMAN L. Preoperative or postoperative irradiation in adenocarcinoma of the rectum : Final treatment results of a randomized trial and an evaluation of late secondary effects. *Dis. Colon Rectum*, 1993, **36** : 564-572.
- MAK A.C., RICH T.A., SCHULTHEISS T.E., KAVANAGH B., OTA D.M., ROMSDAHL M.N. Late complications of postoperative radiation therapy for cancer of the rectum and rectosigmoid. *Int. J. Radiat. Oncol. Biol. Phys.*, 1994, **28** : 567-603.
- PÅHLMAN L., GLIMELIUS B. Pre- and postoperative radiotherapy in rectal carcinoma. Report from a randomized multicenter trial. *Ann. Surg.*, 1990, **211** : 187-195.
- WITHERS H.R., PETERS L.J., TAYLOR J.M. Dose-response relationship for radiation therapy of subclinical disease. *Int. J. Radiat. Oncol. Biol. Phys.*, 1995, **31** : 353-359.
- DENHAM J.W. The radiation dose-response relationship for control of primary breast cancer. *Radiother. Oncol.*, 1986, **7** : 107-723.

26. FLETCHER G.H. Lucy Wortham James Lecture. Subclinical disease. *Cancer*, 1984, **53** : 1274-1284.
27. GRAY L.H., CONGER A.D., EBERT M., HORNSEY S., SCOTT O.C.A. The concentration of oxygen dissolved in tissue at the time of irradiation as a factor in radiotherapy. *Br. J. Radiol.*, 1953, **26** : 638-648.
28. TROTTI A., KLOTCH D., ENDICOTT J., RIDLEY M., GREENBERG H. A prospective trial of accelerated radiotherapy in the postoperative treatment of high risk squamous cell carcinoma of the head and neck. In : JOHNSON J.T., DIDOKLAR M.S. (eds). Head and neck cancer. Amsterdam : Elsevier, 1993 : 13-21.
29. FOWLER J.F. The linear-quadratic formula and progress in fractionated radiotherapy. *Br. J. Radiol.*, 1989, **62** : 679-694.
30. GLIMELIUS B., ISACSSON U., JUNG B., PÅHLMAN L. Radiotherapy in addition to radical surgery for rectal cancer - evidence for a dose-response effect favouring preoperative treatment. *Int. J. Radiat. Oncol. Biol. Phys.*, 1997, **37** : 281-287.
31. CEDERMARK B., JOHANSSON H., RUTQVIST L.E., WILKING N. The Stockholm I trial of preoperative short term radiotherapy in operable rectal carcinoma. A prospective randomized trial. *Cancer*, 1995, **75** : 2269-2275.
32. HOLM T., SINGNOMKLAO T., RUTQVIST L.E., CEDERMARK B. Adjuvant preoperative radiotherapy in patients with rectal carcinoma. Adverse effects during long term follow-up of two randomized trials. *Cancer*, 1996, **78** : 968-976.
33. SAGAR P.M., PEMBERTON J.H. Surgical management of locally recurrent rectal cancer. *Br. J. Surg.*, 1996, **83** : 293-304.
34. HEALD R.J., HUSBAND E.M., RYALL R.D. The mesorectum in rectal cancer surgery - the clue to pelvic recurrence ? *Br J Surg*, 1982, **69** : 613-616.
35. ENKER W.E., THALER H.T., CRANOR M.L., POLYAK T. Total mesorectal excision in the operative treatment of carcinoma of the rectum. *J Am Coll Surg*, 1995, **181** : 335-346.
36. MAC FARLANE J.K., RYALL R.D., HEALD R.J. Mesorectal excision for rectal cancer. *Lancet*, 1993, **341** : 457-460.
37. ADAM I.J., MOHAMDEE M.O., MARTIN I.G. *et al.* Role of circumferential margin involvement in the local recurrence of rectal cancer. *Lancet*, 1994, **344** : 707-711.
38. KUTCHER G., SMITH A., FOWBLE B. Treatment planning of primary breast cancer : a patterns of care study. *Int. J. Radiat. Oncol. Biol. Phys.*, 1996, **36** : 731-737.
39. FREYER G., BOSSARD N., ROMESTAING P. *et al.* Addition of oxaliplatin to continuous fluorouracil, L-folinic acid, and concomitant radiotherapy in rectal cancer : the lyon R97-03 phase I trial. *J. Clin. Oncol.*, 2001, **19** : 2433-2438.
40. KAPITEIJN E., MARIJNEN A.M., NAGTEGAAL I. *et al.* Preoperative radiotherapy combined with total mesorectal excision for resectable rectal cancer. *N. Engl. J. Med.*, 2001, **345** : 638-646.