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Quality assurance in surgical oncology (QASO) within the European Organization for Research and Treatment of Cancer (EORTC): current status and future prospects

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Abstract

The European Organization for Research and Treatment of Cancer (EORTC) has a long history in the development of quality assurance, in particular in radio- and chemotherapy. Quality assurance in surgical oncology is considered to be more complicated, because it is a multistep procedure depending on the individual. Because of the growing importance of the quality of surgical intervention in the multi-modality treatment approach of most cancers, the EORTC recently decided to investigate the current status of quality assurance programmes, both outside and within, the EORTC. The review of EORTC involvement in this area has been conducted on the basis of interviews with subcommittee chairmen and Data Center teams of the EORTC clinical research groups. In addition, clinical trial protocols, case report forms (CRFs) and publications by the EORTC groups related to this field were considered as possible sources of information. Several methods have been used or are currently under investigation to ensure the quality of surgery within clinical trials. These include review of reported data, standardisation of surgery and pathology forms, training sessions and site visits. However, there has been no attempt to harmonise these initiatives across the different medical specialties. The EORTC will have to address this problem within its short-term scientific strategy.

Keywords: Surgery; Quality control; Clinical trials; Clinical protocols; Programme evaluation; Practice patterns; Physicians' role; Practice guidelines; Data collection; Quality of health care

1. Introduction

Within the European Organization for Research and Treatment of Cancer (EORTC), quality assurance has been an area of interest for many years [1]. In the 1980s, the EORTC received several grants from the European Union to perform quality control projects at different levels. As part of this programme, the Radiotherapy Group (RTG) started to investigate the quality and homogeneity of the radiotherapy delivered by institutions participating in trials of this group [2–7]. Various techniques were used for this purpose, including Dummy Run, equipment checks and *in vivo* and *in vitro* dosimetry, immediate review of first randomised patients [8–20]. The programme has demonstrated that the establishment of a quality assurance programme in radiotherapy was feasible and could contribute to uniform important aspects of radiotherapy treatment of the participating institutions.

In addition, the Quality Assurance Committee (QAC) initiated projects regarding quality assurance in chemotherapy and reporting of data in clinical trials [21–24]. Considerable variation was found between centres in the organisation of chemotherapy administration. However, more striking differences were noted between the type and quality of hospital files regarding the (lack of) systemic recording of treatment-related data. As a consequence, stricter guidelines concerning the calculation of doses of chemotherapy have been defined. Furthermore, a systemic therapy checklist was developed to facilitate the reporting of the sequence, timing and doses of chemotherapy and treatment-related toxicity as well.

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The use of the EORTC systemic checklist markedly increased the quality and quantity of treatment data reported in the patient's file [25].

In the field of surgery, a quality control programme was implemented by the Melanoma Group with regard to isolated limb perfusion as adjuvant treatment in melanomas located on the extremities [26]. The performance of site visits resulted in a decrease of surgery-related protocol violations from 28 to 11%, which showed the feasibility of surgical quality control.

More recently, the importance of the quality of surgery and its influence on outcome has been shown more clearly. The quality of local surgical therapy for solid tumours influences local control to a large extent. For many years, most treatment failures were considered to be caused by the biological behaviour of the tumour rather than by an inadequate local therapy. However, several studies have shown [27–31] that an improvement in the surgical procedure had much more influence on local recurrence rates than the use of adjuvant radiotherapy. The role of surgery has been questioned in adjuvant trials, which are very common within the EORTC. If the quality of surgery varies between the participating centres and individual surgeons, then how reliable is the effect of adjuvant treatment? Such an ambiguous situation is, for example, visible in the trial on the effect of radiotherapy following total mastectomy as reported by Overgaard [32]. Mean local recurrence rates of 9% (irradiated patients) versus 32% (non-irradiated group) were observed, which are both considered to be rather high. The authors clearly identified important variations in the extent of surgery. Both the management of the axilla and the mastectomy seemed to have been inappropriate, since more than half of the recurrences were on the chest wall. It was concluded, that with the *current* surgical methods of treatment, radiotherapy seemed to be required for adequate loco-regional control. This has resulted in the standard application of radiotherapy following mastectomy.

Although it is known that a wide variation may exist in the quality of surgery, it seems virtually impossible to objectively assess the quality of surgery, in contrast to the objectively measurable treatment variables in chemo- and radiotherapy. The success of an operation depends on the sequence of numerous manual actions/technical factors, in which the individual surgeon is the only determinant. Because the evaluation of the actual surgical treatment is so complex, surrogate indicators related to outcome usually assess the quality of surgery. Frequently used outcome parameters are either short-term morbidity and mortality, or long-term local control and survival.

On the basis of the success of a previous quality assurance programme, the importance of surgery in local control and the evidence that outcome may be related to the quality of treatment, the EORTC decided that, although difficult, some type of uniformity in the quality of surgery should be guaranteed in order to provide reliable and proper results in surgical and adjuvant trials.

As guidelines on this topic are not yet available, the QAC of the EORTC started with an inventory of the available experience and future plans within the groups. The ultimate goal was to try to identify quality criteria, which could be used for all groups within the EORTC.

Quality assurance activities within the groups are handled by different sub-committees in collaboration with representatives of Data Center staff. Therefore, a description will be given of the presence of these sub-committees within the EORTC groups and their respective responsibilities. This section will be followed by the evaluation of current practices regarding protocol descriptions and documentation on the case report forms (CRFs), preceding specific projects on Quality Assurance in Surgical Oncology (QASO).

2. Methods

Between the end of 2000 and February 2001, all sub-committee chairmen and Data Center teams of 10 EORTC clinical research groups which are active in the field of quality assurance in surgical oncology were interviewed (see Table 1). Ten clinical research groups are active in fields related to specific tumour sites, including the Radiotherapy Group (RTG). The RTG was included in the project because radiotherapy also focuses on local control. Moreover, most of the patients treated by radiotherapy have been operated on as well. Therefore, both the quality of radiotherapy and surgery are of importance for the evaluation of the efficacy of treatment.

The aim of the interviews was to acquire information on general strategies and specific projects within groups in the field of quality assurance in surgical oncology.

All 61 protocols of the abovementioned groups were evaluated to select the studies in which local control was considered to be of importance. As the quality of surgery mainly influences the local recurrence rates, only trials reporting on local recurrence, disease-free or progression-free survival were examined together with trials in which an 'adequate' resection was specifically required. The majority of these protocols were open during the last evaluation (January 2001). In addition, two Gastrointestinal Tract Cancer Group (GITCG)-trials, which had been closed to entry in 1998, were examined, because the number of open trials were too limited to allow a proper evaluation. In other groups (Breast Cancer Group, Genito-Urinary Tract Cancer Group and Lung Cancer Group) trials to be opened soon were included for the same reason. Altogether, 23

protocols were selected for further evaluation concerning parameters in the fields of surgery, pathology and radiology.

Publications and reports by the individual EORTC groups on projects related to quality assurance in surgery and pathology, were also evaluated and reported.

3. Results

3.1. EORTC groups' subcommittees

Table 1 shows the presence within a group of formal sub-committees for quality assurance, surgery and pathology. In general, the quality assurance sub-committee is responsible for the admission and audit of the group members, the surgery sub-committee for the description of the surgical procedures in the protocol and the pathology subcommittee is either active in the quality of pathology (reporting) and/or pathology review/marker studies. All together their activities are essential to enable quality assurance in surgical oncology.

3.2. Quality assurance sub-committees (QASC)

In 1998, minimal requirements for quality assurance within the EORTC groups were defined by the EORTC Quality Assurance Committee (QAC). These requirements consisted of the nomination of a responsible investigator for quality assurance matters of the group, the creation of a QASC with the purpose of reviewing membership and checking the compliance with the regulations of the group. Furthermore, the sub-committee should identify, discuss and address specific quality assurance problems which may be 'disease or modality' oriented and suggest possible perspectives of research programmes. The QASC should provide a yearly report of its activities to the Quality Assurance Unit (QAU) of the Data Center.

In seven out of 10 groups, a quality assurance committee is present and active (Table 1). The Head and Neck group (HNCG) appointed a Quality Assurance Co-ordinator instead of a committee, due to the limited size of the group. In the Melanoma Group, no quality assurance committee is present; however, quality assurance activities have been undertaken by the Board of the Group in collaboration with the Data Center team. There is no QASC in the EOI and the STBSG, which are all small groups and mainly consist of specialised institutions. The STBSG does, however, site visit at each applying institution.

The tasks of the QASCs usually include the audit of membership and the initiation of quality assurance programmes which are either disease- or modality-specific. Table 2 shows the current tasks of the different quality assurance sub-committees.

All of the seven groups that have a quality assurance sub-committee, are active regarding the audit of membership and the evaluation of the compliance of the group members with the regulations of the group. The latter is generally implemented through some type of quality control of the data collected in clinical trials. Concerning surgery, solely the GITCG and the GCG have discussed structural projects in quality assurance within this sub-committee. In the other groups, quality assurance programmes related to specific treatment modalities are not handled by the QASC. It is the responsibility of the surgery sub-committee or the study co-ordinator of specific protocols. In the RTG, the QASC has defined minimum criteria for radiotherapy departments to participate in EORTC trials.

In most groups, a quality assurance questionnaire has been developed separately for the selection of new group members. However, the number of questions concerning surgery varies.

Table 3 shows whether information, considered to be of importance for quality assurance is collected by the questionnaires within the different groups.

A majority of the questionnaires require information related to the general structure and management of the hospital. This information includes the type of hospital and the number of patients treated per year. The

Table 1
Presence of group sub-committees

Group name	Quality Assurance Sub-committee	Surgery Sub-committee	Pathology Sub-committee
BCG (Breast Cancer Group)	+	+	+
EOI (European Osteosarcoma Intergroup)	–	+	+
GITCG (Gastrointestinal Tract Cancer Group)	+	+	+
GUTCG (Genito-Urinary Tract Cancer Group)	+	–	+
GCG (Gynecological Cancer Group)	+	+	+
HNCG (Head and Neck Cancer Group)	+	+	+
LCG (Lung Cancer Group)	+	+	+
MG (Melanoma Group)	–	+	+
RTG (Radiotherapy Group)	+	–	–
STBSG (Soft Tissue and Bone Sarcoma Group)	–	+	+

+, present; –, not present.

presence of a 'joint clinic', or multi-disciplinary consultations is checked in approximately half of the questionnaires. The information collected on hospital facilities like radiology, pathology and nuclear medicine is scarce. The situation concerning the information related to volume of activities and staff members in the department of surgery and the hospital in general, can be summarised as follows. In six groups, this information should be filled in either by the applying *institution* or by the applying *department* (GITCG, GCG, HNCG, LCG, MG, RTG). As a result, the questionnaire will provide heterogeneous information. In some cases, it will be related to the overall hospital characteristics. In other cases, it will provide parameters related to a certain department (LCG). As a consequence, only the name of the responsible surgeon will be known, if the surgical department is not applying, because the questionnaire does not require information regarding the surgical department specifically except for the name of a representative. Concerning the GCG and RTG, the applying department will obviously be known. The GITCG and the HNCG have added a paragraph collecting information about the numbers of patients treated yearly and the number of staff members. The MG has restricted the required information on volume to the number of melanoma patients treated during the last 2 years and does not require any information about staff members.

Some groups have written a Standard Operating Procedure (SOP) on the membership requirements and/or on the functioning of the QASC (BCG, GITCG, RTG). This document is of importance for objective admission of new members and objective audit of the performance of group members.

The initiation of programmes concerning quality assurance in surgical oncology (QASO) will be discussed later.

3.3. Surgery sub-committees

Table 1 shows the presence of a surgery sub-committee for the individual groups. In all groups, except for the GUTCG either a surgery or a loco-regional control sub-committee (STBSG/BCG) is present. Although there is no surgery sub-committee in the GUTCG, this group has been active concerning QASO. Sub-committees per tumour type have initiated QASO programmes in their fields.

The main task of the surgery sub-committees is to design and develop surgical trials or trials related to loco-regional therapy. Some sub-committees also write the surgical part of the protocols and/or are responsible for the development of a QASO programme.

3.4. Pathology sub-committees

A pathology sub-committee is present in all groups (Table 1).

The majority of the pathology sub-committees are focused on pathology review, either systematic (EOI and STBSG), but more often incidental (remaining

Table 2
Tasks of the quality assurance sub-committees

Group name	Audit membership	Compliance with regulations	QASO[a]
BCG	+	+	–
GITCG	+	+	+
GUTCG	+	+	–
GCG	+	+	+
HNCG	+	–	–
LCG	+	+	–
RTG	+	+	–

[a] Quality assurance in surgical oncology.
+, present; –, not present.

Table 3
Quality Assurance Questionnaires

Group name	Questionnaire	Hospital type	Volume	Facilities radiology	Nuclear medicine	Pathology	MDC	Department of Surgery			
								Total volume	Volume specific area	No staff members	Specialisation
BCG	+	+	+	+	+	+	+	–	+	+	+
EOI	–	–	–	–	–	–	–	–	–	–	–
GITCG	+	+	+	–	–	±[a]	+	–	+	+	+
GUTCG	+	–	+	+	+	–	–	+	–	+	–
GCG	+	+	+	–	–	–	–	–	+	+	–
HNCG	+	+	+	+	–	+	+	–	+	+	+
LCG	+	+	+	+	–	–	+	–	+	+	–
MG	+	+	–	–	–	–	+	–	+	+	+
RTG	+	+	+	–	–	–	+	–	–	–	–
STBSG	–	–	–	–	–	–	–	–	–	–	–

+present; – not present; MDC, multidisciplinary consultation/'joint clinics'.
[a] Surgeon is asked if he asks consent from the local pathologist for trials and if the pathologists systematically reports the number of removed and positive lymph nodes.

groups). This procedure will ensure the quality of staging, but obviously cannot evaluate the quality of surgery. Only several blocks of the specimen will be available to the reference pathologist, which will not allow a correct evaluation of the resection margins and/or the number of resected lymph nodes. Other fields of interest are translational research and standardising pathology reporting. The latter initiative is undertaken through a detailed description of the information to be reported, as well as through specific data collected in the CRFs (EOI, HNCG, LCG and STBSG).

3.5. Evaluation of clinical trial protocols concerning surgery and pathology

The 23 selected protocols and CRFs have been evaluated with respect to parameters of interest in the fields of surgery and pathology, which is shown in Table 4. A particular attention has been paid to the extent of the descriptions of surgical and pathological procedures in the protocol and the way the adherence to these guidelines was checked in the CRFs. The extent of the descriptions has been categorised into: no description (−), limited guidelines (±), general guidelines (+), detailed description (++) and minute/precise description (+++).

The minimum criteria to evaluate the surgical intervention include the type of surgical procedure, the extent of local surgery and the extent of the lymphadenectomy. The margins of resection and the number of (resected and involved) lymph nodes were considered as minimum criteria for the reporting of the pathological examination. Consequently, a minus in the table means, that this information is not collected on the CRFs, a ± indicates that the criteria are partially met, a + means that these items are collected. More detailed CRFs are rewarded with an increasing number of pluses. Other parameters checked include the collection of the original surgery and/or pathology reports and pathology review.

The quality of pre-operative imaging is also very important in many tumours. Although it is impossible to check the quality of pre-operative imaging, it was noted whether the protocol contained an adequate description of radiological evaluations required and whether this was checked on the CRF.

By evaluating the different protocols, it has become clear, that the majority of the groups do not have a general strategy on the description and reporting of surgery and pathology.

For example, some groups had well-designed descriptions and documentation in one trial, but in other trials, hardly any attention was paid to the same topics. With time, however, the attention to the extent of the description and the reporting has increased.

Most groups meet the minimum criteria for the description of the surgical procedure in the protocol. It may, however, be necessary to state that these minimum criteria are general guidelines only. Therefore, they might not be sufficient for a proper quality control of the operative procedure.

Guidelines on the reporting of pathology are generally less detailed than the surgical guidelines, although the minimum criteria mentioned before are usually checked on the CRFs.

About half of the groups collect original (pathology and/or surgery) reports and compare them with the data submitted on the CRFs. This is performed either systematically (LCG) or in specific protocols (GUTCG, GCG, MG, RTG and STBSG). Although precise results are not yet known, it has become clear that the control of data consistency in these fields is as important as in any other field.

Concerning programmes on quality assurance, it was remarkable, that hardly any of the groups described the quality assurance procedures in the section 'quality

Table 4
Evaluation of trials

Group name	Number of selected trials	Surgery		Pathology		Collection original reports surgery pathology	Pathology review	Radiology		QASO
		Protocol	CRF	Protocol	CRF			Protocol	CRF	
BCG	3	+	+	±	+	−	−	+	+	±
EOI	1	+	++	+	+	−	+	+	++	−
GITCG	4	++	++	±	+	−	−	−	±	±
GUTCG	3	+	++	+	++	±PA	±	+	±	−
GCG	4	+	+	±	±	±Surg/PA	±	+	±	±
HNCG	1	+	+++	+	+++	−	−	+	+	+
LCG	2	+++	+++	±	±	+Surg/PA	−	+	+	+
MG	1	++	+	±	++	+PA	+	+	+	−
RTG	3	±	+	±	+	±PA	±	+	±	−
STBSG	1	++	++	++	+	+PA	+	+	+	−

−, not present; ±, partially present; +, meets minimum criteria; ++, detailed; +++, precise; QASO, quality assurance in surgical oncology; CRF, case report form; surg, surgery; PA, pathology.

The appendix contains the results of the evaluation of the separate protocols.

assurance', which is a standard section of the protocols. These procedures were specified within the sections concerning surgery. The ± sign in the table (in the QASO-column) indicates that QASO-programmes are designed for specific protocols and not on a structural basis. In the GITCG, GCG and HNCG protocols with a quality assurance programme and in some of the GUTCG protocols, a drawing of the extent of resection should be kept in the clinical record.

Currently, pre-operatively-required radiological examinations are outlined in all protocols (with an exception of some trials of the GITCG). The performance of mandatory radiological examinations are virtually always checked. The results of recommended follow-up evaluations are usually not requested on the CRFs.

3.6. Projects and results in quality assurance in surgical oncology

This section describes the efforts of the groups in the field of Quality Assurance in QASO. Table 5 shows the projects in the different groups. This table gives an overview of the publications and subjects of ongoing projects per group.

3.6.1. Breast Cancer Group (BCG)

In 1991, the group published its first manual for clinical research in breast cancer in an effort to standardise as many aspects of diagnosis and treatment as possible [33]. The manual has been updated several times, with the most recent version published in 2000 [34]. Although this resulted in standardised descriptions of the surgical procedures, this could not immediately be translated into a standardised documentation of the procedure actually performed [35]. With the aim of developing a standard surgical report for breast conserving therapy, the surgical procedure was translated into a series of steps that could be quantitatively documented [35]. Between 1993 and 1994, a comparison was made of the surgical procedures for breast conserving treatment in seven EORTC centres. Even though the participating centres were involved in a single trial and had previously developed regular contacts about the practical aspects of treatment, many differences were detected. The need for a stricter set of guidelines was stressed, especially in conducting clinical trials [36–38]. Consequently, the standardised report was used in one EORTC trial [35]. Unfortunately, this trial was closed prematurely because of insufficient accrual of patients.

In 2000, the long-term results of the 10801 trial [39] (comparing breast-conserving therapy with mastectomy) in which patients had been entered between 1980 and 1986 were published. As part of the analysis, differences were calculated concerning local recurrences among the participating centres. These variations ranged from 10.5 to 36.0% after breast conserving therapy and from 4.6 to 21.3% after mastectomy. Recently, the group opened the AMAROS-trial (protocol no. 10981: after mapping of the axilla: radiotherapy or surgery), which contains an extensive programme on quality assurance of the sentinel node procedure. In order to participate in the study, surgeons should follow a training course and complete the learning phase for this procedure. Strict quality control guidelines are defined and they will be checked by review of the documented procedures and site visits. Quality assurance procedures for the related specialties have also been developed.

One of the future plans is the analysis of old trials to investigate the possible relationship between local tumour control and survival [40].

3.6.2. European Osteosarcoma Intergroup (EOI)

The effect of local recurrence on survival in resected osteosarcoma was recently highlighted in a paper of the group [41]. The remarks made in this paper on the consistency of the data, were of interest for our study. The trial data suggested that 64 (11%) of the 570 patients had a local recurrence. After verification of these data using the definition of local recurrence in the protocol, the reported local recurrences appeared to be unjustified in 19 of the 64 (30%) patients.

In a second study, the influence of surgical therapy on outcome was evaluated. Additional data on surgical methods and outcomes of 202 patients were collected. These patients had been included by three centres, attributing the majority of patients in the trial. Between the centres, a variation in the local recurrence rates was found ranging from 2.5 to 13.3%. A clear relationship was found between the extent of surgery and local recurrence rates. The centre with the low local recurrence rate had a very high (51%) rate of amputation compared with the other centres (15 and 17%). Interestingly, the survival curves for patients having amputation at all three centres were virtually the same.

3.6.3. Gastrointestinal Tract Cancer Group (GITCG)

Similar to the BCG, the GITCG published a Manual for diagnosis and treatment of gastrointestinal tract cancer in 1993 [42].

In the years 1994–1995, the group performed a retrospective study on the 'adequacy' of surgery for gastric cancer as a prognostic factor in resectable gastric cancer, with the use of the surgery and pathology data of trial no. 40813 [43,44]. The adequacy of surgery was judged on the extent of regional lymphadenectomy in relation to the tumour site. Among the 309 patients analysed, it was found that adequate surgery had been achieved in only approximately 33% of the cases. Moreover, this study demonstrated that in Europe in the early 1990s approximately 10 different surgical approaches were used for the treatment of gastric

Table 5
Projects in the field of quality assurance in surgical oncology

Group name	Title article/Project	Name first author	Journal name	Year public
BCG	Manual for clinical research in breast cancer	BCG	n.a.	1991 (first)–2000 (last)
	Quality assurance of surgery in clinical trials	Fentiman	European Journal of Cancer	1994
	Documentation of the surgical procedure; a tool for quality assessment for breast conservative treatment	Christiaens	Anticancer Research	1996
	More detailed documentation of the operative procedures in breast conserving treatment: what good will it do to us?	Christiaens	European Journal of Surgical Oncology	1996
	Comparison of the surgical procedures for BCT of early breast cancer in seven EORTC centres	Christiaens	European Journal of Cancer	1996
	CRFs as a tool for quality assurance: consistency with guidelines in the protocols	Christiaens	Not yet published	2001
	Long-term results of a randomized trial comparing BCT with mastectomy: EORTC 10801 trial	Van Dongen	Journal of the National Cancer Institute	2000
	Quality assurance of the sentinel node procedure in breast cancer (EORTC trial no. 10981)	BCG	n.a.	Ongoing
	Analysis of old trials investigating the possible relationship between local tumour control and survival	BCG	n.a.	Future
EOI	Effect of local recurrence on survival in resected osteosarcoma	Weeden	European Journal of Cancer	2001
	Surgical outcomes from a randomised trial of chemotherapy for osteosarcoma	Grimer	Not yet published	2001
GITCG	Manual for diagnosis and treatment of gastrointestinal cancer	Wils	n.a.	1993
	Prognostic factors in resectable gastric cancer: results of EORTC study no. 40813 on FAM adjuvant chemotherapy	Lise	Annals of Surgical Oncology	1995
	Final results of a phase III clinical trial of adjuvant chemotherapy in resectable gastric cancer	Lise	Journal of Clinical Oncology	1995
	Total mesorectal excision with or without pre-operative radiotherapy in primary rectal cancer: EORTC trial no. 40971	GITCG	Not yet published	n.a.
	Adjuvant chemotherapy in resectable gastric cancer: EORTC trial no. 40905	GITCG	Not yet published	n.a.
GUTCG	Treatment of superficial bladder tumours: achievements and needs	Kurth	Eur Urol	2000
	Quality control of radical prostatectomy. A feasibility study	Van Poppel	Accepted for publication EJC	2001
	Superficial bladder cancer: recurrence at 3 months	Sylvester	Not yet published	2001
	How is radical nephrectomy performed over Europe?: analysis of differences	Kirkali	Not yet published	2001
GCG	Quality control in multicentric clinical trials	Favalli	European Journal of Cancer	2000
	EORTC trial no. 55971	GCG	n.a.	Ongoing
HNCG	EORTC trial no. 24954	HNCG	n.a.	Ongoing
	Standardising surgery and pathology case report forms	Surgery and Pathology Sub-committee	n.a.	Ongoing/future
LCG	EORTC trial no. 08941	LCG	n.a.	Ongoing
	EORTC trial no. 08981	LCG	n.a.	Ongoing
	Standardising forms for registration	LCG	n.a.	Ongoing
MG	Surgical quality control in an international randomised clinical trial	Schraffoordt Koops	European Journal of Surgical Oncology	1992
	Quality assurance of the sentinel node procedure	MG	n.a.	Ongoing
RTG	Interinstitutional differences in the boost versus no boost trial	Bartelink	Not yet published	2001
STBSG	Quality Control in Surgery	RTG	n.a.	Ongoing

BCT, breast conserving therapy; EORTC, European Organization for Research and Treatment of Cancer; CRF, case report form; FAM, 5-fluorouracil, doxorubicin and mitomycin C; n.a., not applicable.

cancer. It was evident that the institutions with the highest number of registered patients, and therefore with a wider experience of gastric cancer, tended to follow the guidelines suggested for adequate surgery more uniformly than those with fewer patients.

The comparison made between the data in the surgical and pathology forms was useful in assessing the quality of surgery. This was used to define the criteria for surgery in protocol no. 40905. Moreover, it enabled a selection of the participating institutions. A commitment statement

on the performance of the specified surgical procedure by the investigators was required, before participation was accepted.

Furthermore, the group participated in the Dutch TME study (EORTC no. 40971), in which a QASO programme was implemented. However, only 42 EORTC patients could be included. The low accrual by the EORTC was mainly due to the quality assurance requirements. Logistical aspects, related to supervision of operations by a limited number of specialised surgeons, formed the main restricting factors. Conditions, which are very feasible within one country, appeared to be much more difficult to easily implement across different European countries.

The attention of the group to the importance of the quality of surgery is further emphasised by the organisation of a symposium in April 2001 called 'The Surgeon as a Prognostic Factor'.

3.6.4. Genito-Urinary Tract Cancer Group (GUTCG)

Differences in local recurrence rates for superficial bladder cancer at three months after complete resection have been analysed recently [45]. The data of 2655 patients of 18 different institutions, treated between 1975 and 1986, were analysed. The study revealed wide variations in local recurrence rates (0–36% for single tumours and 7–75% for multiple tumours) between the institutions. The variation between institutions remained unexplained and is currently subject to further investigation.

The group also performed a feasibility study on the quality control in radical prostatectomies [46]. Detailed information on the surgical procedure was collected by means of questionnaires (232 patients, treated in 23 institutions). The mean values for each parameter were very different in the various centres. However, the outcomes in terms of tumour control and incontinence could not be related to the number of radical prostatectomies performed. The authors concluded, that quality control of radical prostatectomies is feasible on the basis of very few parameters, that can recognise centres that perform better or worse than a proposed average.

A current project of the group is a prospective survey on the performance of radical nephrectomy in renal cell carcinoma. By means of questionnaires, it attempted to document the way radical nephrectomy is carried out in Europe and to investigate the feasibility of quality control measures in this procedure. Preliminary results of 136 patients operated on by 37 urologists will be presented at the European Association of Urology (EAU) in April 2001 [47]. From these results, it was found that although clear differences in surgical approach and management do exist, one can not conclude from these data that one urologist is doing better than another.

3.6.5. Gynecological Cancer group (GCG)

The results of the project of the GCG on quality control were published in 2000 [24]. Although this study revealed interesting information on data consistency and quality assurance in chemotherapy, it did not address any aspect of quality assurance in surgery. In the presently open trial no. 55971 (Neo-adjuvant chemotherapy in advanced ovarian cancer followed by interval debulking surgery versus primary debulking surgery followed by chemotherapy) it was stated that the operations should be performed by senior surgeons only. Detailed guidelines on the surgical procedure and reporting are provided by the protocol. Hospital reports of surgery and pathology are collected and a site-visit programme will be undertaken.

3.6.6. Head and Neck Cancer Group (HNCG)

The HNCG has a quality control programme in its larynx preservation trial no. 24954 (Phase III study on larynx preservation comparing induction chemotherapy and radiotherapy versus alternating chemo-radiotherapy in resectable hypopharynx and larynx cancers). In this trial, the operability must be assessed by a head and neck surgeon. A precise sketch of the local and nodal extension must be kept in the clinical record. The protocol provides general guidelines concerning the extent of surgery and the levels of lymph nodes that should be resected. Essential elements on the reporting of pathology are clearly described. All recommendations are checked on the CRFs. Quality control will pay attention to the radicality of the operation and the completeness and proper examination of the lymphadenectomy. This information will be evaluated on the basis of the data provided on the CRFs.

This group is also currently working on a project aimed at the design of standard operative and pathology reports. Moreover, they have recommended the use of specific guidelines on the reporting of the pathological examination. These are used by approximately 80% of the pathologists when patients are entered into the trial. In common practice, the guidelines are generally not used. This is considered as a problem, because patients are randomised after the diagnosis is confirmed by pathological examination. To encourage participation of pathologists from member institutions and to encourage the use of the proposed guidelines in common practice, the group invited pathologists of the largest institutions to discuss this face to face during a group meeting.

3.6.7. Lung Cancer Group (LCG)

The LCG has focused its attention on adequately documenting the performed surgery (*procedure and complications*) and pathology. This was implemented in the currently open trial in which surgery is an important part of the treatment (no. 08941, Surgery versus

radiotherapy in patients with stage IIIa non-small cell lung carcinoma (NSCLC) after a response to induction chemotherapy). The protocol contains a detailed description of the required surgical procedure and a drawing indicating the exact location of the described regional lymph nodes. Detailed CRFs are compared with the original (hospital) forms for consistency. The same method of quality control is planned for a trial that will be opened soon (no. 08981-phase II-trial, which evaluates the effect of surgical treatment of stage IIb NSCLC after induction chemotherapy).

3.6.8. Melanoma Group (MG)

The MG has been a pioneer in the field of quality assurance of the surgical procedure. In the isolated limb perfusion trial (no. 18332, opened in 1984) a quality assurance programme was performed. With general meetings and on-site visits, the percentage of protocol violations could be reduced from 28 to 11% [26].

Currently, the melanoma group is defining standard guidelines and CRFs for quality control in sentinel lymph node dissections.

3.6.9. Radiotherapy Group (RTG)

The RTG usually performs its trials in collaboration with one of the disease-oriented groups. It therefore, does not have a general strategy regarding the quality (control) of surgery.

3.6.10. Soft Tissue and Bone Sarcoma Group (STBSG)

The group recently designed standard reports on all aspects related to the quality of surgery. This includes the pre-operative examination and treatment, detailed documentation of the performed surgery (and post-operative complications) and adequate reporting of the histological examination.

Within the groups, several ideas concerning the methods of quality assurance in surgical oncology are currently under discussion. Site visits is one of the methods mentioned most frequently. Although this is expected to be the most effective way to check the quality of the operative procedure, the groups do not have the financial funding to put this into practice. Video-taping would be less costly, but it would still require a lot of time to audit and is less effective. Training sessions could be helpful especially in technically complex procedures or for the implementation of new techniques. Similar sessions were also mentioned to be of importance for pathologists in order to encourage the accuracy of their reporting.

A method of quality control, already implemented in some groups, is the design of specific guidelines for the descriptions of surgery in the protocol and standard items on the CRFs. The GUTCG and GCG are now discussing this procedure as well. An idea brought up by the EOI, was to design a case study, and to require each surgeons' view on adequate treatment. This would enable a discussion on the adequacy of treatment in similar cases. Furthermore, it was mentioned, that as objective criteria to assess the quality of surgery are not yet available, adequate reporting of the performed procedures should be the first step in the process.

4. Discussion and conclusions

It has become clear that there is an increasing awareness of the importance of quality assurance in surgical oncology in all of the EORTC clinical research groups. This can be concluded from the implementation of quality assurance questionnaires, a trend to a more detailed description and documentation of the surgical procedures and increasing efforts to use some kind of quality assurance in surgery-related trials. Despite successful projects in the past by individual groups, and promising ongoing and future initiatives, the implementation of quality assurance in surgical oncology requires a more structural approach. This was emphasised by the EORTC Scientific Strategy Meeting in 1999 [1] and during the EORTC site-visit by the National Cancer Institute (NCI) in 2000.

The NCI is facing the same dilemma in the US and has changed its strategy accordingly. The bottom-up approach has been replaced by a top-down approach. In the bottom-up strategy, the groups decide on the initiation of a quality assurance programme and are responsible for the funding of the programme. Using the top-down approach, the importance of quality control is acknowledged by the top and the implementation of quality assurance programmes is encouraged by providing funding for the development of projects. This has resulted, in recent years, in initiatives in the fields of breast cancer [48], colorectal cancer and melanomas, with a variable rate of success. Similarly, the EORTC quality assurance committee (QAC) could play an important role in order to implement a structured strategy concerning quality assurance in surgical oncology. One aspect should be, to encourage the use of a more uniform quality assurance questionnaire, especially regarding information on the surgical departments.

Furthermore, it would be recommendable, to define guidelines on the descriptions of required procedures and reporting in the protocols concerning radiology, surgery and pathology. Although the Protocol Review Committee (PRC) currently requires detailed descriptions, no clear guidelines are available yet. In this aspect, more attention to the performance and quality of preoperative diagnostics would also be appropriate, because these very often form the basis in the assessment of the operability of the tumour and the extent of resection. Moreover, guidelines on the reporting of

pathology should be provided, as these could contribute substantially to the audit of the performed operation. Adequate reporting and collection of data could be implemented by defining minimum criteria for the CRFs. The consistency of these data should be checked by collection of the hospital/original reports and comparing them with the data collected in the CRFs. The efficacy/necessity of this kind of evaluation was clearly shown in the Dutch TME study [49], a multicentre randomised trial applying pre-defined standards of surgery, radiotherapy and pathology in rectal cancer.

However, even if guidelines and adequate documentation are provided, it will remain a difficult task to audit the (quality of the) performed surgery. There are some major restricting factors in the quality assurance of surgery: the methods of quality control and the funding of potentially successful initiatives. Both factors are of importance when comparing strategies in quality assurance between either radiotherapy or chemotherapy and surgery. Whereas the performance of a radiotherapist and a medical oncologist are quantifiable and therefore, objectively measurable, the performance of the surgeon consists of a multi-step procedure, which is dependent on the individual. Documentation of the surgical procedure is only representative for the actual performance to a limited extent, considering the fact, that it is impossible to document each single step. Therefore, the most effective, but costly solution remains a personal audit of the surgeon in the operating theatre. The logistic difficulties of the implementation of this kind of quality control in Europe should not be underestimated. This has been illustrated by the low accrual of the EORTC in the TME-study: the feasibility of a national system can not be translated in a pan-European success automatically.

Apart from the variability in the quality of operations themselves, the quality of surgery is related to the quality of pre- and postoperative staging (i.e. quality of radiology and pathology), as was previously mentioned. These disciplines should therefore be included in quality assurance programmes focused on surgical oncology.

A joint approach of the responsible specialists would be useful in the development of quality assurance criteria in surgical oncology. The need for further discussion amongst specialists of new methods to be applied specifically to this area has been expressed by the subcommittee chairmen. The best opportunity for this meeting would probably be at the next conference organised by the European Society of Surgical Oncology (ESSO) which will take place in 2002.

Concerning funding, the situation is also different in systematic treatments compared with surgery. In chemotherapy, trials are frequently financed by the pharmaceutical industry, which obviously does not apply to surgery. This, in combination with the complexity of surgical quality control on its own, emphasises the need for a structural top-down approach. The EORTC Board has recently decided to encourage a structural development in quality assurance in surgical oncology. As part of this programme, a research fellow will be appointed for several years. However, the tasks of such a fellow will only enable adequate co-ordination and development of methods of quality control. To put these systems into practice, additional funding will be essential. In the past, the EORTC quality assurance programmes in radiotherapy and chemotherapy have been funded, in part, by grants from the European Union (EU). As the impact of the quality of surgical oncology is now generally acknowledged, it would be appropriate for the EU to support such programmes as well.

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Appendix. Evaluation of trials

Group name	Selected trial numbers	Surgery		Pathology		Collection original reports surgery/pathology	Pathology review	Radiology		QASO
		Protocol	CRF	Protocol	CRF			Protocol	CRF	
BCG	10963	–[a]	–	–[a]	+	–	–	+	+	–
	10974	++	–[b]	–[a]	–[b]	–	–	+	–[b]	–
	10981	+++[c]	++	++	++	–	–	++	++	+
EOI	80931	+[d]	++	+	–[e]	–	+	+	++[f]	–
GITCG	40905[g]	+++	+++	+++	+++	–	–	–[h]	–	±[i]
	40911[g]	–[a]	±	–[a]	±	–	–	–[h]	–	–
	40954	++	+++	++	++	–	–	+	+	–
	40983	++[j]	++	–	±	–	–	+	±	–
GUTCG	30904	+	++	+	++[k]	PA	+	+	±	±[i]
	30955	+	+	+	++[k]	–	–	+	–	±[i]
	30994	+	–[b]	–	–[b]	–	–	+	–[b]	–
GCG	55874	–[a]	+	±	±	PA	+	+	+	–
	55971	+++	+++	–	±	Surgery +PA	–	+	+	±[i]
	55981	+	+	+	+	–	–	+	±	–
	55991	±	±	±	±	–	+	+	–	–
HNCG	24954	+	+++	±[l]	+++	–	–	+	+	+
LCG	08941	+++	+++	±	±	Surgery +PA	–	+	+	±[i]
	08981	+++	–[b]	±	–[b]	Surgery +PA	–	+	–[b]	+
MG	08991	++	+	±	++[k]	PA	+	+	+	–
RTG	22911	+	+	++	+	PA	+	+	+	–
	22921	±	++	±	+++	–	–	+	+	–
	22922	–[a]	+	±	±[m]	–	–	+	–	–
STBSG	62931	++	++	++	–[n]	PA	+	+	+	–

–, not present; ±, partially present; +, meets minimum criteria; ++, detailed; +++, precise; QASO, quality assurance in surgical oncology; CRF, case report form; QA, quality assurance; SN, sentinel node; PA, pathology.

[a] No paragraph on pathology and/or surgery, requirements can only be found in the eligibility/stratification criteria.

[b] Not available yet.

[c] Very detailed on SN procedure, minimum criteria on local treatment.

[d] Short description, but more detailed information can be obtained.

[e] Only margin status is required, however, pathology review will be performed.

[f] CRF information and collection of hard copies.

[g] Closed in 1998.

[h] No pre-operative requirements, but recommended follow-up evaluations.

[i] No official QA programme, but drawings, etc., to check the extent of surgery.

[j] Aimed at resection of liver metastases. No description of surgery for the primary tumour, on CRF minimum criteria present, except for margin status.

[k] No information on number or ratio of lymph nodes.

[l] To be found in the quality assurance paragraph.

[m] >Margin status not requested.

[n] Original PA report is used instead of a CRF.

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