

Optimizing the Clinical Management of Gynecological and Breast Cancer *via* Online Tumor Conferences

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Abstract. *Background:* The therapy of gynecological malignancies and breast cancer requires a multimodal therapy approach based on current individualized and risk adapted state of the art therapy concepts. The aim of this online tumor conference project is to reach a broad interdisciplinary and cross-sectoral participation of specialists in order to develop high-quality therapy recommendations for complex casuistics. *Patients and Methods:* The concept of the interdisciplinary online tumor conference was established in 2004 at the Department of Gynecology, Charité Campus Virchow, University Hospital of Berlin to conduct online tumor board meetings of specialists in the field of gynecological cancer from different hospitals and gynecological and oncological practitioners from the outpatient sector. Following a systematic approach, patient data, relevant external clinical evidence and therapy preference are presented to the participants. An individual therapy recommendation for each patient is reached by consensus discussion. *Results:* By July 2009, 131 online tumor conferences had been performed with a total of 275 participants were developed. Per session, a median of 14 participants logged in online. Additionally 398 second opinion recommendations were performed. In an anonymous survey, carried out at the beginning of 2009, 95% of the participating physicians reported being satisfied with the information content and 50% were stimulated to seek more second opinions by the possibility of the online tumor conference. All contributors attested to a high comprehension of the developed therapy recommendations; 70% confirmed

further that the conference presents an optimal possibility for fast and detailed exchange of information between disciplines and care sectors (in- and out-patient) and improves advanced educational training (81%). *Conclusion:* The online tumor conference provides a time saving and high quality possibility for receiving a treatment recommendation based on the best available clinical and scientific evidence and contributes to continuously advanced training for therapists in the field of gynecological cancer.

The management of gynecological malignancies and breast cancer requires a multimodal therapy approach based on current individualized and risk adapted state of the art therapy concepts. Tumor board meetings have evolved to be a well-established element in the clinical routine for treatment planning, follow-up care, and education. Optimization of standards in patient care is only possible by systematic and permanent clinical research activities (1). There is an increasing need for development and widespread implementation of clinical guidelines in daily clinical practice. Furthermore, there is a need for continuously advanced training for therapists in the field of cancer because of the rapid medical progress in the field of oncology. The German healthcare system is moreover facing the situation that one part of the physicians is working in private outpatient practices. They are mainly participated in the treatment of patients with oncological entities and in particular in the follow-up phase. Against this background, interdisciplinary and also close cross-sectoral cooperation is of high importance for high-quality and consistent therapeutic management (2).

Hospitals with specialized departments for cancer treatment in gynecology and senology in Germany are required to organize interdisciplinary tumor board meetings (3-5). Tumor conferences can optimize clinical cooperation, quality of therapy management and can also help recruit patients for clinical trials. Therefore they act as an important quality assurance instrument for clinical management of gynecological and breast cancer. The classic tumor boards

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require a substantial amount of preparation time. Participation of outpatient practitioners or colleagues from other hospitals is restricted because of limited time resources and geographical distance. The organization and preparation of regular meetings requires high individual engagement from the involved medical staff. Therefore many institutions have abandoned tumor conferences because the cost in preparation time outweighs the clinical benefits achieved (6, 7). Institutional studies reported the valuable role of tumor boards for final diagnosis and treatment planning especially in the palliative setting (8).

To reach a widespread and time-efficient participation in tumor conferences, the Department of Gynecology, at the Charité – Campus Virchow, University Hospital of Berlin developed an online tumor conference as a pilot project using an innovative interdisciplinary and cross-sectoral concept (9). This new type of web-based tumor board enables clinicians and practicing gynecological oncologists from all parts of Germany to present their own patients' cases and to participate effectively and in a cooperative setting in all discussions. The successful establishment of this concept in the clinical management of gynecological malignancies and breast cancer patients in hospital institutions in association with outpatient physicians is described in this article. In this paper we present a structured survey of the participants performed by a questionnaire which was sent out to all participants of the conference at the project sites in Berlin and Essen. The questionnaires (two subgroups: inpatient participants and outpatient participants) focused on the qualitative aspects of the tumor conference, which are able to provide evidence for the optimization of the interdisciplinary and cross-sectoral cooperation and the efficiency and quality of the clinical management by the conference. Critical feedback and comments for further improvement or extension of the project from the participating institutions was also requested.

Patients and Methods

The online tumor conference was established in 2004 as a pilot project of integrated oncological care for gynecological malignancies in the Department of Gynecology, Charité Campus Virchow and University Hospital of Berlin. The Department of Gynecology at the University Clinic of Essen took over this concept in 2007 and is also advising breast cancer cases.

Specialists from the Departments of Surgery, Radiotherapy, Pathology and Oncology from both University Hospitals participate regularly in the meetings. By the end of 2008, 378 physicians from other gynecological hospitals, including nine university institutions, outpatient gynecological oncologists and medical oncologists had registered for the conference.

The online tumor conference is scheduled two times per month to perform in an interdisciplinary approach discussions of complex advanced gynecological cancer cases. All presented cases are freely submitted from the registered participants to determine further

treatment. For all presented patients an individual recommendation for the further therapeutic management is given as consensus. The criteria for case presentation at the tumor board meetings include all gynecological or breast cancers in adjuvant or recurrent disease stage, recently operated or otherwise pre-treated, as also patients with complex additional co-morbidities.

The concept of the online tumor conference is based on an online audiovisual communication approach. All participating colleagues are able to log in to the online sessions *via* Internet and to be involved in the discussions (www.online-tumorkonferenz.de in Berlin; www.onkoexpert.de in Essen). At the coordinating center (Departments of Gynecology, Charité Campus Virchow Hospital, Berlin and the University Clinic of Essen), all patient data are prepared on slides and presented during the session as a PowerPoint presentation on the tumor conference homepage. All participants can follow this audiovisual meeting live on their own computers. After the presentation the interactive discussion between all participants begins (see Figure 1).

The main time-consuming procedure during preparation of the scenario is to get all relevant patient data. An exclusive tumor conference manager on both project sides was established to organize the meetings. The tumor conference managers are physicians in training for gynecology. Most participants send the patient's data *via* fax. The conference manager reviews all documents and enters the relevant information into the electronic documentation tool, using a special screening protocol. Following this procedure, adequate documentation of all important prognostic and predictive clinical parameters, performance indices, quality of life aspects, and patient's preferences are entered in the case presentation for the forthcoming meeting (Table I).

The meetings are moderated online by respective head of the Gynecological Department or by its vice director. The participants log in at the time of the session and discuss the ongoing anonymous patient's case live. The patient's presentation follows a predetermined scenario: systematically review of the patient data with physical examination, surgical and diagnostic findings and the current symptoms (see Figure 2, step I). Subsequently relevant national and international guidelines (step II), latest study protocols, current scientific results based on literature review (www.pubmedcentral.nih.gov, www.cochrane.org, www.ago-ovar.de) (step III) and appropriate open clinical trials (step IV) are presented and discussed. Based on this information, an individual diagnostic and therapy recommendation for each patient's case is formed by consensus. The summarized data are accessible online for all registered members of the network.

Special web-based software has been developed for this project in cooperation with a clinical research organization (Alcedis GmbH). The software provides all features for an efficient submission and management of clinical data. Data security of the system complies with national standards and recommendations. All patients' data are transmitted in an anonymous fashion. Upon formal registration each participant may submit new cases for screening. The screening process and the monitoring of updates of international guidelines and national standards are conducted by the conference manager. Actualization of clinical data and access to all databases is possible online 24 hours a day. After the conference, protocols are generated automatically and are sent to all participants.

Statistical analysis was performed using SPSS statistical software for Windows (version 16.0). A value of $p < 0.05$ is described as being statistically significant. In addition, this project was approved as

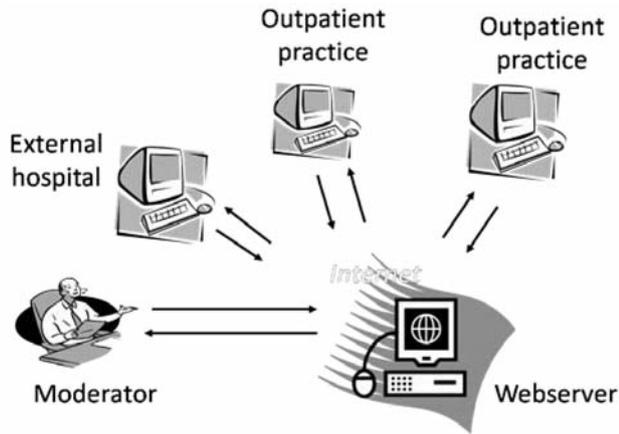


Figure 1. Network of the online tumor conference.

certified medical education by the Berlin and Rhineland Chambers of Physicians and was supported by various German societies: Nord-Ostdeutsche Gesellschaft fuer Gynaekologische Onkologie (NOGGO), Arbeitsgemeinschaft Gynaekologische Onkologie (AGO) and Bundesverband Niedergelassener Gynaekologischer Onkologen (BNGO).

Results

In the period from December 2004 to June 2009, 131 online tumor board meetings took place and 457 cases were presented. An average of 3.49 patient's cases was discussed per conference with a range from one to seven cases. The mean age of the study population was 54 (15.05 SD) years and the median age was 55 years. The youngest patient was 15 years and the oldest 89 years at the time of the case discussion.

By the end of 2008 a total of 275 physicians had taken part in the meetings: 136 were physicians from Charité University Hospital and the University Clinic of Essen, where 139 were online participants from private practices and other hospitals. Many physicians take part regularly in the tumor board meetings and present several patients' cases. The participants are high experienced physicians. The professional experience of the participants from other clinics is a median of 20 years and that of the outpatient sector 15 years. The geographical distribution of all participants is published on the homepages of the tumor conference network (www.online-tumorkonferenz.de; www.onkoexpert.de). Per session, a median of 14 participants logged in online.

Ovarian cancer was the most common type of cancer (218 cases) of the 457 advised patient's cases according to the primary histology, followed by endometrial cancer (83 cases), 71 patients with cervical cancer, 19 with breast cancer and 66 with other entities such as vaginal, vulvar, fallopian tube and peritoneum cancer or other rare tumor cases. Specialists from the Departments of Surgery, Radiotherapy, Pathology

Table I. Screening protocol schedule for the preparation and presentation of the patient data.

Questionnaire for patient data screening and presentation
Diagnosis
Date of first diagnosis
Relevant co-morbidity
Histological classification
Tumor stage
Tumor marker value
Therapy management (surgery, chemotherapy and/or endocrine, monoclonal antibody therapy, irradiation)
Response
Follow-up data (tumor-free period, time to recurrence)
Recurrence (date, diagnostic, therapy)
Recurrence therapy (surgery, chemotherapy, irradiation, etc.)
Response
Performance status (ECOG)
Clinical disorders
Ability for ambulant therapy
Patient's preference
Question/s to the tumor board

and Oncology participate regularly in the meetings. In special cases with complex co-morbidity and discussion of surgical or pain management, anesthesiologists were invited to the conferences. Other disciplines like urology and gastroenterology are invited only in specific cases.

74.38% of all active participants of the online tumor conference responded to the survey. The questionnaire included different groups of questions with the possibility of several answers. The first part of the questionnaire dealt with the expectations of the participants to the conference. The most common expectation was to receive expert advice (81.32%) and to reach a quality improvement for the patient (73.63%). Table II gives an overview of the expectations of the participants. A total of 78.16% of the participants affirmed that their expectations were fulfilled, 17.24% stated that their expectations were exceeded and 4.6% reported that their expectations were not fulfilled. The satisfaction of the participants with the technical aspects of the tumor conference was not evaluated because an earlier survey of Chekerov *et al.* (9) had already shown that 72% found the technical support to be good and/or 80% of the participants found the software was easy to operate, 84% described the design of the web user interface as being good.

The survey included several further questions on the issue of second opinions. Overall 50.57% of the attendees confirmed that they asked for more second opinions in the course of the online tumor conference (43.48% inpatient participants; 58.54% outpatient participants). The criteria for presenting a patients' case in the conference was mainly rare casuistics (83.53%) and ambiguous data (56.47%). Asked for other possibilities to present patient cases for a second

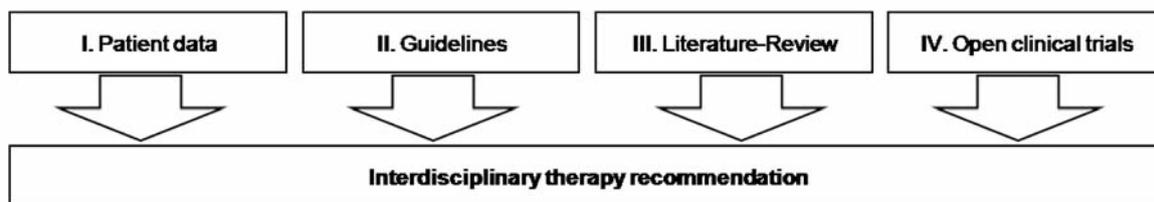


Figure 2. Elements of the interdisciplinary therapy recommendation.

Table II. Expectations of the participants to the conference.

Receiving expert advice	81.32%
Quality improvement for the patient	73.63%
Compile second opinion	62.64%
Advanced educational training	58.24%
Cooperation with colleagues from other care sectors (inpatient/outpatient)	39.56%
Saving of time	23.08%
Other	1.09%

Table III. Comparison: Online tumor conference versus traditional tumor boards (%).

Added value	Agree	Disagree
Amount of information about the patient	53.34	46.66
Quality of information about the patient	53.34	46.66
Additional material about clinical studies	97.73	2.27
Interdisciplinarity of the participants	68.18	31.82
Qualification of the participants	93.33	6.67
Clinical experience of the participants	79.07	20.93

opinion, 75% of the inpatient physicians mentioned the tumor-board in their own clinic. They were asked whether saw an added value of the online tumor conference compared to traditional tumor boards and what specific added-values these were (Table III).

Concerning the cooperation between the participants from hospitals and the participants practicing in private practices, 70% confirmed that the conference led to an improved cooperation with colleagues from the other care sectors (55.56% inpatient participants; 87.18% outpatient participants; $p=0.002$). As main reasons for this cooperational improvement, a faster and more detailed exchange of information was named (87.72% and 66.67% respectively).

The participants were also asked if the consideration of a patient's case in the online tumor conference leads to an avoidance of redundancies in the therapy management, for instance uncalled for or twofold examinations). Overall 69.1% of all participants agreed or rather agreed that the online tumor conference enables the reduction of redundancies (see Figure 3).

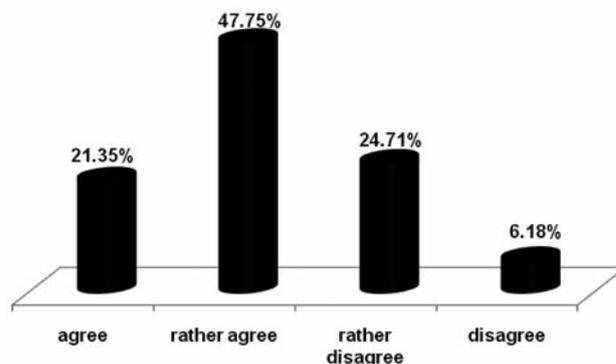


Figure 3. Avoidance of redundancies in the therapy management.

A total of 80.68% of the attending physicians confirmed that they benefit from the conference in a way that they can state a gain of knowledge in the course of participating in the conferences. In addition, all contributors to the survey attested to a high comprehension of the developed therapy recommendations.

Discussion

Interdisciplinary tumor conferences are an important element in the multimodal management of gynecological malignancies. Despite the fact that nearly all national and international guidelines for cancer treatment demand the establishment of interdisciplinary tumor boards, there are very limited data about results of tumor conferences in clinical practice (8, 10). No study results on the outcome of interdisciplinary tumor conferences could be found.

The survey showed a high acceptance of the online tumor conference. Expectations of the participants towards the conference can be fulfilled and match the purposes of this project. One main advantage of this concept seems to be the consequent implementation of an evidence-based therapy recommendation by the integration of external clinical evidence from clinical guidelines, study results and latest research findings with the individual clinical expertise of the participating specialists. Different surveys reported the importance of a second opinion in patient care (11) and

showed that the pre-conference treatment concepts were rejected or had to be modified after the tumor board decision (12). The increased second opinion rate demonstrated through the online tumor conference is therefore a valuable outcome of the conference.

The increase of medical knowledge stands in opposition to the limited time resources of the physicians in daily clinical practice. Coleman (10) reported that the role of the multidisciplinary tumor board is to provide a successful educational opportunity for treatment teams and postgraduate staff. Against this background it is a success of the conference that 81% of all participants could confirm an increase in their level of knowledge by participating in the conferences.

Another advantage of this tumor board is the easy participation by private practices and clinicians *via* the Internet, without the necessity of physically joining the tumor board. Moreover, the patients do not have to visit the clinic for a second opinion personally. Redundancies in the therapeutic management can also be avoided. Based on these findings it can be hypothesized that the online tumor conference provides the potential for a cost reduction of clinical management. Detailed cost and efficiency analyses were not performed in the present study. Future studies should explore evidence for quality improvement in the structure and processes quality of therapeutic management investigated here. To demonstrate increased outcomes and provide cost benefit analysis, a significantly longer observation time is required to evaluate progression-free and overall survival. Another high potential with regard to the cost reduction and increased efficacy of this conference is that 70% of all participants confirmed that the conference leads to an improved cooperation with colleagues from the other care sectors. The peculiarity of the German healthcare system is that the inpatient and outpatient care sectors are characterized by organizational, personnel, technical and financial boundaries which are criticized in the literature as one of the biggest system-inherent cost drivers.

There is an important outcome of participation because the understandability and intelligibility of the therapy recommendations given in the online tumor conferences is a 'sine qua non' for the acceptance and implementation of the recommended therapy afterwards in the clinical practice. This result matches the survey results of Chekerov (9) who showed that 78% of the individual recommendations were accepted and implemented after the session by the responsible physician and 20% of the recommendations were partially accepted. The most common reasons for not implementing the recommended therapy were that patients became clinically worse so that new therapy recommendations had to be developed.

In conclusion, this multidisciplinary and cross-sectoral online tumor conference offers an efficient medium for the discussion of complex oncological malignancies and development of concordant second opinions based upon the best available clinical and scientific evidence; it furthermore

provides continuously advanced training and offers a possibility for improved cost efficiency of clinical procedures.

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