Tumor Boards from the Perspective of Ambulant Oncological Care

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Introduction

Optimal medical care of cancer patients requires cooperation between physicians from multiple disciplines. Therefore, interdisciplinary discussions of treatment options are recommended by guidelines and societies, and tumor boards have become a regular part of oncology. In these, multidisciplinary teams of health care providers discuss patient cases. Tumor boards vary according to country, institution, and tumor entity and can adopt many formats. The core board members commonly comprise surgeons, pathologists, radiotherapists, and oncologists. Further members may include representatives from nursing, nuclear medicine, psychoncology, physical therapy, and radiologists, among others. In rare instances, cancer patients and an accompanying family member can also join. In Germany, the terms ‘Tumorboard’ and ‘Tumorkonferenz’ are used. Internationally, tumor boards are also called ‘multidisciplinary cancer teams’, ‘cancer team meetings’, ‘multidisciplinary meetings’, or, in French, ‘la réunion de concertation pluridisciplinaire’. Although tumor boards occur internationally and new tumor boards are continuously being established, there is no consistency regarding the structure, organization, members, or frequency of tumor board meetings [1].

There is real potential to improve the quality of medical oncology care through tumor boards. They can influence treatment decisions [2, 3] and have been associated with increased diagnosis and therapy safety, better adherence to guidelines, better documentation, higher participation rates in clinical trials, and even an improved quality of life and life expectancy of patients [1, 2, 4, 5].

However, evidence of these beneficial effects is scarce and there has been little research into the process of decision-making at tumor boards [6, 7]. Comparative studies have been complicated by a lack of uniformity in the definitions of tumor boards, confounding variables, and the difficulties of measuring effects that are directly attributable to tumor boards [2, 7, 8]. Common treatment decision-making that occurs within tumor boards supports the treating doctor [9].

However, based on the results of their review of studies on
tumor boards, Lamb et al. [6] state that not all recommendations are per se implemented in therapy, partly because of limited information at the time of discussion and no consideration of patient preferences. Nevertheless, tumor boards themselves are the implementation of guidelines into daily practice, and disregarding a tumor board decision needs to be justified by the treating doctor.

Little research exists on patient participation in tumor boards. Assumed patient distress, concerns about possible effects on the decision-making processes (especially if opposing opinions between board members exist), and resource intensiveness (meetings are time consuming) are juxtaposed to patient empowerment, better informed patients, greater patient involvement in decision-making, and improved communication between patients and care providers [9–12]. Health care professionals seem to be less supportive of patient participation in tumor board meetings, whereas patient advocates and nurses support this approach [11]. Studies report that health professionals feel they have to modify their medical language in the presence of patients and cannot discuss treatment options in the same manner. This may lead, for example, to less accurate reporting or underemphasizing aggressive radiological or histopathological features, which could cause the non-optimal care of patients [9, 11, 12]. An increase in anxiety in patients participating in tumor boards could not be confirmed [12]. Patients prefer different amounts of information and involvement in treatment decisions. Patients with higher education and a preference for more information about the disease are most likely to follow an invitation to participate in tumor boards [10, 12]. Hence, participation of patients in tumor boards might not be reasonable in all cases and thus should be considered carefully, taking the patients’ needs and individual circumstances into account. Patient participation may be an option in cases where all tumor board members are forced to gain a personal impression of the patient whose preferences may be crucial for the decision-making process, e.g. in early prostate cancer if the patient can contribute to a selection between treatment options of similar value [13].

Although tumor boards can vary considerably, they share some commonalities. In particular, they [1, 6, 7]:

- are held regularly,
- pool and coordinate relevant specialists,
- increase diagnosis and therapy safety, and improve adherence to guidelines,
- improve the coordination of patient care trajectories,
- increase the inclusion of patients in clinical trials, and
- provide opportunities for training early-career doctors.

In Germany, interdisciplinary cooperation in oncology care was implemented long before the establishment of centers and tumor boards due to the ‘Onkologievereinbarung’ in 1994. This agreement between the Kassenärztliche Bundesvereinigung (KBV) and the Verband der Angestellten-Krankenkassen (VDAK) postulates continuous interdisciplinary and cross-sectional cooperation among relevant specialists and general practitioners for medical oncologists [14–16].

Tumor boards are of particular importance in the continuing trend towards a stronger pooling of oncological care in centers. The cooperation within such centers aims to ease cross-sectoral and interdisciplinary exchange among doctors, and to smooth the care trajectories of cancer patients. Tumor boards provide opportunities for partners within centers to meet. Hence, efficient functioning and successful collaboration during tumor boards are crucial criteria for positive evaluations of cancer care centers.

Over the past 2 decades, there has been an increase in cancer care centers (CC) in Germany. Initially, breast (cancer) centers were established, followed by bowel (cancer), prostate (cancer), and then other organ-specific centers, for example, melanoma, brain tumor, and lung cancer, among others. The term ‘center’ is not a protected name in Germany. The certification of these centers is mainly done by large societies, such as the Deutsche Krebsgesellschaft (German Cancer Society), the European Society of Breast Cancer Specialists (EUSOMA), or the Deutsche Gesellschaft für Chirurgie (German Society of Surgery). Recently, there has been a saturation of cancer centers. Based on the definitions of the National Cancer Plan, more oncological centers (CC) have been established that comprise several organ-specific centers, or several oncological specialists, following the concept of the Deutsche Gesellschaft für Hämatologie und Onkologie (DGHO, German Society of Hematology and Oncology). In addition, 13 ‘onkologische Spitzenzentren’ (comprehensive cancer centers, CCC) have been established in Germany [17]. The criteria for certification are focused on the quality of structures and processes; within this, the collaboration of a center’s partners in tumor boards is an important criterion. However, there has been little statistical evaluation of the criteria, their effects on centers (regarding the quality of results), or the role played by tumor boards within the complex approach of quality improvement through center establishment and certification programs.

The regulations of the highly specialized outpatient care (ambulante spezialfachärztliche Versorgung, ASV) by the Federal Joint Committee (Gemeinsamer Bundesausschuss, G-BA) also address interdisciplinary work in tumor boards. The regulations, which are concerned with gastrointestinal tumors and abdominal cavity tumors, came into effect in 2014. For gynecological tumors, the resolution has not become effective, yet. However, Wigge [18] criticized the gynecological tumor regulations because radiologists are not considered as part of the core team and, as such, they cannot participate in tumor boards. This is in contrast to the guidelines for diagnostics and therapy of gynecological tumors and to the requirements of certification and authorization of breast cancer centers.

This paper presents a study on the multiple facets of tumor boards in Germany based on 3 surveys to identify the perceptions of office-based oncologists and their patients, and to analyze quality indicators. Based on the information given by the office-based oncologists, insights are gained into their role in and the structures and processes of tumor boards. The question emerges if patients know that their case was discussed at a tumor board; and if yes, do these patients rate collaborations between doctors more positively? This may have beneficial effects on their well-being and perceived distress. The results of quality indicators function as a neutral measure; they show if patient cases were discussed at tumor boards, and if the tumor board’s recommendations were documented in patient records.
Table 1. The structure of tumor boards

| Participation in internal tumor boards (n = 123) | 75.6 | 93 |
| Participation in external tumor boards (n = 154) | 94.1 | 143 |
| Location of tumor boards (n = 155) | | |
| University hospital | 16.1 | 25 |
| Hospital of maximum care | 52.3 | 81 |
| Hospital of regular care | 59.4 | 92 |
| Specialized hospital | 7.1 | 11 |
| Other institution | 5.8 | 9 |
| Online/video tumor boards (n = 152) | 16.5 | 26 |
| Local | 12.5 | 19 |
| Transregional | 5.3 | 8 |
| Frequency (N = 137) | | |
| About every 7 days | 87.6 | 120 |
| About every 14 days | 8.1 | 11 |
| Less often/irregular | 4.4 | 6 |
| Number of participants (mean, SD) | 12.9 (9.5) | 138 |
| Number of patients discussed (mean, SD) | 11.7 (5.9) | 142 |

*Excluding solo practices.

*Multiple answers possible.

SD = Standard deviation.

Source: Structural data survey, WINHO 2010.

Material and Methods

Data were retrieved from 3 surveys comprising information given by office-based hematologists and oncologists, their patients and quality indicators. The routinely conducted surveys each addressed specific aspects of tumor boards, and had not previously been brought together in this detail for publication. The data were analyzed using SPSS 22.

In 2010, the Wissenschaftliche Institut der Niedergelassenen Hämatologen und Onkologen (WINHO) GmbH invited its partner practices (n = 207) to participate in a survey about the structural characteristics of each practice, such as its size, medical and non-medical staff, and quality management, as part of the annual quality report by the institute; 155 practices (75%) answered the questionnaire. In this paper, the results of questions on tumor boards were considered. Further details and data on other survey questions are presented in the WINHO quality report [19].

Every year, WINHO offers to conduct patient surveys in its partner practices. The paper-based questionnaires contain a set of standard questions covering sociodemographic data, diagnoses, and an evaluation of the practice. In addition, the survey includes questions on a specific topic, which changes every year. In 2012, the focus was on the perceptions of patients on multidisciplinary cancer care, including subscale 3: team/cross-boundary continuity of the Nijmegen Continuity Questionnaire [20, 21]. Altogether, 37 practices participated in the survey, comprising 78 hematologists and oncologists. Each practice received 60 questionnaires per doctor (n = 4,680). The response rate was 72.3% (n = 3,393).

Within the WINHO quality indicator project, funded by the German Cancer Aid, data on 2 quality indicators focusing on tumor boards were collected in 2013 [22–24]. The first quality indicator (KA_TP_1) examined the number of patients for which (neo)adjuvant therapy was discussed at a tumor board out of all the patients with invasive malignancy or malignant hemoblastosis who were receiving (or had received) a multimodal therapy with (neo)adjuvant intentions (excluding patients whose therapy had started elsewhere and patients with palliative intentions). The second indicator (KA_TP_2) measured the number of patients with documented tumor board recommendations in the patient chart at the beginning of therapy out of all the patients who met the criteria of quality indicator KA_TP_1. All definitions of the quality indicators can be downloaded at [http://downloads.winho.de/2012_Qualitaetsindikatoren.pdf](http://downloads.winho.de/2012_Qualitaetsindikatoren.pdf). The data were collected as part of a pilot study to examine the applicability of quality indicators on processes in medical oncology. The indicators on tumor boards were taken in the first wave of data collection; 20 practices participated in this wave. Data were obtained from 1,895 charts of patients with solid tumors who had had at least 2 appointments in the respective oncology practice during the quarter before data collection (4th quarter 2012). Patients with breast cancer (48%) were overrepresented as part of the project [24].

Results

Nearly all of the office-based hematologists and oncologists participated in tumor boards – mainly external tumor boards that took place in hospitals (94%) (table 1). Online or video tumor boards were less common (17%). Most meetings occurred weekly (88%); only 8% of the respondents participated in tumor boards every fortnight or less often (4%). On average, tumor boards consisted of 13 members and 12 patients were discussed in each meeting. However, the ranges were 2–30 members and 1–30 patients, respectively. Although tumor boards were primarily based in hospitals, office-based oncologists also presented their own patients regularly (78%). Few respondents claimed that they rarely (21%) or never (1%) presented their own patients at tumor boards. No significant differences were identified in terms of the therapy intention (adjuvant, neoadjuvant, or palliative) for patients presented at tumor boards (data not shown).

The main reasons for presenting a case at a tumor board, named by the respondents for themselves and for other board members, were interdisciplinary (45% and 33%) as well as complex and difficult issues (26% and 33%), followed by decision-making and further procedure requirements (10% and 17%). In addition to the open-ended question, an answer category was included in the sur-
The reasons given by oncologists for not participating in tumor boards were either that too much time was required (n = 6), the respondents had negative experiences (n = 5), or that there was no offer of tumor boards (n = 1) (table 2). Other reasons referred to difficulties in participation during practice opening hours (n = 2) and 1 respondent stated that relevant information about patients was provided without their physical attendance (n = 1). The time needed to participate in tumor boards was considered inappropriately high by 30% of the respondents; however, most office-based oncologists rated the time spent as reasonable (70%). The outcomes from tumor boards, regarding the patients and their treatment were rated as ‘often useful’ (67%) and ‘sometimes useful’ (27%), respectively, by the oncologists. Only 7% of the respondents claimed that the results were seldom useful (data not shown).

When asked for suggestions to improve tumor boards, the office-based oncologists mainly named organizational features (table 3): shorten duration (22%), optimize preparation and organization (19%), optimize documentation (9%), and extend knowledge on patients and anamnesis (9%). Changes in the case selection (exclusively special cases) process were suggested by 10%, and a switch to online or video communication by 9% of the respondents. No suggestions for improvements were given by 18% of the respondents, and 1 argued for the abolishment of tumor boards. Only 3% of the respondents named payment for participation in tumor boards as a means for improvement.

The patient survey revealed that 40% (n = 1,267) of cancer patients knew that their case was subject to discussion at a tumor board, compared to 43% (n = 1,369) who said that their case was not discussed, and 16% (n = 515) who preferred not to say. Significantly more patients who were treated in a certified center, compared to those from non-certified centers, knew that their case was presented at a tumor board (n = 743 vs. n = 234 not treated in certified centers).

Of those patients who knew that their case was discussed at a tumor board, the vast majority rated the explanation of the outcomes as very good (53%, n = 416) or good (36%, n = 287). Only 11% (n = 89) stated that the explanation of the tumor board outcomes was fair, or worse. The data show a positive association between the patients’ knowledge that their cases were discussed at tumor boards and higher levels of distress; that is, patients who knew that their case was discussed had a slightly higher mean score of 4.8 on the distress thermometer (0 = not at all stressed, 10 = extremely stressed), compared to those who did not know if their case was discussed (4.56). The difference in mean scores is statistically significant (p = 0.036) but the effect size is very low, with eta = 0.043.

For patients with and without the knowledge of whether their case had been discussed at a tumor board, there were only marginal differences in their perceptions regarding the ‘exchange of information between doctors’ and the ‘treatment being well matched’ (table 4). However, the differences in the mean scores on the other 2 items of collaboration were statistically significant; patients whose cases were discussed at tumor boards were more likely to say that ‘the treating doctors work very well together’ (p = 0.004) and ‘the doctors always know very well of one another what the other one does’ (p = 0.017). No significant differences in the patients’ perceptions of coordination could be identified in terms of whether the patients were being treated in a certified center or not [21].

For the quality indicators, 123 and 91 patient charts met the inclusion criteria, respectively (table 5). The results of the pilot study...
show that a tumor board was documented in most of the patients’ charts (74%). However, in only half of the cases was the tumor board’s recommendation also documented. The standard deviation is high in both cases; this reflects the high variance in documentation habits among oncology practices [23].

### Discussion

The results of the survey from office-based hematologists and oncologists confirm the interdisciplinary and cross-sectoral character of cancer therapy; they show that most office-based oncologists participate in tumor boards taking place in hospitals on a regular basis. They regularly present their own patients in tumor boards, indicating that case reviews do not only occur when patients pass from stationary to ambulant care. The high participation rate in tumor boards contrasts with the negative rating of the time needed. Based on these study results and the literature [1, 3, 6, 7, 25], several areas of concern regarding the structure and processes of tumor boards have been identified:

- **Effort**: High burden in terms of time (including traveling), organization (including substitution in medical practices), and excessive caseloads.
- **Case presentation**: Insufficient preparation by members, unsatisfactory case reports, latent case selection process, overload of routine cases.
- **Chairing and organization**: Dissatisfaction in the way meetings are run, insufficient resources available for management and infrastructure (including administrative support, bureaucracy).
- **Social factors**: Low attendance, poor teamwork, lack of leadership, historical enmities, hierarchical boundaries, and different personality styles.
- **Patient perspective**: Patients are inadequately represented, lack of clinical assessment and consideration of the patients’ wishes and needs.
- **Protocol**: Unstructured documentation of the consultation results, insufficient monitoring of the implementation of tumor board recommendations.
- **Therapy plan**: Insufficient possibilities for continuing measures, e.g. the follow-up of patients (survivor care).
- **Responsibility**: Risk of diffusion of responsibility, tumor board outcomes as recommendations (vs. final decision), medico-legal concerns.
- **Funds**: Lack of financial compensation.

Despite the concerns, participation in tumor boards is perceived as beneficial by office-based oncologists and not just considered as a fulfillment of society recommendations or guidelines. The implementation of tumor board recommendations is the responsibility of the treating doctor, who has to consider the patient’s age, life expectancy, comorbidities, risk profile, and potential toxicities. The final treatment decision always depends on common agreement between the treating doctor and the patient. Improved eSupport systems may promote the use of online or video conferences and thus reduce the time spent commuting to tumor boards. These results are based on answers given by 155 WINHO partner practices (75%). The reasons for not participating in the survey by the remaining practices are unknown. Future studies would benefit by covering more oncology practices and also perspectives from the inpatient sector, and by identifying reasons for rejection to answer questions on tumor boards.

Less than half of the patients in the survey stated that a tumor board discussed their case. We cannot identify from the survey

### Table 4. Patients’ perceptions on tumor board recommendations and coordination between treating doctors

<table>
<thead>
<tr>
<th>Case presented in tumor board meeting</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>My treating doctors exchange information very well (n ≥ 274)</td>
<td>1.48</td>
<td>0.74</td>
<td>1.43</td>
</tr>
<tr>
<td>My treating doctors work very well together (n ≥ 274)</td>
<td>1.51</td>
<td>0.78</td>
<td>1.35</td>
</tr>
<tr>
<td>The treatment of individual doctors is very well matched (n ≥ 267)</td>
<td>1.52</td>
<td>0.78</td>
<td>1.45</td>
</tr>
<tr>
<td>My treating doctors always know very well of one another what the other one does (n ≥ 252)</td>
<td>1.70</td>
<td>0.92</td>
<td>1.54</td>
</tr>
</tbody>
</table>

*aOnly patients with solid tumors.*

SD = Standard deviation.

Source: WINHO Patient Survey 2012.

### Table 5. Adherence rates to WINHO quality indicators

<table>
<thead>
<tr>
<th></th>
<th>Mean (%)</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multidisciplinary consultation about therapy</td>
<td>74</td>
<td>44</td>
<td>123</td>
</tr>
<tr>
<td>Documentation of tumor board recommendation</td>
<td>52</td>
<td>50</td>
<td>91</td>
</tr>
</tbody>
</table>

SD = Standard deviation.

data if there was a lack of knowledge of tumor boards among patients or if their case was not presented. Patients who were treated in certified centers were more likely to know that their case was discussed at a tumor board. This knowledge was positively associated with the patients’ ratings of coordination among the treating doctors. However, a slightly higher score on the distress thermometer was also identified. This may be because (i) more difficult cases are discussed at tumor boards, and (ii) with such cases, the oncologists spend more time explaining the therapy process, including tumor board results. Further, the doctors’ attitudes towards tumor boards may influence the patients’ views and their knowledge of interdisciplinary team meetings.

Examining tumor boards within the quality indicators used to assess processes in oncology care provides an unbiased measure, compared to the subjective perceptions of doctors and patients. Due to the limited number of participants and the overrepresentation of patients with breast cancer in the pilot study, the quality indicator results can only be interpreted as tendencies and may serve as an example of possible ways to assess tumor boards. While multidisciplinary discussions about the therapy had taken place in nearly three-quarters of the patient charts analyzed, the tumor board recommendations were only documented in half of the cases. This feedback was given to oncology practices to raise awareness and thus improve documentation habits. An examination of adherence rates over time will be part of another paper, as the survey of the quality indicators continues.

The results presented here include data from office-based hematologists and oncologists that are WInHO partners. Data from small practices are underrepresented [19]. Further studies need to contrast the perceptions of hospital staff and office-based specialists regarding tumor boards. The perceptions of patients and doctors and their attitudes towards tumor boards should also be linked. In addition, statistical evaluations of tumor boards are required regarding their effects on improving the quality of care and patient well-being, multilateral decision-making processes, and cost effectiveness. The changes in the core teams of tumor boards, due to the increase in molecular diagnostics, among other factors, also need to be considered. Practical guidelines and standards for tumor boards could be further advanced [25].

Preconditions for a target-directed tumor board are adequate staffing, under consideration of existing local networks, and both open and unbiased discussions without apodictic judgements. Lamb et al. [6] recommended the inclusion of preparation time into the job plans of tumor board members, team and leadership training, as well as systematic inputs from nursing personnel. Considering that new tumor boards are still being established, questions of whether deficits in multi- or interdisciplinary care actually exist, or if only redundant structures are developed, remain relevant—especially given the high resource intensity of tumor boards.

Disclosure Statement

K.H.-M. is scientific director of the WINHO. C.R. is project coordinator and telematics consultant at the WINHO. W.B. is managing director of the WINHO. The WINHO was founded by the Professional Association of Office-Based Hematologists and Oncologists in Germany (BNHO). About 400 specialists from about 200 oncology practices collaborate with the WINHO and sponsor the institute through subscriber contributions. The research is independent of the pharmaceutical industry. R.D. is a medical doctor of internal medicine and is specialized in hematology and oncology. He works in a private practice as a hematologist-oncologist. All authors state no conflicts of interest.

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