Tumor Boards: Optimizing the Structure and Improving Efficiency of Multidisciplinary Management of Patients with Cancer Worldwide

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OVERVIEW

Multidisciplinary management tumor boards are now conducted worldwide for the management of patients with cancer. Studies evaluating their influence on decision making and patient outcome are limited; however, single-center studies have reported significant changes in diagnosis and treatment plans. A survey from Arabic countries showed widespread use and reliance on tumor boards for decision making. A recent multi-institutional survey of veteran affairs (VA) hospitals in the United States found limited association between the presence of tumor boards and care and outcomes. The Cancer Care Outcomes Research and Surveillance Consortium looked at the association between tumor board features and measures of quality of care. Results of overall survival among the patients of these physicians participating in tumor boards is ongoing, but preliminary results are outlined along with a recent ASCO survey of international members on the presence, utilization, and influence of tumor boards in this article. Tumor boards allow for implementation of clinical practice guidelines and may help capture cases for clinical trials. Efforts to improve preparations, structure, and conduct of tumor boards, research methods to monitor their performance, teamwork, and outcomes are outlined also in this article. The concept of mini-tumor boards and more efficient methods for MDM in countries with limited resources are also discussed. In suboptimal settings, such as small community hospitals, rural areas, and areas with limited resources, boundaries in diagnosis and management can be overcome, or at least improved, with tumor boards, especially with the use of video-conferencing facilities. Studies from the United Kingdom showed that special training of multidisciplinary teams (MDT) led to better team dynamics and communication, improved patient satisfaction, and improved clinical outcome. The weight of the benefits versus the time and effort spent to improve efficiency, patient care, and better time management in the United States and in the international oncology community is also reviewed in this article.
Tumor boards have evolved from weekly meetings where cases were presented at the discretion of attending physicians, to subspecialty organ-based meetings where either all cases are presented, or only select ones. Hospitals may have two versions of tumor boards: one where all cases are discussed briefly and another where only specific complex cases are discussed in depth. A more recent variant of a tumor board is called a molecular tumor board. Organized at select cancer centers, basic molecular and microarray translational research is applied at molecular tumor boards. In countries where teams have to treat patients living in geographically diverse areas, video-conferenced meetings are needed. Cases may be discussed during online tumor boards organized by cancer and educational societies (e.g., European School of Oncology). Historically, tumor boards were general tumor boards attended by medical oncologists, surgeons, radiation therapists, pathologists, radiologists, and other specialists. Recently, with increasing subspecialization in medical and surgical oncology, as well as related pathology and imaging, most academic centers have subspecialty, organ-specific tumor boards. Institutions rely on tumor boards to make sure quality care and state-of-the-art patient management is implemented. In all instances, significant physician and staff time and effort is spent on preparing and conducting tumor boards. Many physicians also rely on tumor boards to consult with their fellow physicians to better plan the management of their patients. ASCO has courses that promote MDM and the practice of tumor boards. Newly opened cancer centers, especially in emerging countries, are currently establishing new tumor board meetings. They may benefit from experience gained at established and more experienced institutions.

**TYPES OF TUMOR BOARDS**

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**KEY POINTS**

- Multidisciplinary management tumor boards are widely recommended for better management of patients with cancer. Optimizing structure, conduct, and efficiency of tumor boards is the goal of this article for the interest of the oncology community in the United States and internationally.
- International and U.S. studies evaluating the influence of tumor boards on decision making and patient outcomes are limited, and controversies surrounding the topic will be presented in this article. Additionally, results from Cancer Care Outcomes Research and Surveillance and ASCO tumor board surveys will be outlined.
- Studies from the United Kingdom showed that special training of multidisciplinary teams led to better team dynamics and communication, improved patient satisfaction, and clinical outcomes. A survey from Arabic countries showed widespread use and reliance of tumor boards for decision making.
- Tumor boards allow for the implementation of clinical practice guidelines as well as adapted local- and resource-sensitive guidelines, and may help capture cases for clinical trials.
- The efforts made to optimize preparations, the structure, and the conduct of tumor boards, monitoring their performance, teamwork, and outcomes are reviewed in this article. In some settings where service provision is suboptimal and where resources may be limited, tumor boards may help overcome limitations. However consideration needs to be given to the evaluation of the benefits versus the time and effort spent to improve efficiency and patient care, and to ensure better time management.

**INFLUENCE OF TUMOR BOARDS: SINGLE-INSTITUTION STUDIES**

For several decades, the benefits of working within tumor board configurations have been assumed as a matter of faith rather than as a result of hard confirmatory data. Evidence of their benefit comes from a few single-institution studies. For example, in 2001 a team from the University of Pennsylvania reported that their multidisciplinary breast tumor boards recommended a change in treatment for 43% of patients referred to the center. Interestingly, a complete assessment of each patient was made by their advanced-practice nurse before presentation at tumor boards. Consensus recommendations were made based on expert opinion from participants and not on published treatment guidelines or decision trees. The University of Pennsylvania tumor boards agreed with outside physicians’ recommendations in 55% of cases (in 3% of cases there were no initial recommendations). A study from the University of Michigan in 2006 reported that tumor boards changed diagnosis in 45% of cases, with a corresponding change in surgical management in 11%. Also, a review of pathology at the University of Michigan tumor boards changed diagnosis in 29%, with a corresponding change in surgical management in 9%. A study from New Zealand in 2009 showed that MDM gynecologic tumor boards resulted in changes in diagnosis and surgical management in 9% of cases after histopathologic and radiologic review.

**TUMOR BOARDS: CURRENT RECOMMENDATIONS AND SURVEYS**

MDM, either in MDM clinics or MDM tumor boards, is recommended by most experts and guidelines, because it provides patients with the complementary expertise of a larger number of specialists, a greater likelihood of implementation of evidence-based medicine, or expert opinions when evidence is not available from clinical trials. A review in 2007 noted that MDM clinics in Ontario, Canada, improved patient outcomes, changed management plans, and were also
part of standard cancer care internationally. They subsequently developed a standards document for MDM clinics, which has been adopted by several centers.5

In 2011, a provider survey of the Los Angeles Women’s Health Study examining breast cancer care concluded that tumor boards provide a structure for quality care enhancement. They concluded that tumor board agendas and policies are needed to encourage attendance to improve health outcomes.6 The American College of Surgeon’s Commission on Cancer Program accreditation also requires cancer programs to have a multidisciplinary cancer conference that prospectively reviews cases and discusses management decisions.7 A survey of the utilization of tumor boards in Arabic countries reported in 2011 that 60% of respondents attend tumor boards to seek group opinion for the management of their patients.8 ASCO promotes MDM through tumor boards that are integrated into multidisciplinary cancer management courses (MCMC) and those are considered as measures and indicators of success. MCMC attendees in low- and middle-income counties report starting new tumor boards after MCMC courses held in their countries.9

TUMOR BOARDS CONTROVERSIES: NEW STUDIES FROM THE UNITED STATES

Despite the widespread use of tumor boards, relatively few data are available demonstrating the effects of tumor boards on cancer care. Recently, research is attempting to address this gap. In one recent study, Keating et al examined use of multidisciplinary tumor boards in the veteran affairs (VA) health system, the largest integrated delivery system in the United States.10 This multi-institutional survey of VA hospitals assessed the presence of tumor boards and its association with care and outcomes. The researchers surveyed 138 VA medical centers about the presence of general tumor boards or cancer-specific tumor boards for cancers of the lung, colon/rectum, prostate, breast, and hematologic cancers. They also used cancer registry data linked with administrative data to assess receipt of stage-specific care recommended by guidelines, utilization of certain treatments, and survival for a large cohort of patients with lung, colorectal, prostate, hematologic, and breast cancers. The study found that most medical centers (75%) had at least one tumor board, and many had several tumor boards focusing on specific cancers. Overall, presence of a tumor board was associated with seven of the 27 measures assessed, but several of these associations were not in expected durations, and only one measure was associated after correcting for multiple comparisons. This study suggested little association between multidisciplinary tumor boards and measures of utilization, quality, or survival. This may reflect no effect or an effect that varies by structural and functional components, and participants’ expertise. The findings suggest that additional research is needed to demonstrate how tumor boards can best be structured to improve cancer care.

VA TUMOR-BOARD SURVEY DEBATES

Keating et al survey was accompanied by an editorial that concluded there was a need to change tumor board conduct, to incorporate measures of structure, and include processes to provide a feedback loop to improve outcomes.11 Although a following Medscape report had a provocative title questioning tumor boards, it stated that tumor boards should not be thrown away, and that additional research is needed to understand the structure, process, and outcome of tumor boards.12 A series of correspondences and replies in the Journal of the National Cancer Institute indicated concern about the lack of an adequate number of patients with breast cancer in the VA study, but that tumor boards are nevertheless greatly needed in areas with limited resources where they allow better interaction and communication between health care providers, which translates into more accurate diagnoses and more optimal management of patients.13 Other correspondence was concerned with the design and the execution of the survey regarding the review and the differentiation between cases presented as prospectively or retrospectively.14 There was also concern that in certain diagnosis categories, there was underestimation of benefits from tumor boards, small proportions of patients included, and lack of information on comorbidities and palliative therapy.15 The authors commented that the study suggested little influence on quality of care at the VA hospitals for the tumor types and measures assessed. They further commented that tumor boards may provide little benefit in areas where performance is already assessed by application of standard guideline-recommended care, but may be particularly helpful for more complex cases. Nevertheless, given the large number of hours invested, future studies on structure, conduct, expertise of tumor boards, and measures of benefit versus the time and effort behind them are needed.15

TUMOR BOARDS ONGOING STUDIES

In another study, Keating et al are currently analyzing data from the Cancer Care Outcomes Research and Surveillance Consortium to understand cancer physician participation in tumor boards and features of the tumor boards they attended. In addition, they are examining the association between tumor board features and measures of quality of care and overall survival among patients of these physicians. Results of this study will be presented at the 2014 ASCO Annual Meeting. In addition, ASCO recently conducted a survey of a cohort of international members to collect information on the presence, utilization, and influence of tumor boards worldwide. Members were asked if they held tumor boards, the type of tumor boards, the frequency, case selections and preparation, change in diagnosis and management, documentation of recommendations, mini-tumor boards, and methods for more efficient multidisciplinary management of patients with cancer. Results of this survey will be presented at the 2014 ASCO Annual Meeting.

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MINI-TUMOR BOARDS
Mini-tumor boards are defined as meetings of a smaller group of specialists who discuss cases and/or treatment plans when there are not enough specialists to represent all areas of care of patients with cancer. Respondents to a survey of tumor boards in Arabic countries, of which the majority work in settings of limited resources, agreed that in the absence of experts from all disciplines, a mini-tumor board should be organized with whatever specialists are available. The concept of mini-tumor boards was part of ASCO international tumor board survey and results will be presented at the 2014 ASCO Annual Meeting.

TUMOR BOARDS AND CLINICAL PRACTICE GUIDELINES
Multidisciplinary tumor boards provide substantial advantage in the delivery of care to patients with malignancy, but the influence on decision making has been studied to a very limited extent. Tumor boards serve to assure that all relevant disciplines are involved in the evaluation and treatment planning process, serve to coordinate complicated multidisciplinary care, tend to decrease variation in practice patterns, help to assure the judicious use of health care resources, provide substantial educational opportunity for medical professionals, and may improve the outcomes of cancer care. The goals and benefits that derive from multidisciplinary tumor boards are also demonstrated strengths of high-quality clinical practice guidelines in cancer care.

High-quality guidelines in cancer care are developed by multidisciplinary panels of experts, are based on scientific evidence when evidence is available, and provide the rationale for specific recommendations, are easily available, and useful in the health care delivery system at the point of care, and provide a source of education for medical professionals and the patient and their family. Studies have demonstrated that when care is provided concordant with high-quality clinical practice guidelines the treatment outcomes improve and often with a decrease in resource utilization and decrease cost of care.

The effect of the use of high-quality clinical practice guidelines by multidisciplinary tumor boards has been studied to a very limited extent; however, there are many reasons to expect their use to add value. These include increased ease of coordination of care as the expectations of treatment are predefined, objective, evidence-based, documented, and may be referred back to on an ongoing basis. Those circumstances in which the care varies from the clinical practice guidelines may be readily identified, and this focuses the attention on those components of care to aid in assessing that the variation in care is medically appropriate and justifiable. The use of high-quality clinical practice guidelines to identify the usual options of care also serve to counter-balance any dominant, over-riding personality or specialty within a given practice environment or tumor board. The guidelines become, in essence, a system of self-correction and balance. Occasional deviation by a multidisciplinary tumor board from the recommendations of high-quality clinical practice guidelines is expected and is likely to reflect high-quality cancer care; usual deviation by a multidisciplinary tumor board from the recommendations of high-quality clinical practice guidelines is very likely a signal of biased, poor-quality cancer care.

TUMOR BOARDS, GUIDELINES, AND RESOURCES
The use of clinical practice guidelines does require that the resources, systems, and expertise required for adherence with the guidelines be available to the health care system. These issues are particularly important when clinical practice guidelines are to be used on the international scale, where health care resources are likely to be highly variable and may be quite limited.

One system for modifying cancer treatment guidelines, based on the level of health care resources available, has been developed by the Breast Health Global Initiative. In the Breast Health Global Initiative resource stratification system, components or options of cancer care are associated with a level of resources: basic, limited, enhanced, or optimal. At the basic level of resources, recommendations or options are those essential to even begin to adequately manage a disease. In cancer care, such issues would include the availability of a pathologist to make a histologic diagnosis of cancer, and in most types of cancer, the availability to basic surgical treatment. At the limited level of resources, services might include those therapies that substantially add to outcomes (e.g., adjuvant chemotherapy) over and above the basic level therapies. At the enhanced-resource level are those therapies that add to the limited-level services in less impactful ways, but still enhance outcomes, such as aromatase inhibitor therapy in breast cancer as opposed to tamoxifen. At the optimal-resource level, therapies are those that provide benefit that is typically not disease oriented and/or very resource intense, such as autologous tissue breast reconstruction following mastectomy.

TUMOR BOARDS: WHAT TO DO AND WHAT NOT TO DO
Although relatively little guidance is available from studies of tumor boards themselves, studies of MDTs can inform our understanding of contributors and components likely to be of benefit. A review by Fleissig et al, of the effectiveness of MDTs in the United Kingdom reported that over a decade, the percentage of patients with cancer managed by MDTs was estimated to have risen from 20% to 80%. MDTs aimed to make cancer care more uniform and specialized, with less variation in treatment goals, but as in other countries, the authors found scarce high-level evidence for beneficial effects on the quality of cancer care. In the studies that have been conducted, there were various positive claims including better team dynamics, communication, and educational opportunities for health care professionals, improved patient satisfaction, and, hopefully, improved clinical outcomes reflected in better survival rates for patients considered by MDTs versus individual care. Although MDTs should pro-
mote better clinical decisionmaking, dysfunctional MDTs may not always arrive at clear decisions or include individual members who actively impede the decision-making process. Another important point concerns the implementation of decisions made at MDTs. There is some anxiety that decisions are either not well documented, or because of nonattendance by key health care disciplines, decisions could be less than optimal or never implemented.

Introducing different MDT consultants such as physiotherapists, dieticians, occupational therapists, and social workers to the existing team of oncologists, radiologists, surgeons, nurses, and pathologists helped improve information sharing and the referral and diagnostic process. Many obstacles to running effective MDTs remain, including a lack of attendance by the different consultants because of time constraints and unprotected meeting times, lack of administrative support, or even lack of funding. Online resource guides on quality improvements of cancer care are now available for MDTs. Current studies and trials are also undergoing for MDTs, but we still need better research methods to monitor performance, team working, and outcomes.27

MDTs are also involved in clinical trial preparation and conduct. In a study by Fallowfield et al, authors examined the use of 1-day MDT trainings on team members’ awareness about trials, and individuals’ confidence and communication about clinical trials.28 Six MDTs from the United Kingdom were included in the study, in which participants completed questionnaires aimed at assessing the participants’ awareness about the different roles in the trial, as well as their confidence in delivering trial information before and after the workshops. Team leaders completed a third questionnaire 6 months later that assessed implementation of change and sustainability. MDTs consisted of medical and clinical oncologists, surgeons, radiologists, histopathologists, chemotherapy and research nurses, nurse practitioners and MDT coordinators.

The study found that there was a significant change in the awareness following MDT trainings in different areas, as well as increased confidence in discussing trials (p < 0.001). The workshops were rated on average as 4.8/5, with members Recommending them to other trial MDTs. The findings, though suffering from some limitations, such as lack of objective data

Disclosures of Potential Conflicts of Interest

References


