

Role of multidisciplinary neuro-oncology tumour boards in cancer management

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Abstract

Multidisciplinary care, including a tumour board discussion for all patients with oncological problems is now considered a standard. However, this is not uniformly implemented within many centres, especially in developing countries. The structure of these tumour boards allows for comprehensive discussion and debate regarding various treatment pathways, with inputs from all specialties. This creates a consensus regarding management for each patient that is unique and holistic. Despite its widespread implementation, published data on neuro-oncology tumour boards is quite limited. The presented literature review briefly discusses the structure, goals, outcomes achieved by multidisciplinary tumour boards within the field of neuro-oncology.

Keywords: Neuro-oncology, Multidisciplinary, Brain tumour, Tumour board.

Introduction

Management of patients suffering from neurological malignancies is a multi-disciplinary task, necessitating important contribution from different stakeholders including neurosurgeons, neurologists, medical oncologists, radiation oncologists, neuro-radiologists, and neuro-pathologists.¹ The concept of multi-disciplinary tumour boards was thus introduced to promote a coordinated effort from the team of specialists.^{2,3} Currently, multidisciplinary cancer care is carried out through two models: in specialized units/clinics dedicated towards cancer treatment, as is practiced within Europe, and via multidisciplinary neuro-oncology tumour boards (NTBs), that are most frequently used across the globe.^{2,4} NTBs have been recognized as the keystone of cancer care by the European Society of Medical Oncology (ESMO) and the American Society of Clinical Oncology (ASCO).⁵ The NTBs are weekly or fortnightly meetings where all aspects of patient's pathology, from clinical features to diagnosis, management and outcomes are discussed, and a consensus treatment plan is devised.

The benefit of this system lies in its structure. The

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discussions with senior consultants from various specialties helps reach final diagnosis and evidence-based treatment options for complex cases. A survey carried out by ASCO showed that NTBs are used by 85% of the members surveyed.² NTBs are not only an essential tool for assuring patients and their families of the evidence-based quality care being provided to them, but are also a rich learning tool for trainees.^{3,6} That is why, even during the COVID-19 pandemic, many institutions continued to have NTBs on digital platforms.⁷ In this article, we have reviewed the available literature on NTBs and have discussed their role in treatment of brain and spine tumours.

Review of Evidence

We searched the literature on PubMed and Google Scholar. While there were numerous studies on tumour boards of different specialties, we found very few studies specific to NTB. In one study published in 2005, Lutterbach et al., analyzed the work of an interdisciplinary brain tumour board established at a hospital in Germany - comprising of inputs from radiation oncology, neuropathology, neuro-radiology, neurology, and neurosurgery (general and stereotactic).⁸ Over a period of 5 years, they had discussed 1516 patients in 259 meetings. Analyzing these meetings and recommendations retrospectively, the study reported that once a multidisciplinary recommendation was proposed, these were followed and actualized within 3 months in 91% of cases. The authors also showed that NTBs showed particular value in the management of benign skull base tumours, gliomas and brain metastases. NTB consensus guidelines were developed by the team for most common tumour entities, while still being able to provide individual solutions for special or rare conditions.⁸

In 2017, Snyder et al., carried out a comprehensive online cross-sectional survey to look at the role of NTB in neuro-oncology.¹ With the help of Society of Neuro-oncology and the American Brain Tumour Association, they collected data from 45 centres, with one respondent from each centre, belonging to different specialties.¹ Almost all the centres (94%) were of the opinion that tumour boards played a valuable role in the decision-making process for patients at their centres.¹ Furthermore, these NTBs were shown to be a pathway for enrolling eligible patients for novel therapies through clinical trials in 69% of the

centres.¹ On the academic front, 87% of institutions used tumour boards as a focal point for post-graduate education of fellows-in-training, residents, and even medical students.¹ An important recommendation from some centres was to integrate molecular and genetic data of patients in NTB discussions, or to have a parallel meeting for it, as molecular features will play a key role in brain and spine tumour management in the near-future.¹ Within this study, the role of neuro-radiologists was also highlighted. The spectrum of neuro-imaging modalities (magnetic resonance imaging, positron emission tomography, and computed tomography) was presented by a radiologist in 96% of the institutions, neuro-oncologists in 18%, neurosurgeons in 13%, and radiation oncologists in 9% of the centres. This emphasises the increasing complexity of interpreting imaging studies particularly of neuro-oncology cases with long clinical courses and several repeat imaging studies done to gauge treatment response or failure. In fact, dedicated guidelines for neuro-oncology imaging interpretation and the impact of treatment modalities on radiological findings requires dedicated input from experienced neuro-radiologists that can help guide the rest of the multidisciplinary team.⁹

In a recent paper published in 2021, Henderson et al., described a 'telecollaboration' between neurosurgeons in Western Kenya with specialists based within the United States to develop an online NTB.¹⁰ They described the case of a 5-year-old boy who presented with a cystic enhancing tectal lesion resulting in obstructive hydrocephalus. However, due to the delicate nature of the tumour area, the neurosurgeons at the hospital in Kenya wished to develop a multidisciplinary approach to this case and requested input from the NTB - to weigh the risks and benefits of using ventriculoperitoneal shunting versus endoscopic third ventriculostomy (ETV), and the timing of surgery as well. This case profile was shared with US-based physicians through an online e-mail link, and they responded with recommendations within 12 hours. Based on their recommendations, the patient underwent an ETV, and was to be followed up once more with a paediatric specialist onboard.¹⁰ Similarly, there have been other instances of twinning programmes in neuro-oncology care where smaller, low-volume centres may

benefit from the experience of high-volume, academic centres and discuss their cases at NTBs at these centres.¹¹

Conclusions

According to the limited literature available, NTBs have been shown to add benefit of review from experts in each field, guiding holistic patient management. A multimodal and multidisciplinary treatment strategy can then be formulated based on that diagnosis, with opinions from neuro-oncologists and radiation oncologists necessary to decide between the benefits and risks of chemotherapy, radiation therapy, and stereotactic radiosurgery.

References

1. Snyder J, Schultz L, Walbert T. The role of tumour board conferences in neuro-oncology: a nationwide provider survey. *J. Neurooncol.* 2017;133:1-7.
2. El Saghir NS, Charara RN, Kreidieh FY, Eaton V, Litvin K, Farhat RA, et al. Global practice and efficiency of multidisciplinary tumour boards: results of an American Society of Clinical Oncology international survey. *J. Glob. Oncol.* 2015;1:57-64.
3. Barbaro M, Fine HA, Magge RS. Foundations of Neuro-Oncology: A Multidisciplinary Approach. *World Neurosurg.* 2021. (online only)
4. El Saghir NS, Keating NL, Carlson RW, Khoury KE, Fallowfield L. Tumour boards: optimizing the structure and improving efficiency of multidisciplinary management of patients with cancer worldwide. *Am Soc Clin Oncol Educ Book.* 2014;34:e461-6.
5. ASCO-ESMO. ASCO-ESMO consensus statement on quality cancer care. *Ann Oncol.* 2006;17:1063-4.
6. Bernhardt D, Wick W, Weiss SE, Sahgal A, Lo SS, Suh JH, et al. Neuro-oncology management during the COVID-19 pandemic with a focus on WHO grades III and IV gliomas. *Neuro-Oncol.* 2020;22:928-35.
7. Ruhstaller T, Roe H, Thürlimann B, Nicoll JJ. The multidisciplinary meeting: an indispensable aid to communication between different specialities. *Eur. J. Cancer.* 2006;42:2459-62.
8. Lutterbach J, Pagenstecher A, Spreer J, Hetzel A, van Velthoven V, Nikkiah G, et al. The brain tumour board: lessons to be learned from an interdisciplinary conference. *Oncol Res Treat.* 2005;28:22-6.
9. Okada H, Weller M, Huang R, Finocchiaro G, Gilbert MR, Wick W, et al. Immunotherapy response assessment in neuro-oncology: a report of the RANO working group. *Lancet Oncol.* 2015; 16:e534-42.
10. Henderson F, Lepard J, Seibly J, Rambo W, Boswell S, Copeland WR. An online tumour board with international neurosurgical collaboration guides surgical decision-making in Western Kenya. *Childs Nerv Syst.* 2021;37:715-9.
11. Gross MW, Läubli H, Cordier D. Multidisciplinary tumour boards as videoconferences-A new challenge in the COVID-19 era. *Ann Oncol.* 2021;32:572-3.