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Clinical study

A single-institution prospective evaluation of a neuro-oncology multidisciplinary team meeting

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ABSTRACT

Multi-disciplinary team meetings (MDTs) are considered essential to quality cancer care. For some malignancies, MDTs have been associated with improved outcomes, but data regarding the neuro-oncology MDT is limited. We prospectively described the MDT at our institution and evaluated its impact on clinical management. Cases were discussed amongst the treating team and a pre-MDT plan and reason for discussion (RFD) was documented before the MDT. Patient specific clinical data was captured prospectively, with further pathological and radiological information captured during the MDT. Subsequently, the MDT consensus decision was recorded. High impact decisions (HID) were those in which the pre-MDT plan was substantially modified. A HID rate of >10% was considered clinically significant. Adherence to MDT recommendations was recorded. Seventy-nine cases were discussed at the MDT. Fifty-two cases (66%) were male. The median age was 53 (17–84). Thirty-three cases were new diagnoses and the remainder were relapsed/progressive disease. Thirty-nine cases were primary brain tumours, 25 were metastatic tumours and 15 were other. Twenty-eight (35%) had HID. No RFDs were statistically significantly associated with a HID ($p = 0.265$). Adherence data was collected for 95% (75) of cases. Treatment concordance with the MDT plan occurred in 90% (67) of cases. For cases of non-concordance, six out of eight (75%) were due to patient choice. Overall, a clinically significant proportion of treatment modifications are made at the neuro-oncology MDT. There were no case types which did not benefit from MDT discussion. MDT recommendations were largely adhered to, and in cases of non-concordance, were largely due to patient choice.

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1. Background

Tumour board meetings or multidisciplinary team meetings (MDTs) are a core component of clinical cancer management [1], and have been advocated to ensure timely clinical input on complex oncological cases by multiple specialists with relevant expertise [2]. They often comprise of nurses, allied health professionals, surgeons, radiation oncologists, medical oncologists, radiologists and pathologists and their importance has been recognised for facilitating communication, coordinating management plans and aiding clinical decision making [3]. Given the confluence of rele-

vant specialists and the inherent time and resource demands that coordination of the MDTs involves, assessing the functional utility of these meetings is of great importance. In non-central nervous system (CNS) malignancies, studies have found that MDTs are associated with improved staging [4], changes to management plans [3,5], higher rates of treatment and shift to more curative treatment modalities [6]. Consequently, routine use of MDTs has been recommended as part of optimal cancer management [7]. However, there are proponents of more selective MDT discussion [8,9]. These authors argue that routine MDT discussion does not substantially change clinical management plans and that the cost-benefit analysis is not favourable.

The neuro-oncology MDT is particularly specialized. Compared to other malignancies, CNS malignancies often require multidisciplinary input or specialized imaging prior to diagnosis [10], definitive surgery is associated with better outcomes when it occurs in high-volume centres, leading to specialized neurosurgical

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centres [11], and a wide array of tumor types are often discussed in neuro-oncology MDTs.

In light of this, and given that neuro-oncology MDTs were not represented in any of these studies, there remains a paucity of clinical research on the actual impact of MDTs on patient outcomes in the field of neuro-oncology. Only one study has been published, which demonstrated that it improves clinician satisfaction [12], but did not look at other factors such as effect of MDTs on clinical outcomes and changes to MDT plans. There is no published data regarding the cases typically discussed at neuro-oncology MDTs, the effect on MDTs on clinical management and compliance with MDT recommendations. There is also no published data on operational parameters of MDTs such as the time taken for case discussion. The aim of this study was to prospectively describe the neuro-oncology MDT at our institution and evaluate its impact on clinical management decisions.

2. Methods

All cases discussed over a three-month period at the neuro-oncology MDT were prospectively evaluated for the impact of the MDT on clinical decision making. All cases were discussed prior to the meeting by representatives of the referring teams (MA, WN, DM), and a pre-MDT plan was documented prior to the meeting. Cases were also categorised according to the major reason for discussion (RFD), with standard categories including routine review of tissue from operations performed in the previous week (pathology review), diagnostic uncertainties in imaging studies (radiology review), specialist input on management in complex cases (medical oncology/radiation oncology/surgery) or other. Cases were also categorised according to whether they were new or recurrent cases. Patient specific clinical data was also captured prospectively including demographics, performance status and treatment history, with further pathological and radiological information captured at the time of the meeting. Subsequently, the MDT discussed the case and reached a consensus decision, which was recorded.

A high impact decision (HID) was defined as any case in which the pre-MDT plan was substantially modified, or a treatment plan was developed where none existed prior to the meeting. To be defined as a HID, the classification had to be agreed upon by clinicians of both neurosurgical and medical oncology teams. Changes considered high impact include changes in treatment modality, or additional diagnostic tests which would significantly alter clinical management. An HID rate of greater than ten percent was considered clinically significant, consistent with the reported literature in other tumor types [13].

As an exploratory analysis, the time taken for case discussion was correlated to the category of case discussed as well as the time-point in the meeting. Of note, cases were typically added to the MDT on a purely chronological basis and there was no specific ordering system for case discussion. Post-MDT data capture also included concordance with MDT recommendations and reasons

for non-concordance. This study was conducted with approval from the Human Research Ethics Committee.

2.1. Statistical analysis

R was used for all statistical analyses. For assessment of association of categorical variables with a change in plan, chi-square tests were performed. For the exploratory analysis, given that the number of cases per MDT varied, to effectively compare the time taken for discussion, the cases were split into quartiles based upon the total number of cases discussed at a meeting. As the biggest discrepancy was likely to be between early and late cases, the mean time taken for cases in the first quartile of cases discussed at an MDT was compared to the mean for the fourth quartile of cases with a paired *t*-test.

3. Results

The neuro-oncology MDT at our institution consists of neurosurgeons, neuro-oncologists, radiation oncologists, neuro-radiologists, pathologists, clinical nurse consultant and trainees. Cases are typically drawn from within the institution, with a meeting agenda circulated at least 24 h prior to the meeting. Occasional cases are referred from external sites for an expert or second opinion. All neurosurgical procedures performed for oncology cases within the hospital are typically discussed at the MDT. Additionally, known oncology patients requiring radiology review prior to surgery are often discussed at the discretion of the treating clinician.

Over the three-month period, 79 cases were discussed at the neuro-oncology MDT. The tumour types discussed are shown in Table 1. Twenty-seven (34%) of cases discussed were female and 52 (66%) of cases discussed were male. The median age of patients discussed was 53. Six patients were discussed more than once. Of the 79 cases, 33 were new and 46 were recurrent. Twenty-eight cases had multifocal disease. Most cases discussed at the MDT were for routine post-operative pathology review (42), although there were also 19 cases for questions related to diagnostic imaging (radiology review), fifteen complex cases for specialist input and two 'other' (refer to Table 1).

Of patients who had debulking surgery, the median Karnofsky performance status (KPS) was 90. Of patients who had a biopsy only, the median KPS was 75. A change in treatment plan occurred in 28 out of 79 cases (35%). Of these 22 out of 28 cases included a change to a different treatment modality and were recorded as an HID. Five cases in the 'other' category had unclear predefined treatment plans and received a clear treatment plan following the MDT, and were therefore also recorded as having HID.

On chi-square analysis, the frequency of high-impact decisions was not correlated with RFD ($p = 0.265$), new versus recurrent disease ($p = 0.70$), or the pre-treatment plan ($p = 0.12$) (refer to Table 2). It was however, strongly correlated with the post-treatment plan (refer to Table 3). There was no significant

Table 1
Tumour types discussed at MDT and Reason for Discussion.

Tumor type		For pathology review	For radiology review	For specialist input	Other	Number of cases (N)
GBM	Primary	10	0	3	0	13
	Recurrent	3	4	2	0	9
G3 glioma		2	2	2	0	6
Low grade glioma		2	2	2	0	6
Meningioma		2	2	1	0	5
Metastatic tumour		14	6	4	1	25
Other		9	3	1	1	15
Total (N)		42	19	15	2	79

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