How to do it - Practical Neurology

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Multidisciplinary Team meetings: The epilepsy experience

Introduction

Multidisciplinary Team (MDT) meetings and case-conferences are increasingly becoming the norm in neurological practice, to ensure that all the aspects of patient diagnosis and care and a range of options are considered, and to inhibit maverick practice by a single consultant.

MDTs range hugely in their scope, complexity and remit, and this is much influenced by the workflow. At one extreme in a busy, neuro-oncology service, a weekly MDT may consider 40-50 patients in 2 hours, with rapid fire input from a caucus of neurosurgeons, neuro-radiologists, oncologists and neuropathologists. At the other extreme, an epilepsy surgery MDT may spend 30-40 minutes on an individual patient in whom neurosurgical treatment is being considered for focal epilepsy that is not controlled with antiseizure medication (ASM).

This essay describes the evolution and current practice of the Epilepsy Surgery MDT at Queen Square, and then the implications of this for MDTs in other areas.

Background

I first learned the craft of the epilepsy surgery MDT in Oxford in 1983, working for Drs John Oxbury, Susan Oxbury and Peter Fenwick and Mr Christopher Adams. John would present the history of the epilepsy and the CT scan, Susan would present the neuropsychology, Peter would discuss the EEG findings and the individual's psychiatric state, leading to a consensus regarding the likely lateralization and localization of seizure onset and Christopher Adams would then opine on what could be done. Once a consensus had been reached, the patient and their family, who would often be present in an anteroom, would be invited to join and to discuss the conclusions and recommendations of the meeting.

This model formed the framework of the first epilepsy surgery MDT at Queen Square in 1989, and has stood the test of time over the last 33 years, albeit with considerable modifications and enhancements. The documentation has become considerably more sophisticated. Initially, the neurology registrar would read from the clinical record, and would write a brief summary in the notes after the meeting.

The format evolved in the 1990s, with Word documents of the key data and, in the noughties, typed summaries. A big step forward was made in 2013, with the creation by Drs Diehl and Nachev of a pdf form that specified the key areas of data to be presented and which would be populated with the patient-specific information, indicating who took part in the meeting, the discussion and the outcomes, with drop down menus of choices as well as free text for recording the salient points of the discussion and recommendations (Fig 1). Until March 2020, meetings were held in a seminar room, with a core group of about 10 and a further 10-20 trainees and students. Since March 2020 the MDT has been held using Microsoft teams. This has had the consequence of taking longer, is at the mercy of IT failures but allows colleagues and students to attend without the need to travel.

How the epilepsy surgery MDT works

The term of reference of the MDT is that it is advisory to the individual patient's treating consultant(s) and does not mandate a particular course of patient management. It would, however, be unusual for a consultant to follow a pathway that was contrary to the MDT recommendations.

A key function of the MDT is to consider all the strands of data and to synthesize these into a coherent formulation and options.[1] It is essential that the various components to be considered are well-prepared in advance and the conclusions presented succinctly as, otherwise, the meeting drifts and participants' attention may lapse. There are key decision points in the epilepsy surgery evaluation pathway for MDT discussion (Fig 2). Firstly, an MDT after the initial Phase 1 investigations may identify patients who can be recommended for surgery without further investigation, and also identify those for whom surgery is not a suitable option and, thirdly, those who need further investigation. MDTs are also used to re-evaluate options after further investigations have been carried out.

There is a set format for the epilepsy surgery MDT, with data recorded in a standardized manner (Fig 1), and chaired by a consultant clinical neurophysiologist. First, a neurology resident presents the clinical history, examination and the language dominance. Second, the EEG and video-EEG telemetry of seizures are presented by a neurophysiology technologist, followed by commentary by the clinical neurophysiology consultant chairjng the meeting and then a discussion of the key findings and the lateralizing and localizing clues for seizure onset.

The imaging data including MRI, with PET and SPECT in selected cases, are then presented by a neuroradiologist, with an interactive discussion and review of possible abnormalities. Then a consultant neuropsychologist summarises the neuropsychological data, including reference to the individual's ability to give informed consent for surgery, the presence of any localizing deficits, evidence of more widespread and the likely impacts of surgery on cognitive function. The consultant neuropsychiatrist then presents the individual's psychiatric condition, including their support and resilience, and the psychiatric risks of neurosurgery.

The chair of the MDT then summarizes the data on the likely lateralizing and localizing data regarding seizure onset and propagation and the concordance or otherwise of imaging abnormalities, highlighting the evidence for implicating one area of brain that is likely to be responsible for seizure generation and any red flags. This is followed by an open discussion on whether or not there is a single surgical target, whether there are discrepancies between data, and evidence of multifocal or widespread dysfunction that would reduce the odds of a good outcome.

If there is uncertainty about the likely sites of seizure onset, or network that gives rise to seizures, further investigation may be recommended such as FDG-PET if this has not been done, ictal SPECT and intracranial EEG.

If there is a potential surgical target or if intracranial EEG is suggested, the chances of seizure freedom are discussed. This may range from 80% chance of remission for at least 5 years (clear temporal lobe epilepsy on video and EEG, unilateral hippocampal sclerosis on MRI, concordant impairment of material specific memory encoding with no evidence for cognitive impairments elsewhere and no psychiatric morbidity) to 5% chance of a 5 year remission (extratemporal seizures, focal to bilateral tonic-clonic seizures, normal MRI, psychiatric pathology and learning disability).[2] This is weighed against the chances of seizure remission with further ASM being 5% in patients who have already tried four of more ASM.[3]

If the patient is a candidate for surgery, the discussion then turns to consideration of the neurosurgical perspective of the possible procedures, approach and risks of surgery, compared with the risks of not having surgery, noting the 1/75 annual fatality rate of individuals with medication resistant focal epilepsy, the risks of cerebral damage from physical injury and continued seizures and the psychosocial and financial consequences of un-controlled epilepsy. In general the minimum risks of epilepsy surgery are 1% of a severe new morbidity such as hemiparesis; a 5-10% risk of significant deficit, such a visual field defect following an anterior temporal lobe resection, that would preclude driving, and a 30% chance of worsened memory encoding and word-finding difficulty.[4] As a rule of thumb, in many individuals who would be regarded as good candidates for resection, the risks of surgery are similar to the risks they run from one to two years of the uncontrolled epilepsy.

The neurological and neuropsychological consequences and risks of surgery of course depend on the location of the proposed resection. A hemianopia is an inevitable consequence of an occipital lobe resection, as is loss of any independent contralateral finger function after a functional hemispherectomy. The risks of the proposed surgery causing significant harm to language, memory, executive function and other cognitive skills, and the implications of these for an individual need to be considered. These risks need to be weighed against the risks of not having surgery and having continued seizures. A resection close to the primary motor cortex, or in the speech dominant inferior frontal gyrus and anterior insula risks aphasia, that may be mitigated by surgery being carried out with the patient awake if the patient could cope with that. The use of 3D images with tractography for visual, motor and language pathways can help planning surgery. These also help to consent the patient in understanding the level of risk associated with the operation. The images can be merged in the surgical navigation software during the operation and help the surgeon to delineate the resection margins to reduce the risk of deficit.

Psychiatrically, we note that 50-60% of individuals have increased anxiety and depression in the months following epilepsy surgery and 3% develop a psychosis, and that any psychiatric condition increases the risk and needs to be treated prior to surgery.

Resective surgery is not recommended in 50% of individuals considered at an MDT and in this group consideration is given to other treatment options, such as neuromodulation with vagal nerve stimulation, further ASM or ketogenic diet.[5]

The neurology registrar summarizes the discussion in real time on the proforma pdf, noting who attended, and the outcome of the MDT and future actions to take. The completed proforma is then checked and edited by the MDT chair and the individual patient’s consultant and filed in the electronic patient healthcare records. It is the responsibility of the patient’s consultant to contact the patient and to arrange the next steps, such as further investigations and clinic appointments with themselves and neurosurgical colleagues.

There are many analogies for the MDT; a comparison with a helicopter rescue mission is a good one. The neurologists present the problem and the MDT determines if it is possible to design a mission that can achieve a good result, for example to rescue a group of injured climbers stuck on a precipice in a deep valley above a village. First, the location and its surroundings must be verified. Second, is it possible for an achievable flight plan to be designed (the surgical approach)? Third, what are the chances of being able to rescue the climbers and what is the risk of a crash that damages the town below (eloquent cortex, critical white matter tracts)? In this analogy, the MDT is the overall mission planning team, the 3D image-processing team function as air traffic control and the operating neurosurgeons are the pilots who will carry out the mission and have to indicate whether they consider the mission is achievable and the inherent risks.

If there is a complication from surgery, this is borne by the whole team who considered the case and designed the mission that was given to the surgeon. In this event, a post-operative debriefing MDT is essential to learning and improving future practice, with the whole case being gone through in as much detail as in a pre-operative discussion. The team shares the successes and the disappointments and learns from the experience.

Implications for running an MDT

Experience of and lessons from an epilepsy surgery MDT can be extrapolated to MDTs in other areas. It is key to agree the terms of reference and the data and opinions to be considered, and for there to be a quorum of committed participants. Individual contributions need to be well prepared in advance and focused, and it is useful to follow a set format, with the Chair summarizing the data, followed by a discussion involving all relevant participants. A useful discussion will consider the diagnosis and options for further investigations and treatment, in the light of current state-of-the art knowledge in the area.

There will frequently be a range of diagnostic and treatment options, with their own risks and benefits. These need to be quantified and considered against the likely natural history of the individual's condition if a conservative approach is taken. Having a real-time recording, by a nominated individual who is familiar with the field, of the data presented, the discussion and the consensus is critical. The MDT record informs subsequent discussion between an individual and their treating consultants. Regular audit of the outcome of MDT decisions is essential. If an individual patient has an outcome that is less good than expected it is very valuable to have a through debrief of the decision-making process and subsequent actions. This provides valuable learning for the whole team, leading to improvement in practice, and a mutually supportive team ethic.

Further reading

Duncan JS. Selecting patients for epilepsy surgery: Synthesis of data. Epilepsy Behav. 2011;20:230-2.

Bell GS, de Tisi J, Gonzalez-Fraile JC et al. Factors affecting seizure outcome after epilepsy surgery: an observational series. J Neurol Neurosurg Psychiatry. 2017;88:933-940.

Key Points

Define the terms of reference of the MDT and the data and opinions to be included.

Follow a consistent format to the MDT, with a structured proforma for data presented and discussion points.

Ensure there is a quorum of all relevant specialists.

Have well-prepared concise presentation summaries.

The Chairperson summarises the key facts and ensures all relevant views are taken into account and formulates the MDT consensus and minority views.

The MDT recommendations, including range of options are summarised in writing and copied to the Chair and the patient's consultant for checking and informing of subsequent steps

The outcome of individuals discussed at the MDT is audited.

There is a detailed debrief and reconsideration of an individual patient if the outcome was less good than expected.

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Figures

Figure 1. Epilepsy surgery Multidisciplinary Team meeting proforma.

Figure 2. The pathways for epilepsy surgery evaluation, showing the key roles of the Multidisciplinary team meeting.