





SPECIAL ISSUE

Transition to a virtual multidisciplinary tumor board during the COVID-19 pandemic: University of Pittsburgh experience

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Abstract

Multidisciplinary conferences (MDC) are an important component of head and neck oncologic care including diagnosis, treatment, and survivorship. Virtual MDC allows for improved collaboration between providers at distant sites and proper allocation of health care resources in a time of crisis. When approached systematically, a virtual MDC is feasible to design and implement in a large academic medical center with multiple satellite hospitals.

KEYWORDS

multidisciplinary, remote, teleconference, telemedicine, virtual

1 | UTILITY OF A MULTI-DISCIPLINARY TEAM CONFERENCE

Considering the complexity of head and neck oncologic care, a multidisciplinary team (MDT) approach in diagnosis, treatment, and survivorship care is essential. The MDT is generally composed of a diverse set of specialists: ablative and reconstructive surgeons, radiation oncologists,

medical oncologists, neuroradiologists, pathologists, supportive and palliative care staff, speech language pathologists, nutritionists, dentists, and physical and occupational therapists.¹⁻⁴ As head and neck oncologic staging and treatment paradigms continue to evolve, there is a significant emphasis on the value of a specialized multidisciplinary conference (MDC).⁵ The inherent purpose of MDC is to serve as a quality checkpoint: to ensure a thorough evaluation of each case regardless of the spectrum of

care, whether pretreatment, treatment, or survivorship. This entails ensuring proper diagnosis, staging, treatment planning, clinical trial enrollment, care coordination, management of treatment complications, evaluating disease response, recurrence monitoring, and survivorship outcomes.⁴ There is strong evidence to suggest that MDC implementation may improve pretreatment evaluation (dental, nutrition),⁶ proper staging,^{7,8} and appropriate timely treatment.⁶⁻¹¹ It may also affect disease specific survival^{11,12} and overall survival¹⁰⁻¹⁵ but this is controversial. As MDC usage has become more widespread, academic institutions are beginning to evaluate MDC quality measures with respect to guideline adherence and patient outcomes.¹³ Given its impact, MDC has become a standard in head and neck oncologic care.

2 | COVID-19 PANDEMIC AND FRAGMENTATION OF CARE

Due to the COVID-19 pandemic, head and neck care coordination has been dramatically altered. In these uncertain times, limitations with clinical resources and health care office availability have made it more difficult for head and neck cancer patients to obtain multidisciplinary care. In the usual timeframe, a new head and neck cancer patient would be able to meet all the members of the MDT, finish pretreatment diagnostic

studies, and receive a consensus MDC recommendation within the span of about 2 to 3 weeks. In the current scope of telemedicine, there is concern for possible delays along any of these timepoints as well as the time-interval from diagnosis to treatment initiation. The ability of MDT and MDC to modify care coordination is essential in a time of crisis. The MDT framework allows patients to be referred in a timely fashion between a network of specialty providers; this way patients from regions of low resource availability (ie, personnel, equipment, operating room availability) can be guided to areas which are able to deliver timely oncologic care. The MDC is fundamental to this care coordination model.

At our institution, the University of Pittsburgh Medical Center, there are multiple distant hospital campuses spread out across three states, Pennsylvania, New York, and Maryland (Figure 1). New patients may be referred to the head and neck MDT from any of these locations. However, it is often that such patients may see a local primary care physician or general otolaryngologist before being referred for evaluation by the UPMC Head and Neck MDT. Due to the COVID-19 pandemic, any delays which are associated with this pathway are likely to be exacerbated. In the past few weeks, the MDT has adopted hosting a virtual MDC which is accessible to remote UPMC locations away from Pittsburgh, PA. The concept is to streamline head and neck oncologic care such that patients in any region of the hospital system would be

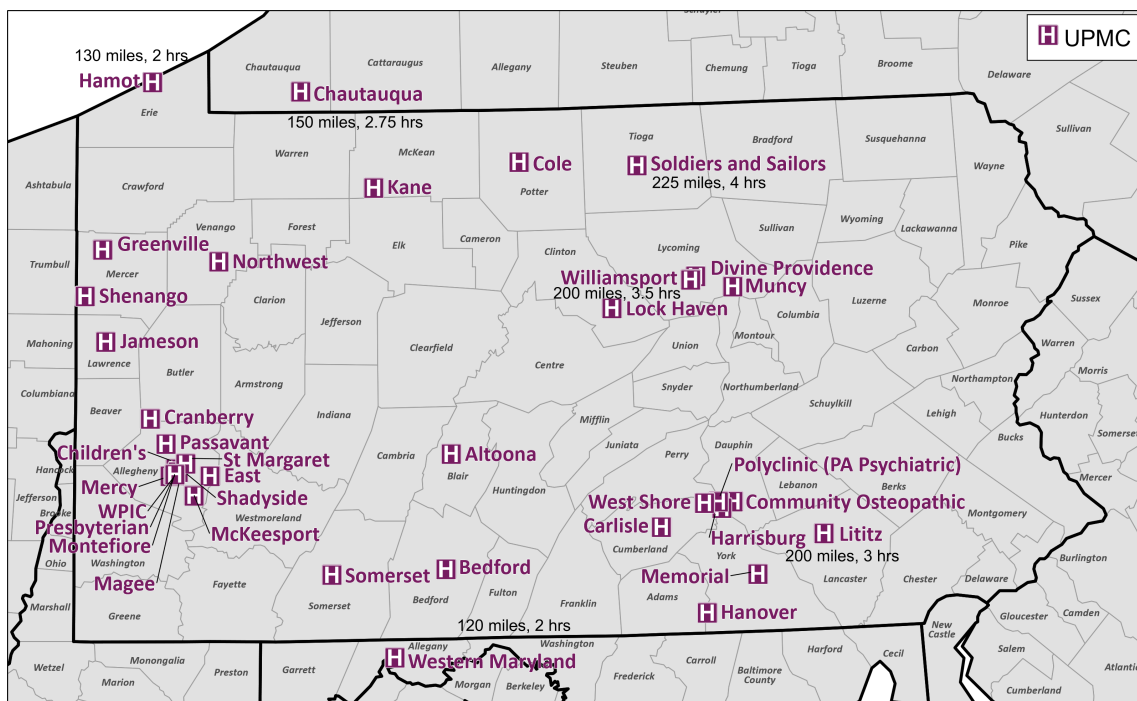


FIGURE 1 UPMC system map. Listed is the approximate distance to satellite hospitals (in miles) from Pittsburgh, PA, and the estimated driving time in hours [Color figure can be viewed at wileyonlinelibrary.com]

able to obtain timely diagnosis and treatment plans. The virtual MDC offers flexibility for both providers and patients. Regardless of whether patients are awaiting an initial MDT evaluation or definitive treatment, MDC discussions empower patient-centric care so that current needs are matched in an appropriate fashion with available system resources.

3 | PRIOR EXPERIENCE WITH VIRTUAL TUMOR BOARDS

Virtual MDC has been employed in multiple settings including evaluation of lung cancer,^{16,17} hepatocellular carcinoma,¹⁸ breast cancer,¹⁹ GI cancer,¹⁹ malignant hematology,¹⁹ general oncology,^{20,21} and head and neck.²² Utilization of virtual MDC has been associated with improved referral coordination,²⁰ decreased delays in diagnosis and treatment,^{16,18,20} higher frequency of MDT evaluation,¹⁸ and reduced patient^{18,20} and provider travel burden.¹⁶ Reported challenges in implementing a virtual MDC program include reliable technical setup,^{16,20} increased length of virtual case presentations,²¹ paucity of community provider cases,^{19,20} delay in receiving supporting information such as imaging and pathology slides,¹⁹ and cost of virtual informatics infrastructure.¹⁷ Even with these barriers, it appears that virtual MDC participants in general either endorse or find it comparable to traditional in-person meetings.^{19,21} However, the extent to which a virtual MDC affects guideline adherence and patient outcomes in comparison to a traditional MDC is yet to be studied. As more data becomes available with regards to MDC quality improvement, these relationships will be detected.

4 | VIRTUAL MDC EXPERIENCE AT UNIVERSITY OF PITTSBURGH MEDICAL CENTER

UPMC conducts a weekly MDC to discuss care of head and neck cancer patients. The MDT consists of providers from Otolaryngology-Head and Neck Surgery, Medical Oncology, Radiation Oncology, Neuroradiology, Pathology, Oral and Maxillofacial Surgery, Nursing, and Palliative and Supportive Care. MDC was conducted primarily in person prior to the COVID-19 pandemic. The conference was held in the Otolaryngology-Head and Neck Surgery department conference room with an associated teleconference line. Remote participants were able to join MDC via teleconference but were not able to observe any of the imaging reviewed during the conference.

During the present COVID-19 pandemic, MDC has been transitioned to a remote, virtual format utilizing

video teleconference via Microsoft Teams. This format allows for both audio and video participation as well as screensharing. Data shared through Microsoft Teams is secure, meeting HIPAA compliance standards. In order to access the application, MDT members must login via their institutional access; this prevents other users from gaining access to the MDC. At the start of the meeting, the neuroradiologist shares his or her screen, which allows attendees to view radiological images that are reviewed during the conference. Screen sharing of Microsoft PowerPoint slides also allows for brief presentations on relevant clinical topics. MDC is organized by an otolaryngology resident, who assembles the list of patients to be presented at the conference. A preliminary list of patients is distributed to the MDT at least 24 hours prior to MDC in order to allow for providers to prepare for patient presentations. The organizer distributes the final list to MDC participants and hosts the video teleconference. Additionally, the chair of Otolaryngology-Head and Neck Surgery helps to lead patient discussions. Notes summarizing the MDC discussion and final recommendations are placed in each patient's chart at the conclusion of the conference.

5 | EARLY IMPRESSIONS OF THE VIRTUAL MDC

UPMC has conducted three fully remote MDC sessions. A brief survey was distributed to participants in order to query opinions regarding the new format. Responses were obtained from 19 participants from a variety of specialties including Otolaryngology-Head and Neck Surgery, Medical Oncology, Radiation Oncology, Neuroradiology, and Pathology (Table 1). Survey respondents included both attending physicians and graduate medical trainees. Most respondents had attended at least two virtual MDC sessions (84.2%). The majority of respondents (57.9%) indicated they preferred the virtual MDC format compared to the traditional in-person format. Furthermore, a majority of respondents (78.9%) also indicated they preferred to continue the virtual MDC format once in-person meeting restrictions have been lifted. Virtual MDC and in-person formats were felt to facilitate patient discussion with similar ease.

6 | ADVANTAGES AND DISADVANTAGES OF A VIRTUAL MDC

A virtual MDC improves ease of attendance, particularly for off-site providers. This encourages greater participation

TABLE 1 MDC participant survey responses

	Number	Percentage
Role in MDC		
Otolaryngologist	9	47.4
Medical Oncologist	2	10.5
Radiation Oncologist	3	15.8
Neuroradiologist	4	21.1
Pathologist	1	5.3
Palliative and Supportive Care	0	0.0
Graduate Medical Trainee		
No	15	78.9
Yes	4	21.1
Number of virtual MDC attended		
One	3	15.8
Two	7	36.8
Three	9	47.4
MDC format preference		
Virtual	11	57.9
In-person	5	26.3
No preference	3	15.8
Ease of format		
Virtual easier	6	31.6
In-person easier	6	31.6
Same ease for both virtual and in-person	7	36.8
Format preference for future MDC		
Virtual	15	78.9
In-person	4	21.1

for community providers. Our most recent virtual MDC allowed the inclusion of additional providers from a UPMC campus 200 miles from our main center in Pittsburgh. Additionally, eliminating the need to travel from local hospitals within the UPMC system decreases time and burden previously required for providers to attend MDC. The virtual format provides flexibility to on-site providers as well, which promotes attendance. Images are more easily viewed by both the neuroradiologist and MDC participants when a virtual format is employed. Furthermore, by attending MDC at their workstation, providers have real time access to patient records, which can be reviewed to assist with clinical decision making.

One disadvantage of a virtual MDC is the lack of personal interaction during discussions of patient care. This results in decreased camaraderie between providers across specialties. Additionally, interactive conversations with multiple speakers can be challenging using the videoconferencing software. Software difficulties including

difficulty with screen sharing and audio were challenges primarily during the first virtual MDC sessions. However, this has been improved in subsequent sessions. Finally, some participants found it more difficult to follow the list of patients discussed during virtual MDC.

7 | RECOMMENDATIONS FOR HOSTING A VIRTUAL MDC

In order to transition from a traditional to a virtual MDC framework, we suggest using the “Model for Improvement” created by the Associates in Process Improvement.²³ This methodology entails a cyclic four step process: plan, do, study, and act. This will help to ensure the reliability and accuracy of a virtual MDC setup. Summarized below are the corresponding sections for each process step.

7.1 | Virtual MDC planning

The dedicated MDC organizer should meet with the institution's IT staff to brainstorm ideas for the virtual MDC. Questions to consider include the cost of implementation, necessary IT infrastructure, security measures, number of participants anticipated, feasibility, ease of collaboration across MDT, and approximate timeline for implementation. Once these essential topics are addressed and discussed with MDT leadership, the organizer should proceed to hosting a few trial MDC sessions in lieu of the weekly traditional meetings. A simple survey addressing the ease of communication, participant preferences, and comments may then be conducted. This will help to gauge the degree of buy-in from MDT members at the onset of the project. Based on the survey responses, we encourage discussion within the MDT regarding the specific advantages and disadvantages to implementing a virtual MDC. We anticipate that if there is a significant preference for one format, there will be strong support from MDT leadership to institute such a system.

7.2 | Virtual MDC implementation

There are several factors which affect the degree to which MDT members can interact in a virtual setting: time, ability to hear colleagues, visualize case imaging, and see other MDT members.²⁴ The organizer must find the best time to host the virtual MDC so that as many MDC members can participate as possible. In addition, all MDT members need adequate time to prepare for case discussions; thus, new case submissions and the meeting agenda should be finalized at least a day in advance permitting same-day case additions if needed. On the matter of virtual MDC workflow

in comparison to traditional meetings, Kane and Luz found that teleconferencing was associated with a greater time spent per case (147%), increased participant turn duration and total attendance, decreased number of total participant turns per minute and percent of informal conversation.²⁵ Patients with advanced T and N staging will require more discussion and time allocation as compared to those with early stage disease whose treatment may be planned via a protocol.²⁶ Thus, it would be beneficial to prioritize discussion of advanced stage and complicated cases earlier in the teleconference when all members are available.

Virtual MDC can be set up to allow either one or more MDT members to talk at once. However, it is often the case that there is one MDT member who has the floor at any given time while other participants are muted in order to reduce background noise. In this way, the speaker's dialogue is easily understandable. Sometimes, in traditional settings, there is risk of multiple people speaking at once or poor voice projection across the room (ie, room acoustics or variable seating arrangements) that may make the meeting's sound quality inconsistent. With the virtual MDC, participants may have to wait a bit longer to respond to discussions rather than speaking in freeform, which would be the standard in traditional meetings. If the teleconference connection quality is reliable, there should not be any problems with MDT members hearing their colleagues.

We recommend a virtual MDC setup in which individual MDT members can share their computer screen with others. In this manner, the MDT radiologist should be able to access individual patient scans and share them on a single centralized display. This tremendously improves the ease of use for the radiology team. The radiologist can prepare the pertinent imaging slides ahead of time and be ready to share this information rather than having to reload all the images on a new computer at the meeting hall. In a similar fashion, the pathologist may be able to share the final pathology report, stains, or any pertinent microscopy findings with the entire team. If there is any need to verify case information, participants can check the electronic medical record in real time as well. In terms of seeing other MDT members, individuals can choose to utilize videoconferencing, but the informal conversations in a traditional meeting are hard to replicate in a virtual setting. If interested, MDT leadership may choose to hold a once monthly or quarterly in-person meeting to support the team camaraderie.

7.3 | Assessing virtual MDC performance

In order to evaluate the quality metrics of a virtual MDC, there must be proper, systematic data collection. It is vital

that each case discussed at the MDC have documentation linked with the patient's electronic medical record. This information should be accessible to all MDC participants in case specific members are unable to attend a session. The documentation system should be design in a systematic manner and be goal-oriented.²⁷ If data recording is standardized, the MDC case database will serve as a central resource for reviewing patient diagnostic pathways, treatment plans, outcomes, and guideline adherence. This has immense implications for analyzing patient data across the spectrum of care including survivorship. There are a few options for building a virtual MDC documentation database. Rangabashyam et al. utilized the REDCap web application, Research Electronic Data Capture (<https://www.project-redcap.org/>), in order to document each aspect of MDC case presentation: scheduling, biodata, diagnosis, presentation, imaging, histopathology, management plan, MDC discussions and decisions.²⁸ This system proved to be efficient as it could be embedded into the existing electronic medical record system.

A few institutions have developed methods to independently assess MDC. Harris et al. implemented an MDT meeting observational tool (MDT-MOT); this rating system allowed observers to evaluate 10 different teamwork domains pertinent to the MDC and had good criterion validity.²⁹ Virtual MDC can be assessed in terms of process and outcome measures.³⁰ Process measures include time interval to case presentation from initial request, percentage of relevant member participation, and overall attendance. Outcome measures include percentage of cases following MDC recommendations, correlation of MDC recommendations with guidelines, time to treatment initiation, disease-specific and overall survival, and patient quality of life and satisfaction. Regardless of the methodology in assessing virtual MDC, the underlying principle is to have each institution critically review its own MDC and the outcomes associated with its discussions.

7.4 | Process modifications

Based on data analysis from the virtual MDC sessions, quality improvement projects can be appropriately tailored. There are many areas to focus on including preventing delays in treatment or referrals and improving adherence to MDC recommendations. The expectation is that each of these new quality improvement projects will also follow the "plan, do, study, and act" process. Furthermore, adjustments can be made to the virtual MDC setup if data analysis shows that there is a specific area of weakness that can be addressed.

8 | NEXT STEPS

Virtual MDC is feasible to design and implement in a large academic medical network. We are currently working to establish connections with the entire network of UPMC hospitals so that head and neck oncologic care can be centralized, especially in times of crisis. Changing from a traditional to a virtual MDC will require us to revisit the methods of electronic documentation and subsequent data use in tracking outcomes.


PRIOR PRESENTATIONS

This project has not been presented or published in prior meetings.

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