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Utilization of a Virtual Tumor Board for the Care of Patients With Renal Masses: Experience From a Quality Improvement Collaborative

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Study Need and Importance: Multidisciplinary tumor boards are offered at some institutions, and the literature confirms they can improve patient outcomes. There is limited published evidence regarding such tumor boards in the field of urology, with only 1 other publication regarding a virtual tumor board (VTB). We report our experience in developing a functioning and valuable VTB for urologists who participate in the Michigan Urological Surgical Improvement Collaborative (MUSIC).

What We Found: Over the course of 2 years, MUSIC urologists have submitted 50 renal mass cases to the VTB for discussion by their colleagues. These submissions generated over 350 messages from more than 58 specialists in urology, medical oncology, and genitourinary pathology. These responses provided an initial treatment plan for 42% of cases, an alternative approach to the submitting physician's initial plan in 16%, and confirmed the clinician's approach in 38% of cases (see Figure). Impressively, the VTB appears to have increased the use of surveillance (which was implemented in 11 patients initially to undergo surgery). Kidney-sparing interventions were used when appropriate, as evidenced by the fact that each radical nephrectomy performed was warranted according to the participants in the VTB.

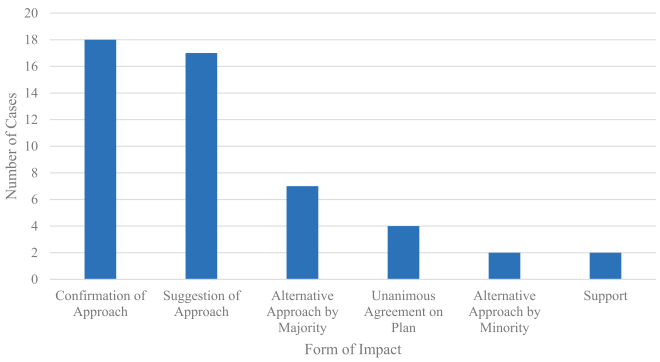

Figure. Impact of virtual tumor board responses on treatment plan.

Limitations: Our study is limited by its sample size and reach, and the ability to determine whether the VTB recommendations truly resulted in better patient outcomes, as the length and availability of follow-up data were somewhat limited.

Interpretation for Patient Care: Overall, it is evident that virtual discussion forums, such as the MUSIC VTB, provide value in the field of urology, and we hope others develop and utilize similar platforms to generate more discussion of complex patient scenarios to achieve the best outcome for each patient.

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Utilization of a Virtual Tumor Board for the Care of Patients With Renal Masses: Experience From a Quality Improvement Collaborative

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Abstract

Introduction: Multidisciplinary tumor board meetings are useful sources of insight and collaboration when establishing treatment approaches for oncologic cases. However, such meetings can be time intensive and inconvenient. We implemented a virtual tumor board within the Michigan Urological Surgery Improvement Collaborative to discuss and improve the management of complicated renal masses.

Methods: Urologists were invited to discuss decision-making for renal masses through voluntary engagement. Communication was performed exclusively through email. Case details were collected and responses were tabulated. All participants were surveyed about their perceptions of the virtual tumor board.

Results: Fifty renal mass cases were reviewed in a virtual tumor board that included 53 urologists. Patients ranged from 20-90 years old and 94% had localized renal mass. The cases generated 355 messages, ranging from 2-16 (median 7) per case; 144 responses (40.6%) were sent via smartphone. All urologists (100%) who submitted to the virtual tumor board had their questions answered. The virtual tumor board provided suggestions to those with no stated treatment plan in 42% of cases, confirmed the physician's initial approach to their case in 36%, and offered alternative approaches in 16% of cases. Eighty-three percent of survey respondents felt the experience was "Beneficial" or "Very Beneficial," and 93% stated increased confidence in their case management.

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Ethics Statement: This study was deemed exempt from Institutional Review Board review.

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Data Availability: The data set generated during and/or analyzed during the current study is available through AskMUSIC and can be found at https://musicurology.com/vtb/.

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Conclusions: Michigan Urological Surgery Improvement Collaborative's initial experience with a virtual tumor board showed good engagement. The format reduced barriers to multi-institutional and multi-disciplinary discussions and improved the quality of care for selected patients with complex renal masses.

Key Words: carcinoma, renal cell; watchful waiting; nephrectomy; interdisciplinary communication

Management of renal masses (RMs) is typically performed by urologists with the involvement of multiple specialists in select cases, particularly those with complex and challenging features. Often, comprehensive treatment plans are generated via institutional multidisciplinary tumor boards (MDTBs) that leverage the expertise of other providers, including radiologists, pathologists, and medical and radiation oncologists with experience in the management of genitourinary malignancy.[1-3] Studies have shown that the impact of MDTBs includes more accurate staging/diagnosis, better initial management plans, higher rates of treatment, shorter time to treatment after diagnosis, better survival, and adherence to clinical guidelines.[4] However, MDTBs can be time and resource intensive and traditionally involve providers from a single institution.[4,5] Doing so limits the diversity of responses and approaches to each case. Moreover, organizations in rural settings may not have relevant specialists and/or limited resources and staff to implement a MDTB.[6-8] Further, since the start of the COVID-19 pandemic, in-person meetings have been prohibited or conducted with a limited capacity. Innovative solutions to these limitations have the potential to guide clinical care and benefit patients.

The Michigan Urological Surgery Improvement Collaborative (MUSIC) attempted to address these concerns by implementing a virtual tumor board (VTB) to discuss complicated clinical scenarios, beginning with complex RM cases. MUSIC has an established history as a multi-institutional collaborative focused on improving urological care across the state of Michigan.[9] We hypothesized that a VTB would be a useful forum for multidisciplinary engagement without many of the limitations confronting in-person, single-institutional tumor boards (TBs).

Materials and Methods

MUSIC is a physician-led quality improvement collaborative of over 260 urologists across the state of Michigan. The MUSIC KIDNEY (Kidney mass: Identifying & Defining Necessary Evaluation and therapY) working group[10] invited all MUSIC urologists to discuss RM cases through voluntary engagement with an email listserv. Urologists were asked to submit cases for discussion utilizing the "Safe Harbor" method of de-identification as laid out by the U.S. Department of Health and Human Services.[11] Case submissions included pertinent patient- and tumor-specific history, screenshots of relevant imaging, and pathology reports when available. The submitting urologist was also asked to provide their initial management strategy to compare their pre-discussion approach with peer recommendations. Once a case was submitted, all listserv participants were able to reply with their approach, advice, or additional questions. Notably, all communication occurred through an email interface as opposed to an online meeting format (WebEx, Zoom, Teams, etc), which requires a time-coordinated and concomitant physical presence. Specialists from other disciplines were also invited as participants and provided comments in this in silico format. All communication was monitored by MUSIC staff for patient identifiers so that any breach could be promptly addressed.

Once all responses were submitted for a case, data were tabulated, and endpoints were determined. Baseline features including age, sex, creatinine level, glomerular filtration rate (GFR), the presence of proteinuria, size of the RM, RENAL (for radius, exophytic/endophytic, nearness of tumor to collecting system, anterior/posterior, location relative to polar line) nephrometry score, and mass type (solid, cystic, or indeterminate) were collected. Individual responses were recorded and used to determine if the response addressed the submitting urologist's questions and if the response confirmed (or indicated an alternative) the submitter's initial suggested plan. When the majority of responses (>50%) echoed the initial plan, the case was deemed to have a confirmation of approach. The overall impact of the VTB responses was also recorded. Classifications of responses are:

1. Alternative Approach by Majority: The submitting physician indicated an initial plan, but the majority (>50%) of respondents provided an alternative plan.
2. Alternative Approach by Minority: The submitting physician indicated the initial plan, but a minority (≤50%) of respondents did not agree with the initial plan.
3. Suggestion of Approach: The submitting physician did not have an initial plan and responders provided possible treatment approaches.
4. Confirmation of Approach: The submitting physician had an initial plan that received <2 alternative treatment suggestions.
5. Support: Responding physicians provided resources or personal support to help guide the submitting physician.
6. Unanimous Agreement on Plan: Submitting physician did not indicate a plan, but respondents all agreed on how the physician should proceed.

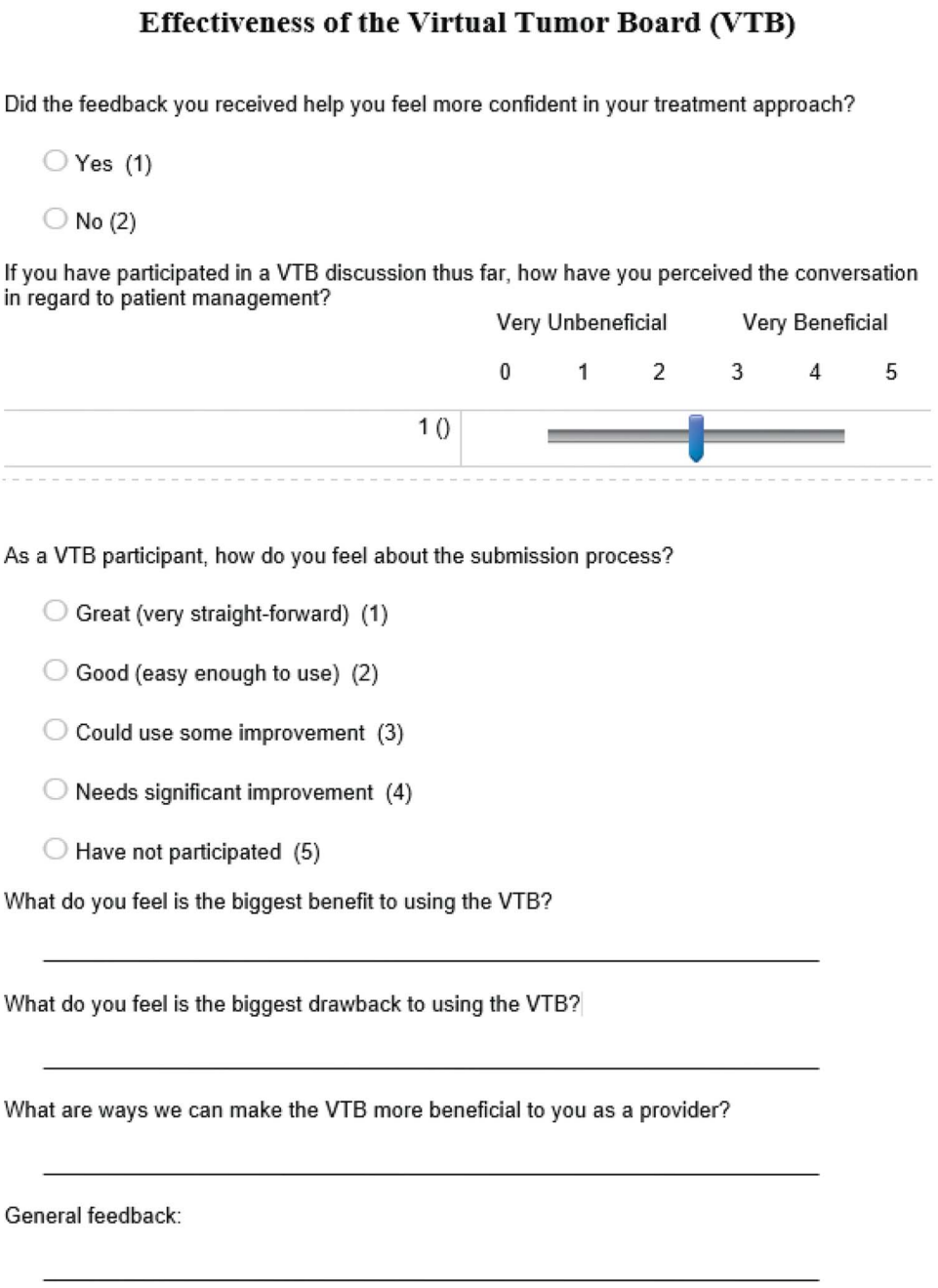

Figure 1. Survey disseminated to all participants of the virtual tumor board (VTB).

Responses were also classified as conservative, biopsy (RMB), radical nephrectomy (RN), partial nephrectomy (PN), advice, or other. Conservative approaches included active surveillance (AS), additional imaging, genetic testing, biomarker testing, sestamibi scan, and/or medical management. Others included thermal ablation, stereotactic body radiation therapy, embolization, and chemotherapy. Some responses were included in 2 categories. For example, a responding physician recommended PN and provided specific advice or techniques on how to perform PN in the specific scenario; this was classified as PN and advice. For responses with sequential steps, each step was independently categorized.

Following a case discussion, actual management performed was collected to assess the impact of the VTB and if the management plan had changed based on the VTB responses. Additionally, all participants (submitters and respondents) were sent a survey (Figure 1).

Results

The MUSIC KIDNEY VTB included 66 participants, with 56 attending physicians and 10 other participants (MUSIC staff, medical students, residents, and fellows). Specialists represented included urologists (n=53), genitourinary pathologists

Table 1.
Patient Demographics and Baseline Health

Variables		
Age, mean, y	61.8	
Sex, No. (%)		
Male	23	(46)
Female	24	(48)
Undisclosed	3	(6)
Baseline Cr, mean, mg/dL	1.03	
GFR, mean, mL/min/1.73 m^2	59	
CKD, No. (%)	10	(20)
GFR <60	8	(80)
Proteinuria	3	(30)
Masses, No. (%)		
Solid	35	(70)
Cystic	2	(4)
Indeterminate	13	(26)
Localized	48	(96)
Metastatic	2	(4)

Abbreviations: CKD, chronic kidney disease; Cr, creatinine; GFR, glomerular filtration rate.

(n=1), medical oncologists (n=1), and nephrologists (n=1). Fourteen participating urologists were part of groups with 1-5 urologists, 11 with 6-10 urologists, and 28 with >10 urologists. Between February 6, 2020 to August 8, 2022, 19 urologists submitted a total of 50 separate RM cases. Patient demographics, baseline health, and tumor classifications can be found in Table 1.

Patients ranged from 20-90 years old. Twenty percent of patients had chronic kidney disease, including 8 with GFR <60 mL/min/1.73 m^2 and 3 with proteinuria. Of the 50 masses, 35 (70%) were solid. Ninety-six percent (48/50) of masses were localized, with 1 patient each having nodal metastasis and adrenal metastasis.

Examples of Cases Submitted to the VTB

The type of cases submitted varied greatly, from those in which multimodality treatment might be indicated to those in which the primary decision was intervention vs AS. For example, 1 case submission was a 65-year-old morbidly obese male with prior bowel surgeries and recurrent 3.8-cm left RM. He had thermal ablation 5 years prior for biopsy-proven clear cell renal cell carcinoma in this location with subsequent tumor growth and development of a large ventral hernia (Figure 2, A and Videos 1 and 2, https://www.urologypracticejournal.com). The submitting physician was hoping to offer a kidney-sparing intervention but believed the mass to be too large for ablation and had concerns about the feasibility of transperitoneal robotic PN and the prolonged recovery with an open PN via a flank incision. The managing urologist asked the VTB "what would you do?" The suggested approaches included open RN by 5 urologists, stereotactic body radiation therapy by 3, and retroperitoneal robotic RN by 1. The patient underwent uncomplicated open RN for pT3a renal cell carcinoma; the patient has subsequently developed metastatic disease progression and is being treated with systemic therapy.

The VTB has also provided good discussion regarding when and how to perform RMB and AS for small RMs. One case involved a healthy 52-year-old woman with normal GFR and functioning contralateral kidney who presented with abdominal pain. One year prior, RMB of an 11-mm mass yielded a diagnosis of metanephric adenoma. The patient was placed on AS and repeat imaging showed 4-mm growth to 15 mm (Figure 2, B). The submitting physician asked, "after reviewing the literature and still not knowing how to proceed, has anyone had prior experience with a similar case?" Seven physicians responded and all agreed that the best approach at this time would be continued AS with a repeat biopsy sometime during the surveillance period. Respondents varied in terms of timing of re-biopsy from "never" to "every 3 years," but in general did not feel a second biopsy was indicated presently. Similarly, a subsequent case involved a patient with a 15-mm biopsy-proven metanephric adenoma (Figure 2, C and D). During the 8 years since biopsy, the lesion grew to 36 mm (Figure 2, E and F), and the patient was motivated to pursue surgical removal. The VTB responses this time suggested either repeat RMB or PN, given the long interval since prior tissue was obtained, the size now >3 cm, and uncertain oncologic potential. The patient elected for repeat biopsy, which again showed "metanephric adenoma," and the patient agreed to continue on AS.

Recommendations and Impact of the VTB

All 50 cases submitted (100%) generated responses addressing the submitting physician's questions. The main inquiry included 30 cases in which the submitting clinician asked respondents "what would you do?," 14 that questioned the need for a biopsy or repeat imaging, and 6 on surgical techniques and approach. A summary of initial plans, recommendations, and final treatment can be found in Table 2.

In total, 33 attendings responded to the submitted cases. Each case had an average of 6 attendings respond with a median of 7 messages per case. Of 355 total email responses, 144 (40.6%) were sent via smartphone. The number of responses per physician ranged from 1-36 with a median of 6 responses from each attending. The VTB provided suggestions to those who did not indicate a specific treatment plan in 21 cases (42%), confirmed the submitting physician's initial approach for 19 submissions (38%), and offered alternative

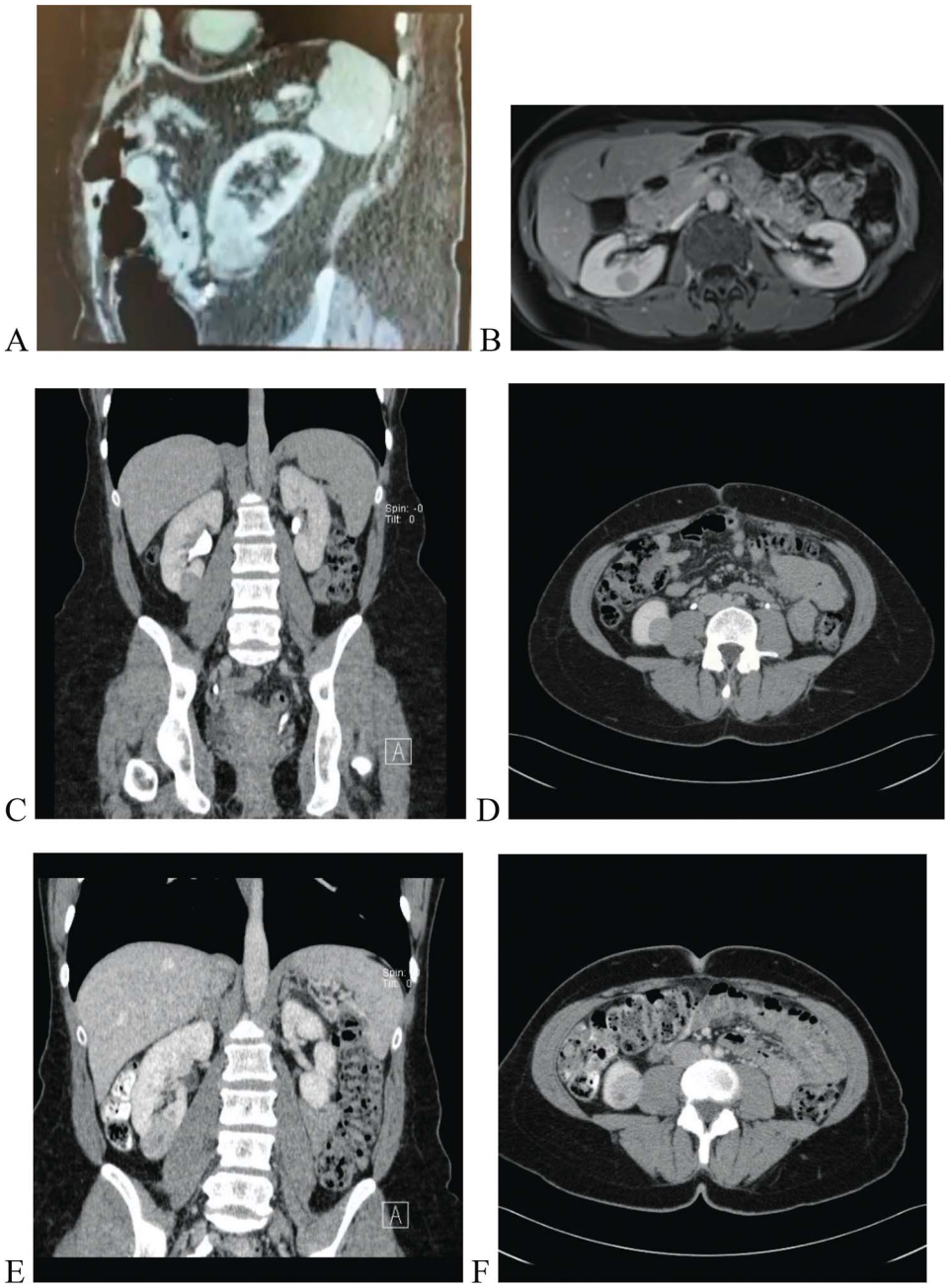

Figure 2. Images submitted by the presenting urologist to the MUSIC (for Michigan Urological Surgery Improvement Collaborative) KIDNEY (for Kidney mass: Identifying and Defining Necessary Evaluation and therapY) virtual tumor board. A, Case No. 1. Sagittal image of an infiltrative lower pole clear cell renal cell carcinoma that had previously been treated with cryoablation and had grown in size and displays heterogeneous enhancement. B, Case No. 2. Axial magnetic resonance imaging of a small posterior interpolar lesion biopsy-proven to be metanephric adenoma. C-F, Case No. 3. CT scan showing 1.4-cm, right, lower pole, biopsy-proven metanephric adenoma in coronal (C) and axial (D) planes. CT scan 8 years after diagnosis in both coronal (E) and axial (F) planes, showing growth of this renal mass to 3.6 cm.

approaches in 8 (16%; Figure 3). Of the 33 respondents, 18 most commonly recommended conservative approaches (54.6%) to VTB cases, 5 most commonly recommended RN (15.2%), and 3 most commonly recommended PN (9.1%).

Of the 22 patients who underwent AS, only 11 were submitted with AS being the submitting provider's recommended treatment approach. A definitive plan for surgery had been made for 2 patients, while 9 did not yet have a final plan.

The VTB only recommended RMB for 2 of 6 cases that specifically asked whether RMB was warranted; RMB was additionally recommended in 9 other patients. Following RMB, 5 patients underwent robotic PN, 1 had RN, and 1 had thermal ablation, and the other 4 patients avoided other intervention.

Among patients who underwent a kidney-sparing intervention, 1patient had thermal ablation, 8 robotic PN, and 1

Table 2.
Summary of Initial Treatment Plans, Recommended Plans, and Final Treatment Plans by Intervention Type for Each Case

	Initial plan, No.	Recommendations, No.	Final plan, No.
Active surveillance	15	17	22
Intervention	13	25	26
KSI	10	11	10
RN	3	14	16
Mixed	4	8	0
Not stated	18	0	2

Abbreviations: KSI, kidney-sparing intervention; RN, radical nephrectomy.

open PN. Five patients had high-complexity tumors (RENAL ≥9) and RMB was performed prior to surgery in 6 patients. One patient whose surgeon was planning RN for a solid 6-cm RM underwent RMB per VTB recommendation. RMB showed PEComa and the patient underwent successful robotic PN. Sixteen VTB patients underwent RN, including 13 minimally invasive RN and 3 open RN. Two patients underwent RN in disagreement with the recommendation; both had complex T1a tumors that were felt to potentially be amenable to PN, but the patient and surgeon opted for robotic RN after shared decision-making. The reasons for open RN included venous tumor thrombus, prior RM ablation with local progression in the setting of multiple prior abdominal surgeries, and a locally advanced 12-cm RM.

Survey responses were received from 39 VTB participants, including 14 who had submitted at least 1 case to the VTB. Quantitative results from the survey can be seen in Figures 4 and 5. Qualitative feedback was also solicited. Although most respondents recognized the benefit of the VTB, several mentioned limitations and areas for improvement. Reasons listed for lack of greater participation referenced difficulty uploading clinical images due to large file sizes, forgetting to utilize the VTB, and feeling as though they have yet to have a case "worth submitting."

Discussion

A TB is widely recognized as an effective method of generating discussion regarding the management of difficult oncologic cases. The benefit of an MDTB has been proven across multiple fields. Studies analyzing the implementation of an MDTB have shown improved tumor staging, with analyses showing a change in staging in 19%-28% of enrolled patients.[12,13] The benefit of obtaining opinions from multiple specialists has also been demonstrated. Lordan et al found that the use of a colorectal MDTB involving a liver surgeon resulted in a significant increase in overall patient survival when compared to an MDTB that only included colorectal surgeons.[14] Similar increases in survival were seen in patients with esophageal cancer who were treated through an MDTB vs those treated by their surgeon independently.[15] To our knowledge, limited data exist regarding TBs, traditional or virtual, in the field of urology. The MUSIC KIDNEY VTB experience is unique in its ability to engage urologists from various academic- and community-based institutions, representing a "real-world" collection of practice patterns connected through a well-established quality improvement collaborative. Therefore, our aim was to analyze the effectiveness, ease of utilization, and outcomes associated with a virtual discussion between urologists and other specialists involved in the care of RM patients.

To date, the VTB has accrued over 350 messages from 33 physicians. Most of these discussions endorsed conservative management or RMB prior to surgical intervention. While there is clearly selection bias in the cases submitted to the

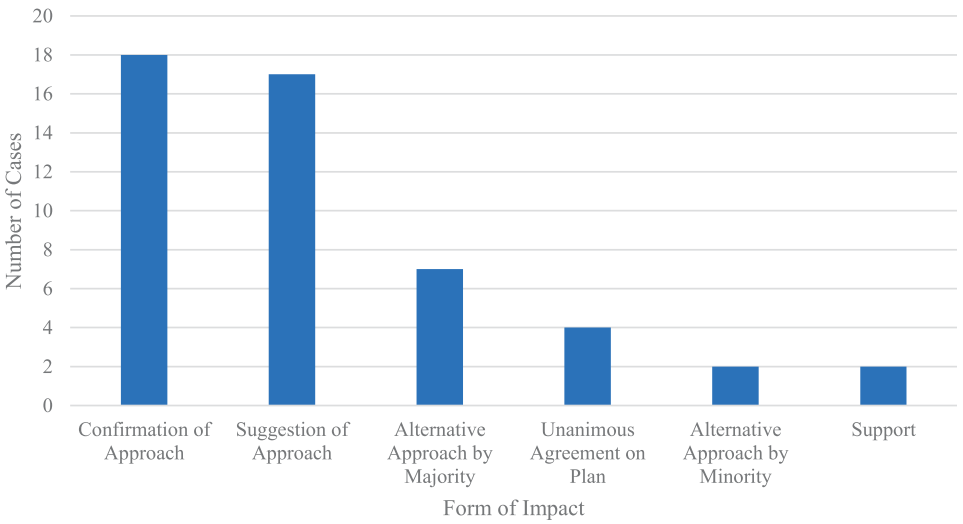

Figure 3. Impact of virtual tumor board responses on treatment plan.

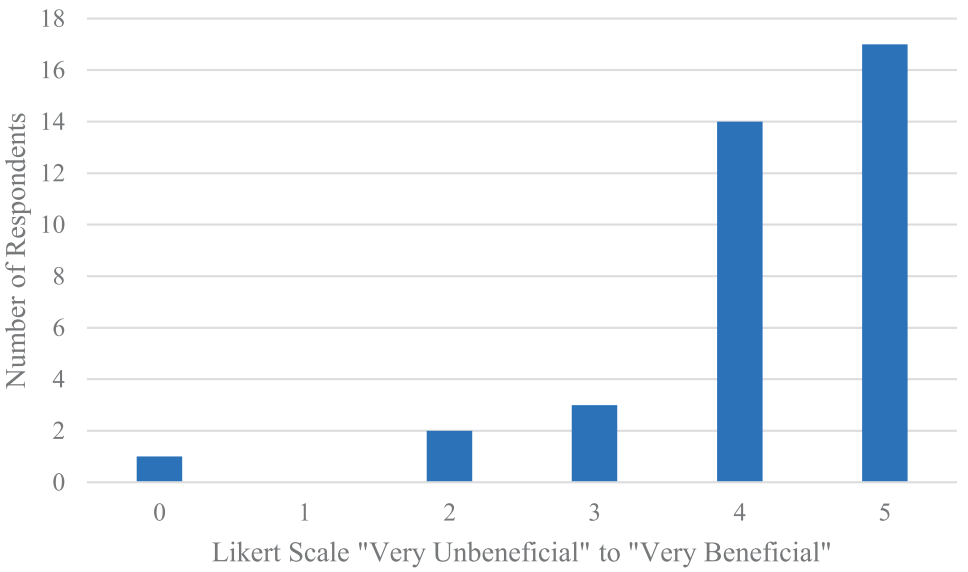

Figure 4. Likert scale results to the survey question, "If you have participated in a [virtual tumor board] discussion thus far, how have you perceived the conversation in regard to patient management?"

VTB, this is consistent with our previously reported high rate of AS across MUSIC.[16]

Our descriptive analysis of the initial experience of the MUSIC KIDNEY VTB reveals that providers were engaged and felt the VTB was both helpful to their practice and impacted the management of their patient. Participants almost unanimously described the experience as positive and appreciated the recommendations and/or reassurance. The ability to interact via smartphones and email likely increased participation based on the reduced logistical considerations compared with a live MDTB. Although not directly captured, anecdotal review of the email conversations indicates that providers enjoyed the opportunity to interact with their peers remotely. A comparable analysis looking at the National Cancer Institute–designated cancer center's gastrointestinal TB found that TB participation increased once the TB became virtual ($P < .001$), with respondents preferring the virtual platform to an in-person platform, and most finding the VTB to be more efficient and convenient than an in-person TB. There was no difference in confidence levels regarding case decisions made across the 2 formats.[3] Our findings validate their assessment, supporting expanded utilization of VTBs across medicine.

The impact of the MUSIC KIDNEY VTB is evident, as 38% of cases followed a treatment recommendation that differed from the submitting physician's initial approach. For

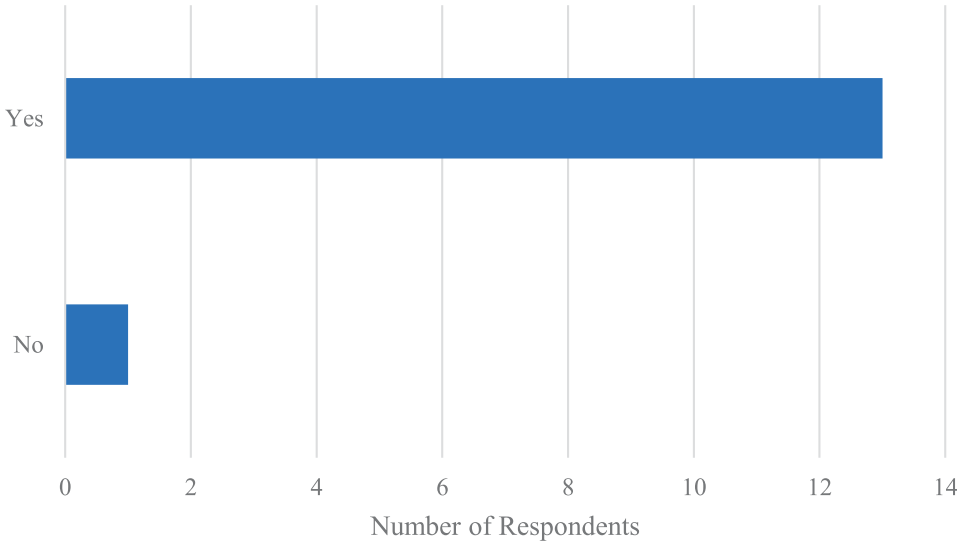

Figure 5. Responses from virtual tumor board participants who submitted a case to the question, "Did the feedback you received help you feel more confident in your treatment approach?"

cases in which the initial approach did not change, the benefit was affirmation of the attending's approach to a case in which they sought other opinions.

There appears to be great value in VTB discussions generated by the sharing of ideas and techniques across practices and hospital systems. This level of communication would be difficult to mimic, especially in the post-COVID era with limited in-person meetings, reduced room capacities, and need to coordinate schedules. It is reassuring to see strong involvement by physicians in small practices (1-5 urologists) who likely do not have access to an institutional MDTB. The sharing of patient cases through our VTB has been safe and secure using the "Safe Harbor" method of de-identification. To date, no patient identifiers have been shared through the VTB. After submission, case information is stored within a private, password-protected drive only accessible to MUSIC staff.

Quality improvement is the main work of MUSIC and, accordingly, we continue to evaluate opportunities to improve the MUSIC KIDNEY VTB. Future modifications may include multiple-choice voting so participants may indicate their proposed management from a predefined list in an anonymous manner and receive immediate feedback regarding the previous responses. Though case presentation to the VTB has been efficient over email, we have considered shifting to an alternative platform that allows for easier uploading of clinically relevant images. Further, participants have taken the initiative to expand the discussion outside of RM cases. Additional cases reviewed in the VTB have included prostate cancer, renal stones, complication management, urachal mass, and pediatric testicular rhabdomyosarcoma. Ultimately, longitudinal analysis to demonstrate improvements in patient care attributable to the VTB, and MUSIC more generally, remains the ongoing goal.

Conclusions

The utilization of a VTB within MUSIC has shown the benefit of inter-institutional discussions surrounding RMs. Not only has the VTB served as a learning opportunity for urologists within Michigan, but it has also provided valuable feedback and support when determining treatment for complicated cases. The VTB promoted AS in multiple cases that were initially scheduled for surgery, and for some after RMB, demonstrating a reduction in overtreatment. The role of similar discussion forums in the field of urology is evident, and we hope to see other groups utilize this easy and effective resource.

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Editorial Commentaries

As the Greek philosopher Aristotle once said, "The whole is greater than the sum of its parts." This statement rings true in the case of tumor boards, where the collective expertise and experience of health care professionals can lead to better patient care than the efforts of individual practitioners alone, as demonstrated by the survival advantage in other medical fields. The optimal management of a renal mass can be entangled by the multiple factors that come into play when, as urologists, we have to decide which way to go.[1] Despite some intrinsic limitations, AUA guidelines certainly provide evidence-based guidance that helps us decide.[2] The current article comes from one of the most laudable statewide quality improvements initiatives in the urology field, the well-known "MUSIC" (for Michigan Urological Surgery Improvement Collaborative) group.[3] In this study, the authors showed the impact of implementing a virtual tumor board (VTB) for the discussion of how to best tackle cases of renal masses. It is interesting to see that in a nonnegligible proportion of cases the initial management plan was changed and, for example, a conservative management was endorsed over a surgical intervention. In general, the initiative was well received by the health care professionals involved, this being a testament to the fact that in some cases it is really challenging to know which way to go, and having feedback from other peers can be helpful. Additionally, the proposed virtual format enabled increased participation due to its reduced logistical considerations compared with live multidisciplinary meetings. To this end, VTBs may prove particularly beneficial for centers in a rural setting, as they allow access to expert opinions and enable the most up-to-date recommendations, strengthening the chosen management pathway. Nevertheless, indiscriminate use of VTBs is unfeasible, as it would be costly and not time effective. Therefore, VTBs must be proposed to patients who most likely would benefit from a collegial discussion. To this effect, Martini et al generated a model that weighed the competing causes of death over time according to age, comorbidity, and cancer stage with the aim of assisting practitioners in identifying ideal patients for VTB discussion.[4] Last, but not least, it is crucial that patient preferences and expectations are considered, as they are crucial factors in guiding therapy decisions and ensuring that patients receive care that aligns with their individual needs and goals. In summary, VTBs are an effective way to discuss complex oncologic cases and share ideas across institutions, offering a practical tool to health care providers, particularly those in rural areas, when used for the appropriate patient population.

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Hijazi et al introduced a virtual tumor board (VTB) format to improve complex renal mass care throughout Michigan.[1] The group utilized an asynchronous email format, recruiting physicians from within MUSIC (Michigan Urological Surgery Improvement Collaborative). After 50 cases, the VTB helped generate treatment plans in 42% of cases and shifted management decisions in another 16%. Notably, the group found increased utilization of active surveillance as primary management strategy.

We commend the group for formalizing and studying the impact of a VTB. This was timely, as COVID-19 forced many traditionally in-person forums online. In addition, the use of an established network allowed for assessment of the VTB across the geographical and institutional boundaries of a more typical in-person tumor board (TB). Though this is an excellent start, there are several potential areas for improvement and additional collaboration.

Work has been done in other areas of oncology highlighting increased utilization of TBs when the format is shifted from in person to online.[2] We think the virtual, asynchronous format described here may lend itself well to enhancing the ability of isolated practitioners to participate in multidisciplinary discussion. However, the pre-established nature of MUSIC limits the study's generalizability to settings in which physicians are not yet connected.[3]

Though the email format maximizes flexibility, the authors highlight the challenge of presenting imaging. Our department has transitioned to live online TBs, which avoid this limitation. One could envision a mixed approach, with an asynchronous forum supplemented by live virtual discussions, perhaps to address the most challenging cases.

Finally, most participants in this study were urologists. This may have been influenced by both the forum and the disease, but as this concept is expanded, efforts must be made to encourage participation from all relevant specialties, as cross talk across disciplines is one of the core tenets of modern TBs.[4]

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Reply by Authors

We appreciate the enthusiasm expressed in these editorials regarding our initial experience with the MUSIC (Michigan Urological Surgery Improvement Collaborative) virtual tumor board (VTB).[1] A major advantage of the VTB is that it levels the playing field. In centers where access to complex multidisciplinary care is limited, it allows for immediate high-quality input which is collaborative and not judgmental. The VTB instills a sense of community amongst providers with the patient at the center. We agree that for larger institutions/health care systems, live online tumor boards are a good option, and have the advantage of multidisciplinary involvement. Better engagement of specialists from other disciplines within this VTB and MUSIC's other activities is a growth opportunity. We would encourage cancer specialists of all types to leverage existing relationships to forge additional VTBs and make this type of care available to as many patients as can be reached, particularly for those with complex scenarios.

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