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# Perspectives of Radiologists and Pathologists on Technology-Enhanced Thoracic Multidisciplinary Cancer Conferences

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## Abstract

### Background

Lung cancer remains the leading cause of cancer mortality worldwide, making effective multidisciplinary cancer conferences (MCCs) essential for improving patient outcomes. Accurate clinical information and expert input are critical for effective case discussions at MCCs. This study explored the roles/views of radiologists and pathologists on thoracic MCCs and the impact of technology.

### Methods

We conducted a mixed-methods study using semi-structured interviews and observational data at a comprehensive cancer center. Using thematic analysis, we explored the views of radiologists/pathologists on thoracic MCCs. Observational data from a prior prospective study were also analyzed before and after implementation of a tumor board technology platform.

### Results

A major role of pathologists is to leverage cell morphology data to provide diagnostic and prognostic insights that guide treatment decisions, while radiologists utilize radiological findings to support differential diagnoses and planning of radiation/surgical interventions. Participants reported that technology could extend MCC benefits to underserved communities, and AI-driven technology may optimize MCC case preparation and presentation through automated access to digital patient records. MCC participation also refined radiologists' and pathologists' approaches to clinical care planning. Our observational data showed improved quality of radiology and pathology presentations after implementation of the MCC technology platform (pre vs post mean scores: 3.5 vs 4.8, p<0.001; 3.2 vs 4.4, p<0.001, respectively). Radiologists' participation in case discussions increased (pre vs post: 7.4% vs 17.5%; p=0.019).

### Conclusion

Radiologists/pathologists provide impactful insights into care planning at MCCs. Digital technologies may improve MCC efficiency and could extend the benefits of MCCs to underserved populations.

**Categories:** Radiology, Pathology, Oncology
**Keywords:** clinical decision-making, multidisciplinary cancer conferences, pathologists, radiologists, technology, thoracic oncology

## Introduction

Lung cancer causes more deaths than prostate, breast, and colon cancers combined, making it the leading cause of cancer-related death globally [1]. National reports indicate that the 5-year survival rate for lung cancer has increased by 26% to 29.7% in the last five years [2]. Despite screening advancements leading to early detection and treatment, survival of patients with advanced stages remains low [3]. Various regions in the world incorporate multidisciplinary cancer conferences (MCCs) to ensure optimal patient treatment [4].

Multidisciplinary cancer conferences are meetings where healthcare specialties like medicine, surgery, radiation, radiology, and pathology discuss complex cancer cases [5] to provide tailored diagnostic and treatment recommendations [6]. MCCs improve survival rates for advanced-stage lung cancer patients, with median survival rates of 36.9 months versus 19.3 months for cases not presented at MCCs [7]. However, limited information exists about individual specialties' impact on these meetings, particularly radiology and pathology.

In MCCs, pathologists present pathology slides during which they review histological features, molecular findings, and biomarkers to characterize tumors and guide management decisions [8]. Radiologists present

radiological images, providing details about tumor size, location, and involvement of adjacent structures. They also help determine lesion surveillance strategies and provide input for surgical planning during MCCs [9].

As it evolves, information and communication technology has been playing an increasingly pivotal role in streamlining MCCs. For example, specialized software solutions such as navify® Clinical Hub for Tumor Boards (nCH) (F. Hoffmann-La Roche Ltd., Basel, Switzerland) have been successfully used to present patient case summaries, histopathology slides, radiology images, and immunochemistry results during discussions. This platform has shown reduced preparation time and improved efficiency [10].

Given radiologists' and pathologists' central role in tumor diagnosis, staging, and participation in the decision-making process at MCCs, alongside technology's growing influence, this study explores their contributions and opportunities to enhance their engagement in multidisciplinary cancer care.

## Materials And Methods

Using a mixed-methods design, we conducted semi-structured interviews and utilized previously reported archival observational data to evaluate radiologists' and pathologists' roles and perspectives, and nCH's impact on their input at thoracic MCCs at an academic comprehensive cancer center. Details of the study procedures were communicated to all participants, who were also given an informational sheet describing the protocol, consistent with Institutional Review Board requirements.

### Participants and data collection

For the qualitative component, we examined radiologists' and pathologists' roles in thoracic MCCs, their views on the MCC process and nCH implementation. We selected attending radiologists and pathologists who routinely participate in the thoracic MCC. We conducted one-on-one semi-structured interviews over six weeks using consistent open-ended questions while allowing elaboration. Each participant was interviewed separately, in one session lasting 45-60 minutes. The interviews covered their MCC participation, nCH's impact on workflow, and collaboration, the use of artificial intelligence (AI) and digital platforms at MCCs, and MCCs' influence in shaping their clinical expertise. Responses were handwritten during each interview and subsequently transcribed into Microsoft Word (Microsoft Corporation, Redmond, USA) for analysis. The same semi-structured interview guide was used across participants, with follow-up questions permitted for clarification or elaboration during each interview session. The research team met weekly to review responses, discuss recurring concepts, and interpret emerging themes. The complete semi-structured interview questionnaire is provided in the Appendices.

For the quantitative component, we used observational data previously reported in a study of thoracic MCCs that examined presentation quality and engagement among clinicians before and after the implementation of nCH [11]. The typical thoracic MCC workflow is illustrated in Figure *1*. In that study, presentation quality was evaluated using a validated MCC performance assessment tool that scored presentations on a scale from 1 (underperformance) to 5 (ideal performance). Overall MCC quality was measured using a weighted mean composite score from 11 variables included in the tool. Observers also recorded radiologist and pathologist participation in MCC discussions ("Radiologist $2^{0}$" and "Pathologist $2^{0}$"). The details of the prior study and the scoring system for the performance assessment tool have been reported elsewhere [11,12].




**FIGURE 1: Thoracic MCC workflow.**

The image shows a flowchart illustrating the MCC presentation and discussion process.

MCC: multidisciplinary cancer conference

### Data analysis

Interview responses were analyzed using thematic analysis. Team members reviewed the transcribed interview responses, identified recurring concepts, grouped related concepts into categories, and examined relationships among categories to develop overarching themes. Representative quotations were subsequently selected to illustrate each theme. For the observational data, analyses were conducted in our prior study. Characteristics were summarized by pre- and post-nCH cohorts, with means, medians, and standard deviations reported for continuous variables and frequencies reported for categorical variables. Comparisons between cohorts were performed using the Mann-Whitney U test for continuous variables and Fisher's exact test for categorical variables, and p-values were reported. The complete results of this analysis

have been previously reported elsewhere [11]. The statistics were performed using SAS version 9.4 (SAS Institute Inc., Cary, USA), with a significance level of 0.05.

## Results

We interviewed a total of six participants - three radiologists and three pathologists. The average age of participants was approximately 48 years. There was an equal gender distribution consisting of three female and three male participants. There were three Asians and three Caucasians in the group. All participants had substantial clinical experience, with an average of more than 15 years.

For the observational analysis, a total of 317 thoracic MCC cases were included, of which 151 were collected before and 166 after the implementation of nCH. Most of the patients presented had lung cancer. Cases involving benign findings or non-thoracic malignancies were excluded. The overall cohort included 53% (n=168) female and 44% (n=140) male patients, with a mean age of 67 years. The majority of patients were diagnosed with either early-stage (Stage I; 25%, n=79) or locally advanced (Stage III; 29%, n=92) disease. Adenocarcinoma was the most frequently observed histologic subtype, accounting for 46.5% (n=147) of all cases discussed.

### Interview report

A thematic analysis of the interview transcripts revealed four overarching themes: a) Radiologists' and pathologists' perceived roles and contributions in MCCs, b) Perceptions on the use of digital and emerging technologies in MCCs, c) Perceived challenges and strategies to improve the MCC process and expand access, and d) Influence of MCC participation on professional development and interdisciplinary learning.

*Radiologists' and Pathologists' Perceived Roles and Contributions in MCCs*

Representative participant quotations highlighting the perceived roles and contributions of radiologists and pathologists in MCCs are presented in Table *1*. Radiologists reported contributing detailed imaging interpretations to support diagnostic accuracy, staging, and treatment decisions during the MCCs. They described their role as including evaluation of lesion characteristics, determination of biopsy needs, and suggestion of appropriate surveillance timing (Table *1*, quote 1 (Q1)). One radiologist described their role as presenting imaging findings and offering diagnostic impressions during MCCs (Q2). Another noted reviewing imaging and clinical records and responding to clinical questions (Q3). Some others described assisting in determining the timing for further tests and how everybody’s input is important for the best patient outcome (Q4 and Q5).

| Perceived Roles | Quotes |
|---|---|
| Support diagnostic accuracy and staging | "I comment on if biopsy is needed and the surveillance time of a given lesion, how long we should wait before ordering other images, or whether a lesion needs a biopsy or not. If a lesion requires biopsy, then I comment on the specific region where a biopsy should be taken." Q1 |
| | "My role is to present images, offer my opinion regarding staging disease, talk about my suspicions of images and comment on imaging from a diagnostic view." Q2 |
| | "My role is to review patients' imaging, records, answer questions about treatment responses, prognosis of disease, and residual diagnosis." Q3 |
| Involvement in clinical or treatment decisions | "We can help with timing interval of imaging and decide if a lesion is growing, whether we need to use PET scan or MRI." Q4 |
| | "I think everybody has different perspective[s] regarding staging of disease and we need everyone's input to determine the best outcome for patients." Q5 |
| Histopathologic diagnosis and tumor grading/staging; Involvement in clinical or treatment decisions | "I provide histological diagnosis of tumors, provide tumor grades and stages which are important for patient management. I comment if the tumor is benign or malignant." Q6 |
| | "We educate the clinicians in what we say in our report… such as this is adenocarcinoma lung cancer vs squamous cell lung cancer which determines the treatment options…We tell them the margin involvements—if it's positive or negative—as well as lymph node staging". Q7 |
| | "Pathologists have the knowledge of the pathophysiology of tumor's biology… based on our input, clinicians can make decisions in the MCC." Q8 |
| | "The leading MCC person can ask pathologists specific questions that are relevant to the case following clinical presentation." Q9 |
| Source of information on diagnostic tools/tests, biomarkers, and molecular testing | "There are new tests that are emerging fast, and our clinicians are not always aware. We provide our help and bring them up to date with current tests available in our field." Q10 |
| | "I can answer specific follow-up questions about biomarkers, molecular testing, as well as ordering another test if needed." Q11 |

**TABLE 1: Radiologists and pathologists perceived roles and contributions in MCCs**

Abbreviations: MCC, multidisciplinary cancer conference; MRI, magnetic resonance imaging; PET, positron emission tomography.

Pathologists reported various roles in MCCs, including histopathologic diagnosis, tumor grading and staging, margin assessment, and biomarker analysis (Q6). They also described educating clinicians on pathology findings that affect treatment decisions and evaluating margin status and lymph nodes (Q7 and Q8). Others described how their participation could be increased through targeted questions (Q9). Some also reported serving as a source of information for the clinicians attending the MCCs on new diagnostic tools and tests (Q10) and contributing to discussions about biomarkers and molecular testing (Q11).

*Perceptions on the Use of Digital and Emerging Technologies in MCCs*

Selected participant quotations related to digital technologies, platform adoption, and the potential role of AI in MCCs are summarized in Table *2*. Participants discussed technology use in MCCs, including tools for organizing information and remote communications. One pathologist described nCH as useful (Table *2*, Q12), while a radiologist considered it a good tool (Q13). However, most radiologists (Q14 and Q15) and pathologists (Q16 and Q17) said they did not use the platform. A pathologist reported difficulty with image uploads and digital slide conversion (Q18).

| Perception on Adoption | Quotes |
|---|---|
| nCH as a clinical information hub | “Navify [nCH] is useful because it contains clinical history, questions being asked, [and the] reason for presentation...Overall, compared to without the Navify, it is more effective now.” Q12 |
| | “Initially, when we started using Navify, I thought it was good to use it personally.” Q13 |
| Barriers to nCH adoption | “I do not use it...and it has no impact on my ability to prepare cases for the MCC.” Q14 |
| | “Currently, I do not use it, I find the patient information or MRN from the PDF file case that is sent to us and use that to find information.” Q15 |
| | “We do not use it that much. It was launched a year to two years ago. Using it there is a little hiccup, so we use the conventional way. We have the microscope and share it on screen live. So really, no impact of Navify.” Q16 |
| | “Navify does not impact me neither positively nor negatively. In my other tumor boards, I do not use Navify, and I am still able to talk or present cases well.” Q17 |
| | “...it costs more time to take the pictures of slides and upload them in the first place. For now, I use Navify to get information, but I do not upload pictures...” Q18 |
| Remote participation and image sharing via Microsoft Teams | “...since we switched [from in-person] to Microsoft Teams, it is much more efficient; I can join from my workstation and will have the patients’ images already pulled up on my PACS.” Q19 |
| | “Technology has already improved with the use of Microsoft and Navify. Both save time. NAVIFY has the patient history and necessary information and using Microsoft teams allows for cases to be presented remotely.” Q20 |
| Integration of multiple digital platforms | “I would like a way where we can combine all the software, we use such as PACs, Navify, and other software, computing PACs, EMR all together will make the whole process even more efficient. Now, we use different software, copying and pasting from different software can be challenging…” Q21 |
| AI potential and uncertainty | “I spend about 50% of my time trying to measure lesions...We can use AI to do these measurements so that I can focus on other findings.” Q22 |
| | “I think maybe in the future AI can synthesize records accurately pull best medicine practice for patients with the right inputs and optimize risks and benefits of a given treatment.” Q23 |
| | “Creating one smart program [using AI] that can keep track of all the information, produce staging of disease and double check we are following the NCCN guidelines can be beneficial in the thoracic MCC.” Q24 |
| | “We can use AI in digital image in which we can ask it to interpret selected images such as showing the dissection margins, tumor type and other findings of the tumor.” Q25 |
| | “We can certainly use it [AI] for quantification scoring system...if we can have automated system...we can use it in the software such as Ki-67 proliferation index to give us cell count measurements and the type of tumor present.” Q26 |
| | “I do not see a room where AI can be helpful for the thoracic MCC.” Q27 |

**TABLE 2: Perceptions on the adoption of digital and emerging technologies in MCCs**

Abbreviations: AI, artificial intelligence; EMR, electronic medical record; MCC, multidisciplinary cancer conference; MRN, medical record number; nCH, navify Clinical Hub for Tumor Boards; PACS, picture archiving and communication system; Ki, Kiel.

Participants discussed Microsoft Teams (Microsoft Corporation, Redmond, USA) for remote MCC participation. A radiologist noted it improved workflow efficiency (Q19), while a pathologist emphasized time savings through Teams and nCH (Q20). One radiologist suggested integrating the Picture Archiving and Communication System (PACS), nCH, and electronic medical records (EMRs) to improve efficiency (Q21). Additional suggestions included asynchronous communication platforms, digital pathology, and improved screen-sharing tools. Participants indicated that while technology supported MCC operations, challenges remained in access, awareness, and integration. Regarding AI in MCCs, radiologists (Q22-Q24) and pathologists (Q25 and Q26) described potential applications in workflow automation, lesion measurement, staging support, and image interpretation, though one pathologist expressed uncertainty (Q27).

*Perceived Challenges and Strategies to Improve the MCC Process and Expand Access*

Participants from both groups identified shortfalls in MCC conduct and suggested improvements as

summarized in Table 3. Radiologists emphasized the need for structured case summaries, clear clinical questions, and relevant clinical information to improve preparation and case discussion efficiency, noting that insufficient context often required additional review (Table 3, Q28 and Q29). Pathologists highlighted the need for advance case notification for preparation and slide review (Q30 and Q31), and recommended limiting cases per session while improving attendance across disciplines (Q31 and Q32).

| MCC Challenges & Access Expansion Strategies | Quotes |
|---|---|
| MCC case listing and preparation | “Sometimes the clinician does not ask specific questions on the case, and I spend more time finding out more information on older images and studies. After I search for older information and put it together, the clinicians will say we already knew that information and it will not help with the case...If they ask specific questions such as how a lesion is changing over time...it will help guide relevant clinical information that can better help me prepare for the MCCs.” Q28 |
| | I think it is important that there is a summary of patient condition...what are specific issues for presenting them at MCC and what is the question for radiologists or pathologists? Knowing this information will better prepare me for cases." Q29 |
| | “I think it is important to let us know about cases ahead of time so that we have time to prepare...sometimes I get cases the day before, and it is difficult.” Q30 |
| | “I think the list of cases need to be carefully selected and we should limit the number of cases. Like if there are 10-15 cases, it is just not feasible to present all that. Also, after cases are selected, notify pathologists in timely fashion because we do not have time to pull slides from the archival.” Q31 |
| | “Sometimes not every discipline that needs to be present, is there, and we should have better attendance from everyone. Also, if we cap the cases being presented to seven will make the preparation process more effective and better since we can focus our time on these cases only.” Q32 |
| Virtual MCC formats and impact on access | “I think it is depersonalized and there is very little contact. MCC is a way of new people getting to know people, meeting the people and we lack the whole facial expressions and seeing live. The least we can do for now is having your camera on during the meeting.” Q33 |
| | “Since we already have virtual MCC, it is straightforward. Community physicians can join...as there are no physical or geographical boundaries.” Q34 |
| | “Given that most of the lung cancer screening is ordered by primary care physicians...it can overwhelm them to know what option to discuss with their patients. If we invite PMDs [primary medical doctors] and they hear about these discussions, MCCs could help them in discussing cancer management with their patients.” Q35 |
| | “We [current study cancer center] use EDDY [Early Detection Driven to You], which is a mobile lung cancer screening bus that goes to underserved populations. We have a nodule board where we email to discuss tumor size or complications...I think it’s important we expand care by having virtual MCCs once a month where we invite oncologists and primary care physicians from these communities.” Q36 |
| | “…we can have joint MCCs...Each site can bring their top three complicated cases and have discussions for it. Since participants from the rural areas are attending, they are educated about standardized treatments...and that way we expand care to underserved regions.” Q37 |
| | “If we have a digital pathology platform, we will be able to present cases remotely to other thoracic surgeons or oncologists.” Q38 |
| | “…we still have physical slides, which is an issue...If we can have digital pathology where all the slides of patients are in one place, it will make my work more efficient.” Q39 |
| | “We can use technology to allow for remote consultation, remote conferences where we can exchange ideas with people who have been there. We can give treatment guidelines and improve expert care from our end as well.” Q40 |

**TABLE 3: Perceived challenges and strategies to improve the MCC process and expand access**

Abbreviations: MCC, multidisciplinary cancer conference; PMDs, primary medical doctors

While virtual formats were noted as efficient (Q19), one radiologist mentioned reduced interpersonal engagement, suggesting camera use could help (Q33). Participants reported that virtual MCCs could enhance access to underserved communities. A pathologist noted that virtual MCCs remove geographic barriers for

community physicians (Q34). Radiologists suggested inviting primary care physicians to discuss cancer management with patients (Q35), provided a current outreach model example (Q36), and proposed joint inter-institutional MCCs to promote shared learning (Q37). Pathologists described digital infrastructure and remote consultation as ways to facilitate collaboration beyond institutional boundaries (Q38-Q40), with digital pathology enabling remote case presentation (Q39) and supporting remote consultations (Q40).

*Influence of MCC Participation on Professional Development and Interdisciplinary Learning*

Radiologists and pathologists described MCC participation as influencing their diagnostic approach, reporting, and clinical communication. Radiologists noted that participation helped them anticipate clinician questions, refine imaging reports, and tailor impressions to support staging and treatment decisions (Table 4, Q41 and Q42). Pathologists reported greater awareness of clinical context, describing how MCC discussions informed their report priorities and communication of findings relevant to management decisions (Q43 and Q44). Pathologists also described MCCs as fostering interdisciplinary learning across specialties, enhancing their understanding of clinical relevance and how other disciplines approach patient care (Q45). Both radiologists and pathologists reported applying MCC insights to their broader clinical practice, including better anticipation of clinician expectations and enhanced diagnostic interpretation beyond conferences (Q46 and Q47). Participant perspectives on the educational and professional value of MCC participation are presented in Table 4.

| MCC Impact on Professional Growth & Interdisciplinary Learning | Quotes |
|---|---|
| Refinement of reporting practices | “I learned a lot in terms of what is important to oncologists or surgeons, and it helped me prepare for the cases for the Thoracic MCCs. This essentially helped me anticipate the needs of clinicians and read cases better for other images and direct my report to specific patient information to help with the clinician.” Q41 |
| | “Participating in the MCC helped me to find out what specific questions clinicians are asking and help them in their treatment decisions for patients.” Q42 |
| | “It allowed me to see the relevance of my work and how meaningful it is to patient care. Additionally, it helped me find relevant information that is necessary for clinicians in managing patients, which helped me learn a lot from the MCC. I apply that knowledge to read studies of other patients in my daily clinical practice.” Q43 |
| | “We love what we do. Our role provides very important help in choosing treatment options... We find the clinical presentation patients have and find out what is important to clinicians in determining treatment and diagnosis of patients. I apply that knowledge that I gained in MCC in my clinical practice.” Q44 |
| Interdisciplinary learning and mutual exposure | “…As pathologist we were caught up behind the curtain. In participating [in] MCC, the curtain exposed us to other clinicians and exposed them to us. We learn from others; and the other clinicians learn from us as well. I apply that knowledge that I gained in MCC in my clinical practice.” Q45 |
| Application of MCC insights beyond the conference setting | “I now use these skills that I have acquired through MCCs to my other impressions of imaging and discuss the specific clinical information that is relevant to the patient that will guide diagnosis and treatment options.” Q46 |
| | “I learned a lot in terms of what is important to oncologists or surgeons, and it helped me prepare for the cases for the Thoracic MCCs. This essentially helped me anticipate the needs of clinicians and read cases better for other images and direct my report to specific patient information to help with the clinician.” Q47. |

**TABLE 4: Influence of MCC participation on professional development and interdisciplinary learning**

Abbreviations: MCC, multidisciplinary cancer conference.

## Observational report

A summary of the observational findings is presented in Table 5 below. There was an improvement in the quality of presentation of radiology images and pathology slides during the thoracic MCC following the implementation of nCH. The mean quality score for presenting images by radiologists increased from 3.5 in the pre-nCH period to 4.8 in the post-nCH period ($p<0.001$). Similarly, the quality of pathology slide presentations improved, with the mean score increasing from 3.2 pre-nCH to 4.4 post-nCH ($p<0.001$). Furthermore, there was an increase in participation in the case discussions by radiologists (Rad 20), from 7.4% (n=11) pre-nCH to 17.5% (n=29) post-nCH ($p=0.019$). Pathologist participation rose from 6.0% (n=9) to 10.8% (n=18), though it was not statistically significant.Lastly, the overall quality of the MCCs also increased

(mean composite score: 56.8 vs 82.02; p<0.001).

| Variable | Pre-nCH | Post-nCH | p-value |
|---|---|---|---|
| Images Presented | | | |
| Mean/SD/No. | 3.5/0.7/155 | 4.8/0.4/177 | < .001 |
| Pathology Slides | | | |
| Mean/SD/No. | 3.2/0.9/126 | 4.4/1.0/149 | < .001 |
| Rad $2^{O}$, No. (%) | | | |
| Yes | 11 (7.4%) | 29 (17.5%) | 0.019 |
| No | 134 (89.9%) | 131 (78.9%) | |
| Unsure | 4 (2.7%) | 6 (3.6%) | |
| Path $2^{O}$, No. (%) | | | |
| Yes | 9 (6.0%) | 18 (10.8%) | 0.217 |
| No | 137 (91.9%) | 147 (88.6%) | |
| Unsure | 3 (2.0%) | 1 (0.6%) | |
| Composite Score (continuous) | | | |
| Mean/SD/No. | 56.80/8.75/151 | 82.02/9.88/166 | < .001 |

**TABLE 5: Mean quality scores and assessment of other variables**

Note: Adapted from Ibekwe et al. [11].

Statistical Tests: Mann-Whitney U test, Fisher's Exact test.

p significance level = 0.05.

Abbreviations: MCC, multidisciplinary cancer conference; nCH, navify Clinical Hub for Tumor Boards; No., number; SD, standard deviation; Rad $2^{0}$, secondary input from radiologists; Path $2^{0}$, secondary input from pathologists.

## Discussion

Despite their central role in providing imaging and histopathological data for clinical decisions, radiologists' and pathologists' specific contributions to MCCs remain underexplored. Emerging technologies such as nCH software have shown potential to improve the quality of patient information used in MCCs [11]. Our study examined their specific roles and views on technology's impact on the quality of MCCs. To the best of our knowledge, this is the first study to qualitatively explore both specialties' perspectives on thoracic MCC workflow and specialized technology application.

Radiologists provided detailed imaging interpretations supporting diagnostic accuracy, staging, and treatment planning during MCCs. They addressed clinical questions about biopsy site selection, surveillance strategies, and treatment response assessment. Costa et al. found that radiologists' participation enhanced diagnostic accuracy and guided treatment through imaging-based staging and response assessments [13]. Lesslie et al. similarly showed radiologists' integral role in surgical planning and staging, particularly for breast cancer [14]. Our findings show radiologists' contributions extend beyond image interpretation to inform staging and guide treatment discussions.

Pathologists described their work in MCCs as extending outside the limits of diagnosis confirmation to include grading, staging, margin assessment, and biomarker evaluation. They emphasized explaining molecular and immunohistochemical results that guide therapeutic choices. Plotkin et al. reported pathologists' input as critical for accurate diagnosis and treatment decisions [15]. Angerilli et al. emphasized that, in precision oncology, pathologists are central to molecular tumor boards, integrating morphologic and molecular data to guide treatment and prognostication [16]. Our findings show pathologists serve both diagnostic and interpretive roles, supporting treatment planning while facilitating communication.

Both specialties described how digital platforms enhanced MCC efficiency and quality, though adoption varied. These findings align with our previous study, where nCH implementation improved mean quality scores of case presentations from 3.5 to 4.8 for radiologists ($p < .001$), 3.2 to 4.4 for pathologists ($p < .001$), and overall mean composite quality scores from 56.8 to 82.02 ($p <.001$) for the MCCs [11]. These observations indicate that implementation of the digital platform was associated with greater presentation quality during MCCs and may support more organized and focused case discussions. Our prior results showed radiologists' participation in case discussions increased from 7.4% to 17.5% ($p = 0.019$) following nCH implementation, while pathologists showed an upward trend without statistical significance. These observational findings suggest that digital tools may facilitate specialist engagement in MCC discussions, although the observed increase was statistically significant for radiologists but not pathologists. This pattern was complemented by interview-participant reports that digital platforms supported real-time discussion, streamlined information sharing, and clearer communication. Hammer et al. found that adopting a tumor board digital platform reduced preparation time by 30% and decreased variability, indicating more efficient workflows [10]. Their follow-up study showed nCH reduced average case discussion time [17], while a Taiwan-based trial demonstrated increased efficiency across preparation, discussion, and documentation phases [18].

Exploring the possibility of leveraging tele-oncology to integrate academic multidisciplinary expertise into community-based cancer care, radiologists and pathologists reported that Microsoft Teams improved accessibility through remote attendance and image sharing, enabling broader collaboration across sites. Previous reports show virtual tumor boards can expand participation and extend access across institutions, particularly for community and rural hospitals [19]. Participants expressed optimism about AI's potential in MCCs for lesion measurements, cell quantification, and data extraction, aligning with evidence that AI may reduce workload and improve diagnostic precision [20]. However, some voiced concerns about integration into current workflows. Overall, our findings suggest that while digital platforms and AI may enhance MCC operations, their effectiveness depends on usability and clinician engagement. These proposed applications were not directly evaluated in this study, and their effectiveness will require further investigation.

Participants also identified ongoing challenges affecting MCC preparation and participation. Pathologists noted that while nCH improved organization, digitizing and uploading slides increased workload. Similar barriers, including scanning requirements and workflow interruptions, have been documented in digital pathology studies [21]. Both specialists emphasized that unclear clinical questions and delayed case distribution limited preparation. This concern was echoed by Soukup et al., who found that logistical delays and incomplete information could disrupt communication in MCCs [22]. Study participants suggested limiting cases per session for thorough review, consistent with Al-Hammouri et al., who reported that prioritizing complex cases allows comprehensive deliberation in MCCs [23]. Participants highlighted how expanding virtual participation could improve access, particularly for clinicians in smaller hospitals or rural settings overcoming geographic and scheduling barriers. AkbariRad et al. showed that virtual tumor boards expand access to expertise for remote areas [24], and Davis et al. found that transitioning to virtual meetings increased provider attendance and the number of cases presented [25]. These findings suggest that earlier case list distribution, clear clinical questions, and virtual participation may strengthen MCC efficiency and could provide opportunities to broaden access to multidisciplinary expertise.

Beyond the logistical and access-related factors, our study participants reflected on how MCCs influenced their professional practice and interdisciplinary collaboration, serving as a forum for continuous learning. Radiologists explained they tailored imaging reports to address clinicians' key questions, while pathologists highlighted histopathologic details most relevant to lung cancer management. Participants noted that exposure to other specialists' perspectives fostered interdisciplinary learning. Previous research has shown that multidisciplinary discussions influence how radiologists and pathologists structure reports for their teams [26, 27], and that MCC attendance improved teamwork across specialties [28]. Studies on MCCs' educational impact demonstrated that participation supports professional growth and enhances understanding of complex cases. Fink et al. showed that tumor board simulations improved interdisciplinary decision-making [29], while Shaukat et al. found mock tumor boards increased understanding of workflows [30]. Interviewees emphasized that knowledge gained during MCCs influenced their subsequent case assessments and professional development. Taken together, these insights and prior research show that MCCs support both case-based decision-making and continuous refinement of clinical expertise.

This study had limitations. First, we interviewed relatively few participants from a single cancer center, limiting generalizability. Second, the qualitative component relied on participants' self-reported perspectives and experiences, which are inherently subjective and may be influenced by individual and institutional context. Third, the observational data from real MCC sessions means factors like case complexity, workflow differences, or digital platforms at other institutions could yield different results. The pre-post observational design therefore demonstrates associations following nCH implementation but does not establish that the technology itself caused the observed changes. Finally, although the study included perspectives from both radiologists and pathologists, their experiences were shaped by the institutional context in which the study was conducted. Despite these limitations, this mixed-methods approach provides important insights into radiologists' and pathologists' evolving roles within MCCs. By combining observation with interviews, this study shows how technology may impact preparation, participation, and collaboration, and how MCCs contribute to professional development. It also details how radiologists and pathologists contribute to MCCs and how technology could shape these roles. These findings contribute to

the literature on digital platforms in MCCs and highlight opportunities to strengthen multidisciplinary cancer care.

## Conclusions

Radiologists and pathologists play essential roles in MCCs by translating and correlating imaging and histopathological findings into information that guides patient care. Digital platforms can improve the clarity of case presentations while facilitating specialist participation. Emerging technologies like AI and virtual tumor boards may help reduce workload and expand access to underserved areas. Ultimately, the effectiveness of MCCs depends on the collective expertise of all participating disciplines working together through integrated technologies to improve efficiency, enhance teamwork, and deliver quality cancer care.

## Appendices

| Discussion Point | Interview questions |
|---|---|
| Perceived roles and contributions | 1. What is your role during MCC discussions? |
| | a. Could you talk more about your involvement in the MCC following clinical case presentation? |
| | b. Do you think radiologist/pathologists should be involved in treatment decision making? |
| | c. What is the reason for your answer from b? |
| | d. How can your involvement in treatment decision making be facilitated or encouraged? |
| Impact of Technology/AI | 2. How does using Navify (nCH) impact your ability to prepare cases for the MCC? |
| | 3. How do you think technology can be used to improve MCCs? |
| | 4. What role should AI have in the Thoracic MCC? |
| Improvement /Expansion of MCC | 5. How do you think MCCs can be improved? |
| | a. How can we expand MCCs so that we can provide expert care to underserved regions such as rural areas? |
| Influence of MCC on professional development | 6. How do you think your participation in MCC impacted you as a radiologist/pathologist? |

**TABLE 6: Interview Questionnaire**

MCC: multidisciplinary cancer conference; nCH: navify Clinical Hub for Tumor Boards; AI: artificial intelligence

## Additional Information

### Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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