Impact of a Multidisciplinary eBoard on the Management of Patients With Complex Inflammatory Bowel Disease

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Background: We aim to assess the impact of a multidisciplinary inflammatory bowel disease (IBD) conference on the management of patients with complex IBD.

Methods: Data were collected during each conference from February 2017 through October 2018 with chart review performed at 6 months to determine if conference recommendations were successfully implemented.

Results: Eighty-five patients were discussed. The presenting diagnosis was changed by 11.8%. Recommendations for further testing, medical therapy, and surgery were successfully implemented in 77.1%, 98.1%, and 88.4%, respectively.

Conclusions: This study supports the role of IBD multidisciplinary conferences in the management of patients with complex IBD.

Key Words: inflammatory bowel disease, multidisciplinary team, video conferencing, telemedicine

INTRODUCTION

It is widely accepted that the management of patients with Crohn's disease (CD) and ulcerative colitis requires a multidisciplinary approach.1 In keeping with this, inflammatory bowel disease (IBD) care teams commonly involve close interaction among gastroenterologists, colorectal surgeons, radiologists, pathologists, pharmacists, dieticians, nurses, mental health providers, and other specialties with IBD expertise in their respective fields.2 To facilitate interaction and discussion among these various disciplines in a more structured manner, many healthcare centers have developed multidisciplinary team meetings (MDTM) for the management of patients with complex IBD.

In general, the aim of any MDTM is to improve patient care through collective experience and expertise in an organized manner to develop a clear care plan.3 Much of the current literature regarding the effectiveness of this approach on patient care stems from the experience of MDTMs in other chronic disease states, including the impact of various tumor boards on the care of oncology patients. However, available literature remains limited due to the heterogeneity in structure and design of the various MDTMs and the lack of documentation regarding compliance of MDTM recommendations.4 Despite these limitations, there exists a growing body of evidence to suggest that oncology-based MDTMs positively impact patient care, leading to a change in management plan, reduced time to treatment, and better outcomes.4 While we hope that IBD-focused MDTMs are effective, literature is lacking regarding the impact of MDTMs on the management of patients with IBD.

An important barrier to the wide implementation of multidisciplinary care in patients with IBD remains the fact that access to specialized IBD care is not available at all medical centers. Many healthcare centers or practices have IBD-trained providers within some disciplines, but not across every discipline required to effectively treat all aspects of IBD, leaving gaps in the care team. Other smaller or rural healthcare systems may lack IBD subspecialists altogether, relying on referrals to tertiary care centers for access to IBD care. However, this approach may lead to delayed treatment due to long wait times and subsequently, worse outcomes.5 The cost
and time associated with travel to referral centers contribute a high financial burden for these patients. Telemedicine has been studied as means to circumvent geographic disparities by improving access to subspecialized IBD care.6

In 2017, the IBD eBoard was started at Mayo Clinic in Rochester, Minnesota to enable interdisciplinary discussion regarding the management of patients with complex IBD. Unique to this IBD MDTM is the use of interactive video conference technology to allow participation by a group of independent regional medical systems, thereby enhancing access to IBD subspecialists. We herein aim to assess the impact of our own IBD MDTM (IBD eBoard) on the management of patients with complex IBD.

**METHODS**

**Conference Design and Structure**

The IBD eBoard at Mayo Clinic in Rochester, Minnesota formally began in February 2017 in an effort to facilitate more structured interaction among the multiple disciplines involved in caring for patients with IBD. This consists of a biweekly meeting in which challenging outpatient and inpatient IBD cases are presented and discussed. This meeting takes place every other Thursday morning from 7:00 am to 8:00 am central time. Each conference is attended by IBD subspecialist gastroenterology (GI) staff, GI trainees (fellows and internal medicine residents), colorectal surgery (CRS) staff, CRS trainees, GI subspecialist radiologists and pathologists, IBD-trained nurses and physician assistants, IBD eBoard coordinators, and media support personnel, among others. Each meeting is led by a chair person, a duty that rotates among the GI staff on a voluntary basis. The chair person has several key responsibilities, which include: (1) ensuring that each case is being presented in a timely manner, (2) emphasizing the main discussion points and specific questions being addressed with each case, (3) facilitating organized discussion among the various disciplines in attendance, (4) engaging external participants, and (5) summarizing recommendations made during each case discussion. Although multiple representatives from any given discipline are often in attendance, a single representative from each core discipline (GI, CRS, pathology, and radiology) is designated in advance to serve on the IBD eBoard for each meeting. This is also done on a voluntary basis, which helps to ensure attendance and participation among all disciplines. When relevant to the case being presented, providers from other specialties are often invited to attend.

During each conference, 2 to 5 patients are presented. Each presented case is submitted in advance, triaged by an IBD-trained nurse, and then reviewed by a single gastroenterologist (LER) for appropriateness. Once approved, the case details are sent in advance to the assigned gastroenterologist, colorectal surgeon, radiologist, and pathologist for that specific conference. To begin each discussion, the case specifics are presented, including information regarding the diagnosis of IBD and prior management and relevant past medical history, social history, and family history. Next, radiology images and pathology slides are reviewed by the respective diagnostic specialist. To conclude the presentation, the presenter poses his or her specific question(s) to the board, often regarding the need for further testing to establish a correct diagnosis and/or next steps in management.

Participation in the IBD eBoard is available through video conferencing to all members of the Mayo Clinic Care Network (MCCN), which is made up of more than 40 health care organizations across the US and in China, Mexico, Singapore, and the United Arab Emirates. Continuing medical education credit is available to providers who attend the live eBoard conference. The IBD eBoard is also recorded and available for viewing for 1 week after each conference.

**Video Conference Technology**

The IBD eBoard relies on high-quality video conference technology to ensure production quality video in an effort to facilitate clear, efficient interaction among providers. The technology and the infrastructure utilized have been adapted from previously established eTumor Boards at Mayo Clinic in Rochester, Minnesota. The technology is supported and maintained by dedicated media support personnel through close collaboration with our Media Support Services. Our IBD MDTM, the only non-cancer related eBoard at Mayo Clinic, relies on a Cisco hardware-based video conference system to ensure optimal video production and functionality. More recently, the eBoards have incorporated high-quality software-based video conferencing platforms, including Zoom and Vidyo, to extend the reach of eBoards to providers who otherwise may not be able to participate. Media personnel required for each MDTM include a dedicated producer, a technical director, and an engineer to monitor remote access sites for technical difficulties.

Integral to the success of this MDTM is the meeting space and room design. The IBD eBoard utilizes a designated room with integrated control room specifically designed to facilitate the technical needs of the eBoard. For content display, the room consists of three 90” LED monitors, allowing attendees to view and reference all presented data at all times (Fig. 1). Remote access sites are displayed on the left screen, de-identified patient information in the middle, and pertinent pathology and radiology images on the right. There are designated radiology and pathology workstations, which includes an in-room microscope to review any pathology slides that have not been digitized. In collaboration with our Radiology Department, an “anonymous mode” for image viewing was developed, allowing for de-identified images with a single click. The production room (Fig. 2) utilizes a video switcher, with 4 cameras and several microphones in the room to follow conversations from all attendees.
Data Collection

Data are collected prospectively by one of the eBoard nurses at the time of each case conference. Data relating to conference attendance include the date of each meeting, the number and role of each internal attendee, the number and location of each external attendee via video conferencing, and the name and role of each case presenter. Specific demographic information is recorded, including the age, gender, and diagnosis of each patient at time of presentation. Current and/or proposed management strategies by the presenting provider are documented. The specific question(s) being asked by the case presenter are then recorded along with the results of the case discussion, which include recommendations regarding further testing, medical and/or surgical treatment, and change in the initial diagnosis, if any. If the eBoard agrees with the current management strategy without further treatment recommendations, this is also documented. Any change in the presenting diagnosis is based on the consensus of the eBoard after careful review of the clinical scenario and accompanying radiographic, endoscopic, and histopathologic findings for each case.

Data are also collected retrospectively at 6 months to determine whether or not recommendations proposed during the case discussions were successfully implemented. This is done via chart review of the electronic medical record. Recommendations are considered successfully implemented if the recommendation was carried out within 6 months of the IBD eBoard. Recommendations are classified as pertaining to further diagnostic testing, medical therapy, or surgical treatment. For patients in whom recommendations were not successfully implemented, the reason for this is recorded.

RESULTS

From February 2017 through October 2018, a total of 34 IBD eBoard conferences occurred, with an average of 18.8 internal attendees, and 5.6 external attendees from 6 independent regional medical centers. Average internal provider attendance was comprised of 4.7 GI staff, 3.9 GI trainees, 3.3 CRS staff, 3.7 CRS trainees, 1.0 pathologist, and 2.1 radiologists. Also in attendance were several physician assistants, nurses, study coordinators, and media support personnel, although this information has not been recorded. In total, 90 case discussions...
occurred regarding 85 patients (4 patients presented twice and one patient presented a third time). Six patients were presented externally via video conferencing, with a tertiary care hospital located in Hangzhou, China being the furthest location geographically. Table 1 contains baseline demographic information for the 85 patients presented (at time of first presentation if presented on multiple occasions). Notably, 63.5% of patients carried a diagnosis of CD at the time of their initial case presentation. Of the 2 patients with an initial diagnosis of “other,” both had familial adenomatous polyposis (FAP) requiring ileal pouch-anal anastomosis (IPAA) with subsequent IPAA-related complications. One of these patients was diagnosed with CD of the pouch and initiated on adalimumab. Eight patients were presented with an “unknown” diagnosis at time of the IBD eBoard, with CD or ulcerative colitis on the differential in each case. Three of these patients had isolated perianal disease of unclear etiology, of which only one was subsequently diagnosed with CD.

Case discussions led to a new diagnosis or change in previous diagnosis in 11.8% of presented patients (Table 2). Of the 85 patients discussed, recommendations were made for further diagnostic testing in 40 (47.1%), medical therapy in 62 (72.9%), and surgery in 47 (55.3%). Twelve patients had no follow-up to determine whether or not recommendations were successfully implemented. Of these, 5 were presented via video conference without access to their electronic medical records for chart review. In the other 7 patients, recommendations were provided, but no follow-up occurred. Of 35 patients with recommendations for further testing and at least 6 months of follow-up, testing was successfully completed in 27 (77.1%). Of patients with sufficient follow-up, recommendations for medical treatment and surgical management were successfully implemented at 6 months in 52/53 (98.1%) and 38/43 (88.4%), respectively. Medical therapy was not successfully implemented in one patient due to patient’s preference to avoid immunosuppressive therapy. Surgery was not implemented in 5 patients for the following reasons: three patients declined surgical management, one patient improved with medical therapy alone, and surgery was felt to be too high risk in one patient awaiting kidney transplantation.

DISCUSSION

Multidisciplinary care is important in the management of patients with complex IBD to address the many disease-related comorbidities and complications that often arise throughout their disease course. In many medical centers around the country and the world, interdisciplinary care is being facilitated through the development of IBD MDTMs. However, the effect of such an approach on clinical decision-making and on the care of patients with IBD has not been extensively evaluated. In the present study, we have demonstrated that our own MDTM model, the IBD eBoard, seems to impact the care of patients with complex IBD, leading to a new diagnosis or change in diagnosis in almost 12% of patients. The clinical impact of our MDTM is also established by the successful implementation of the majority of recommendations provided during patient discussions. In those with at least 6 months of follow-up, recommendations for further testing, medial therapy, and surgery were successfully implemented in 77.1%, 98.1%, and 88.4%, respectively.

Much of our knowledge regarding the clinical effectiveness of MDTMs has been derived from the experience of various tumor boards designed for the interdisciplinary management of patients with malignancy. Basta and colleagues performed a systematic review in 2017, assessing the value of MDTMs in the management of patients with gastrointestinal malignancies. They demonstrated a change in diagnosis in up to 26.9% and changes in treatment in 41.7% of patients. In another systematic review that included all oncology-focused MDTMs regardless of the type of malignancy, patients discussed at an MDTM were more likely to receive appropriate staging and neo-adjuvant/adjuvant treatment versus a comparator group. Compared to oncology-focused MDTMs, there is a paucity of literature regarding the clinical impact of
MDTMs on the management of patients with IBD. Ferman et al. recently published a study that aimed to assess the effectiveness of their own IBD MDTM on patient outcomes. In this study, MDTM recommendations were made for 159 patients, with successful implementation of recommendations within 6 months in 91.6%. Of 146 patients with successfully implemented recommendations, 58.2% were in clinical remission at time of last follow-up. Our data further support the impact of IBD MDMTs in management of patients with IBD, in which treatment recommendations (combined medical and surgical) were successfully implemented in 92.7% of patients at 6 months.

Despite IBD MDTMs now being utilized in many IBD centers worldwide, there remains uncertainty as to the optimal design and format of such meetings. To better define key elements for designing an IBD MTM, Morar and colleagues conducted prospective, qualitative studies in 2015 and 2018 using standard Delphi methodology. Through the consensus of multiple IBD experts, several themes were identified as important to developing a successful IBD MTM. These include defining “core” MDTM members, encouraging good attendance and interdisciplinary participation, use of an alternating formal chair person, and a designated meeting coordinator. Core members of IBD MDTMs were identified as colorectal surgeons, gastroenterologists, IBD nurse specialists, dieticians, pathologists, and the MDTM coordinator. Other features recognized as important include a structured case selection process, appropriate meeting duration and frequency, a confidential meeting space, and functioning, regularly maintained technological resources. Our IBD eBoard has effectively incorporated the majority of these key elements, which likely have contributed to its early success. The basic structure of our IBD MTM is one that can likely be replicated and sustained by other IBD centers.

While our study supports a role for IBD MDTMs in the management of complex IBD, there remains a geographic disparity in which many patients with IBD do not have easy access to subspecialized, multidisciplinary care. Technological advances have led to new, innovative ways of overcoming this challenge of accessibility. Over the last 2 decades, communications technology has been incorporated into medical practice in various formats. Within the field of IBD, telemedicine has been utilized in multiple medical centers, aiming to improve access to subspecialty care and to facilitate provider and patient education. One of the most successful implementations of video conference technology into a multidisciplinary IBD format is the Inflammatory Bowel Disease Live Interinstitutional and Interdisciplinary Videoconference Education (IBD LIVE) Series. Derived from the weekly multidisciplinary IBD conference at the University of Pittsburg Medical Center (UPMC), IBD LIVE uses an interactive virtual conference platform to convene IBD professionals from multiple academic institutions for discussion of complex IBD management and to promote clinical education in IBD. Cases discussed during this continuing medical education-approved, multisite conference are then published to further enhance medical knowledge. While possessing similar goals, our IBD MDTM model encompasses important and distinct features. In addition to providing a case-based format for clinical IBD education and complex decision-making, the IBD eBoard uniquely improves the accessibility of IBD subspecialists from multiple disciplines to medical centers lacking specialized IBD care. This “hub-and-spoke” model has the potential to overcome some of the geographic barriers that limit access to quality IBD care.

Our study has several limitations, including its small sample size. This is largely a manifestation of the fact the IBD eBoard is relatively new, having been formally established in 2017. As the IBD eBoard continues to grow and develop, we hope to expand our reach to additional MCC members and provide future updates regarding its impact on patient care. As experience continues, it would also be important to evaluate the effect our IBD MDTM on long-term patient outcomes. One of the challenges to this is defining an adequate comparator group. As patients presented at the IBD eBoard are some of the most severe and complex cases encountered at our IBD center, developing an equally complex comparator group for appropriate outcomes analysis may prove difficult. Lastly, the cost-effectiveness of this model has not been established and needs to be further explored.

A potential impediment to the eBoard model being more widely adapted to other IBD centers is the resources required, including both technology and support personnel. The development and maintenance of the IBD eBoard at our institution has required significant input and effort from media support and Provider Relations colleagues. As such, this model of MDTM may be less feasible at healthcare centers lacking in these resources.

CONCLUSIONS

Multidisciplinary care is necessary for the management of patients with IBD. For patients with IBD and other chronic illnesses, MDTMs offer a structured format for interdisciplinary discussion to develop a clear care plan. Our study supports the role of IBD MDMTs in the management of patients with complex IBD. The IBD eBoard at Mayo Clinic in Rochester, Minnesota fosters provider medical education through case-based discussions. Additionally, through its “hub-and-spoke” model, the IBD eBoard provides a platform for independent medical centers in various geographic locations to reliably access IBD specialists among multiple disciplines via interactive video conferencing. This IBD MDTM model could be adapted by other IBD centers with the appropriate resources to improve patient and provider accessibility to IBD subspecialists. However, to implement more widely, further work is necessary to determine the long-term impact on patient outcomes and the cost-effectiveness of such an approach.
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