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Multidisciplinary Cancer Conferences for Gastrointestinal Malignancies Result in Measureable Treatment Changes: A Prospective Study of 149 Consecutive Patients

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Abstract

Background—In most jurisdictions, a minority of patients are discussed at multidisciplinary cancer conference (MCC) despite recommendations for such reviews. We assessed the impact of MCC review of gastrointestinal (GI) cancers at a stand-alone cancer center.

Methods—Patient data were prospectively collected on consecutive cases presented at a GI MCC during a 6-month period. Original treatment plans were collected confidentially before presentation and compared to post-MCC treatment plans. We defined changes in management plans as major (change in treatment modality) or minor (testing prior to original plan).

Results—A total of 149 cases were evaluated: 115 upper GI (gastric/small bowel—10 %, liver—32 %, pancreaticobiliary— 36 %), and 34 lower GI (23 %). Reasons for presentation were: questions regarding progression/metastases (44 %), management (26 %), diagnosis (21 %), pathology (15 %), and resectability (7 %). Physicians were certain of their original plans being the final recommendations in 84 % (n = 125). Change in management was recommended in 36 %; 72 % were major and 28 % were minor. Patients underwent all recommended treatments at our institution in 77 % of cases, a portion in 5 %, and no recommended treatments in 18 %. On multivariate analysis, physician degree of certainty for original management plan was not predictive of a change in management plan (p = 0.61).

Conclusions—Although certainty of prediscussion treatment plan is high, changes in treatment recommendations occurred in more than one-third of patients after GI MCC. This prospective study demonstrates the value of MCC in GI cancer sites, even at a stand-alone cancer center.

Multidisciplinary cancer conferences (MCC) are regularly scheduled meetings of cancer specialists, including surgeons, medical oncologists, radiation oncologists, and pathologists. MCC allow for discussion of patient cases, review of pathology/imaging, and formulation of treatment plans. The potential advantages of MCC include improved consistency, continuity, coordination, cost-effectiveness of care, and many others.[1] In an effort to improve cancer care in the United Kingdom, the Calman–Hine report recommended organized meetings,

such as MCC, to guide patient care.[2] Although their utility and direct effects on quality of care are debated, their use is recommended in the United States.[3] Despite these recommendations, setting up and maintaining MCC can be challenging given the time and resources required.

The potential of MCC discussions to change a clinician's initial treatment plan may be an important measureable outcome. If the probability of change in the initial treatment plan is exceptionally low, the conference would be considered of minimal value. In a systematic review from the United Kingdom, Lamb and colleagues found a 2–52 % change in pre- to post-discussion plans.[4] However, only three of the studies originated from the United States and included only breast or gynecologic cancer patients. A more recent study from a U.S. center demonstrated a 23.6 % change in treatment recommendations for pancreatic cancer patients after MCC discussion compared with recommendations from outside institutions.[5] A similar study of breast cancer patients referred to the University of Pittsburgh indicated a change in treatment plan of 43 %.[6] Observed changes with MCC for rectal cancer included higher adherence to guideline-recommended treatments, decreased positive circumferential margins after resection, increased use of preoperative MRI and staging accuracy, increased use of multimodality therapy, including neoadjuvant and adjuvant chemotherapy, and improved perioperative mortality and survival.[7–14] Most studies compare changes for either rectal cancer alone or other disease sites. We are unaware of studies evaluating other GI MCC influences on treatment recommendations after MCC discussion within a specialized U.S. cancer institution.

We hypothesized that clinicians practicing in a standalone cancer center, and a center involved in the training of future cancer specialists, would see little change in cancer management recommendations following MCC. We postulated that clinicians in such a center would follow recognized treatment standards and only a small minority of patients would have unique presentations requiring the input of numerous specialists and colleagues to determine a final treatment plan. The purpose of this study was to prospectively measure the influence of a MCC in a freestanding cancer center on final versus initial management plan for patients with gastrointestinal (GI) cancers and to identify patient and process factors that may be predictive of such changes.

METHODS

Setting

Roswell Park Cancer Institute (RPCI), in Buffalo, New York, is a free-standing cancer center, with a Society of Surgical Oncology (SSO) accredited surgical oncology training program. Two GI MCCs that meet weekly were selected for this current study. Information was collected prospectively after institutional review board approval from patients presented at the upper GI (liver, pancreaticobiliary, gastric/small bowel) and the lower GI (colon, rectum, or anus) MCCs.

MCC Organization

Presentation of individual patients at the MCC was at the discretion of the main attending clinician. At the time of this study, less than half of eligible patients (i.e., patients with a GI cancer) referred to RPCI were selected by attendings for presentation. Meeting attendance was recorded through sign-in sheets and included members from surgery, medical oncology, radiation oncology, gastroenterology, pathology, and radiology teams, including attendings, trainees, and physician extenders. A multidisciplinary coordinator was responsible for collecting basic patient information. If a patient was new to the institution, pathology and radiologic images were typically reviewed by RPCI's pathologists and radiologists before MCC discussion.

Prior to discussion, a research team member not participating in the discussed patients' care obtained the original care plan (e.g., neoadjuvant therapy) and the level of certainty for this original plan from the attending clinician via email or direct discussion. Level of certainty was defined as (1) uncertain, (2) somewhat certain, and (3) very certain. The original plan and level of certainty were kept confidential. Although still presented, patients were excluded from our study if an original plan and level of certainty were not obtained prior to MCC discussion (3 patients).

Data Collection

Data were prospectively collected during the relevant MCC and treatment plans undergone from patient charts. Patient demographic data included age, gender, disease site, number of times presented at MCC, and whether the patient was seen at RPCI by the presenting attending before MCC. The presenters of patient data were recorded, along with, patient comorbidities, psychosocial factors, nutritional status, patient/family wishes, pathology slides, and radiology images. Reasons for presentation were recorded as was participation by specialty (defined as asking questions about presentation data). Reasons for presentation included: (1) diagnosis (may be unknown before presentation or questioned based on available information), (2) progression, (3) resectability, (4) management, and (5) pathology concerns. Length of time in minutes required to present each patient case also was recorded.

Discussion data included which specialties participated in final planning and whether they agreed with the original plan stated by the presenting team. Length of time of discussion also was recorded in minutes.

Outcome Measures

The primary outcome was defined as any change in management plan from pre- to post-MCC discussion. Major recommendation changes were defined as change in initial treatment modality (e.g., radiation therapy rather than surgical resection). Minor treatment changes included the original stated plan but were preceded by another recommendation, such as diagnostic laparoscopy, repeat biopsy, or further imaging.

Statistical Analysis

Patient demographic and clinical characteristics, presentation, discussion, and decision-making details were reported by group as medians and ranges for continuous variables and

as frequencies and relative frequencies for categorical variables. The between group comparisons (change versus no change) were made using the Wilcoxon rank-sum and Kruskal–Wallis exact tests for continuous variables, and the Fisher's or Chi square exact tests for categorical variables, as appropriate.

Multivariate logistic regression models were used to evaluate the impact of suspected patient, presentation, and discussion variables on the outcome change in management plan and whether those changes were major versus minor. The model estimates were obtained using Firth's penalized maximum likelihood and from these estimates adjusted odds ratios were obtained. All analyses were conducted in SAS v9.3 (Cary, NC) at a significance level of 0.05.

RESULTS

Data for consecutive patients presented from August 2012 to February 2013 at GI MCC were collected. Total included patients were 149: 115 from upper GI and 34 from lower GI MCC. Median age was 63 years (range 18–91), and 59 % were male. Demographics by disease site can be found in Table 1. The most commonly presented disease site was pancreaticobiliary (n = 52, 35 %); other sites included liver (31 %), colorectal (22 %), gastric/small bowel (10 %), and unknown (2 %). The majority of cases (73 %) were selected for presentation by the surgical team. Liver cases were commonly selected by the surgical (32 %) and medical oncology (37 %) teams (p = 0.03). Thirty-seven (25 %) patients were not seen by clinicians before MCC presentation; 116 (78 %) were presented for the first time, 24 (16 %) for the second time, 6 (4 %) for the third time, and 3 (2 %) for the fourth time.

Presentation Details

The majority of patients were presented by either an attending (n = 53; 36 %), fellow (n = 54; 36 %), or both (n = 24; 16 %). Median length of time for patient case presentations was 3 min (range 1–9 min). Comorbidities were presented for 45 % (n = 67) of cases, psychosocial aspects for 8 % (n = 12), performance status for 5 % (n = 8), nutritional status for 7 % (n = 11), and patient/ family views for 8 % (n = 12). Performance status was more likely to be reviewed for liver cases (p = 0.04) than other disease sites. If case presentations were B3 min, comorbidities (38 vs. 56 %; p = 0.04), pathology (51 vs. 72 %; p = 0.01) and radiology (82 vs. 95 %, p = 0.03) were less likely to be presented.

Reasons for presentation included: progression/metastases 44 % (n = 65), management options 26 % (n = 38), diagnosis 21 % (n = 31), pathology 15 % (n = 23), and resectability 7 % (n = 10). More patients were presented by the medical oncology and gastroenterology service for questions regarding progression/metastases than the surgical service (52 and 78 vs. 39 %; p = 0.04). Lower GI cases were more likely presented for management concerns (p = 0.01). Liver cases were less likely presented for histopathology concerns (p = 0.02) and most likely presented for progression/metastases (57 %).

Discussion Details

The median discussion time following case presentation was 3 min (range 0–8 min). The discussion time was significantly shorter (B3 min) for older patients (median age 64 vs. 57 years; $p = 0.04$.) Discussion input was given by surgeons in 93 % ($n = 138$) of cases, medical oncologists 57 % ($n = 85$), radiation oncologists 20 % ($n = 30$), radiologists 20 % ($n = 29$), pathologists 11 % ($n = 16$), and gastroenterologists in 6 % ($n = 9$). The majority of patients were offered one treatment (70 %, $n = 105$), and 30 % ($n = 44$) were offered two or three treatments.

Outcome of Recommended Treatment Change

Change in initial management was recommended in 36 % ($n = 53$) of cases; 28 % ($n = 15$) were minor and 72 % ($n = 38$) were major. Major recommended changes were between liver directed therapies, chemotherapy, radiation, surgical resection, ablative therapies, observation, and endoscopic procedures. Of all recommended changes, type of surgical procedure ($n = 14$, 26 %) was most common, followed by recommendations from major surgery/endoscopic procedure to another treatment modality ($n = 13$, 25 %). Univariate analyses for predictors of any management change (minor or major) can be found in Table 2 for presentation details and Table 3 for discussion details. No significant differences in presentation factors predicted post-discussion treatment changes. Not surprisingly, the only significant predictor of a change in management (minor or major) using multivariate analysis (Table 4) was length of discussion, where the risk of change in management increased with the increased discussion time.

Univariate analyses of both presentation and discussion details for minor versus major changes can be found in Table 5. If treatment change was recommended, it was more likely to be minor if surgeons agreed with the original plan ($p = 0.002$). Other nonsignificant variables examined included presentation concerns, disease sites, and levels of certainty. Table 4 contains results of a multivariate analysis for predicting minor versus major change related to presentation and discussion details. The only remaining factor of significance was surgeon agreement with the original plan ($p = 0.005$).

Patients Undergoing Recommended Treatments

Within 3 months of MCC discussion, 77 % of patients underwent all recommended treatment(s), 5 % ($n = 7$) underwent part of the recommended treatment(s), and 18 % ($n = 27$) did not undergo any recommended treatment at RPCI. Reasons not to undergo treatments were: four refused treatment, ten received treatment elsewhere or were lost to follow-up, two died before treatment initiation, seven underwent treatments other than those recommended, and two had progression/regression of disease. Two patients had a delay in treatment initiation, where treatment began at 4 months. No predictive factors for likelihood of undergoing recommended treatments were significant on univariate analysis, including number of offered treatments and incidence of initial treatment change.

DISCUSSION

To our knowledge, this is the first study that prospectively evaluates the MCC discussion process and its effects on treatment changes for a variety of GI cancers at a US cancer center. Despite 84 % of clinicians being somewhat or very certain of their original plan, there remained a 36 % recommended change in management and 72 % of those were major. It is expected that clinicians at a major cancer center involved in SSO fellow training are well versed in clinical practice guidelines and evidence-based medicine within their areas of expertise. While a learning curve or nuances not clearly fitting into treatment algorithms may be to blame, prior literature, particularly for rectal cancer, showed improved staging and margin status prediction with increased imaging and MCC discussion with experienced radiologists.[7,13] Staging accuracy may increase the use of neoadjuvant therapy, also explaining increased major initial treatment modality changes.[7,13] This study highlights the fact that management changes were high regardless of expertise, indicating the discussion with colleagues adds to the process of MCC.

Within our academic specialized cancer center exists expanded treatment options and diagnostic capabilities, including evolving paradigms of neoadjuvant therapy, new systemic treatment combinations, clinical trials, and novel ablative technologies that are discussed at MCC. These evolving treatment options and differing opinions on their utility and efficacy also could explain a proportion of recommended treatment changes that occurred. In this regard, MCC can be postulated to help standardize applications and monitor and evaluate outcomes with the use of these novel treatment modalities.

In the current study, comorbidities, psychosocial factors including patient/family wishes and nutritional status were rarely presented. Blazeby and colleagues found 18 (43.9 %) of recommended changes were due to comorbid health issues, 14 (34.2 %) due to patient choice, and 8 (19.5 %) due to suboptimal available clinical information at time of presentation, with most discordance found in gastric and esophageal cancer patients.[15] In our study, the group with the highest possibility to lack information, those not seen at RPCI prior to presentation, analyses indicated lack of information was not predictive of management change recommendations. While it is implausible that this information is not considered by clinicians in the decision making process, it may be related to patient selection (e.g., patients with poor performance and nutritional status have fewer treatment options and selecting their cases for discussion may not be as productive).

Although this study is the first of its kind, being prospective and evaluating the process of MCC discussion within a stand-alone cancer center, it does have limitations. When trying to assess compliance with recommendations, 18 % of our patients did not undergo recommended treatments at RPCI within 3 months of discussion. We could not discern whether this was truly compliance failure or a direct result of presentations for second opinions. We also could not separate out recommendations for palliation or if the patients received treatments elsewhere. While a large number of GI malignancies may require medical and radiation oncology treatments, less active participation of these groups may be a result of selection bias, especially when clear indication for their use exists. Although overall or disease-free survivals are attractive outcome measures, the timing of our study

(2012–2013) did not allow us to evaluate the impact of MCC on survival. One study of 138 VA centers did not find changes in quality of care or survival with the use of tumor boards for colorectal, lung, prostate, hematologic, and breast cancers.[16]

We were unable to address the impact of missing or unreported information at the time of case presentation on the final MCC recommendation. Additional information accessible later to the individual provider could explain some of the discordance between recommended and actual treatments received. Better integration of the health information records within MCC discussion may help standardize patient presentations and thereby improve consistency and quality of discussions. Novel strategies, including virtual case presentations or electronic repositories for clinical information, may enhance and allow expanded multidisciplinary discussions.

CONCLUSIONS

Following MCC review in a stand-alone cancer center, a change from the original management plan was observed for 36 % of patients with a GI cancer. No factor predicted a change in management plan, including degree of certainty for the original management plan held by the attending clinician. Discussion of all patients in an MCC setting is recommended.

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TABLE 1

Demographics of patient cases discussed at MCC by disease site

		Total	Pancreaticobiliary	Liver	Gastric/ SB[a]	LGI	*p* value
	n (%)	149	52 (35)	46 (31)	15 (10)	33 (22)	
Age (year)	Median (range)	63 (18–91)	61 (27–81)	65 (39–91)	65 (47–73)	61 (18–87)	0.58
Gender	Male (%)	88 (59)	29 (56)	31 (67)	10 (67)	18 (55)	0.10
Specialty selecting and presenting case	Surgery (%)	109 (73)	39 (75)	34 (74)	8 (53)	26 (79)	0.03
	Medical Oncology (%)	31 (21)	6 (12)	11 (24)	6 (40)	7 (21)	
	GI[b] (%)	9 (6)	7 (14)	1 (2)	1 (7)	0	

[a] Small bowel

[b] Gastroenterology/endoscopy

TABLE 2

Univariate analysis of presentation details and recommendations for management change

		No change	Change	*p* value
		96 (64)	53 (36)	
Specialty selecting and presenting case *n* (%)	Surgery	72 (75)	37 (70)	0.76
	Medical oncology	19 (20)	12 (23)	
	GI[a]	5 (5)	4 (8)	
Presentation times *n* (%)	Median minutes (range)	3 (1–9)	3 (2–8)	0.47
	≤3 min	60 (65)	32 (35)	0.86
	>3 min	36 (63)	21 (37)	
Most senior presenter *n* (%)	Attending	46 (48)	33 (62)	0.26
	Fellow	38 (40)	16 (30)	
	Physician extender	12 (13)	4 (8)	
Pre-discussion level of certainty *n* (%)	Uncertain	17 (18)	7 (13)	0.44
	Somewhat certain	35 (37)	25 (47)	
	Certain	44 (46)	21 (40)	

[a]Gastroenterology/endoscopy

TABLE 3

Univariate analysis of discussion details and recommendations for management change

		No change	Change	*p* value
	Total *n* (%)	96 (64)	53 (36)	
Discussion time	Median minutes (range)	2 (0–8)	3 (1–7)	0.01
Pathology reviewed (*n* = 87)	*n* (%)	56 (58)	31 (60)	1
Radiology reviewed (*n* = 129)	*n* (%)	80 (83)	49 (93)	0.14
Questions *n* (%)	Surgery	90 (94)	52 (98)	0.42
	GI[a]	7 (21)	2 (10)	0.46
	Medical oncology	32 (35)	17 (35)	1
	Radiationoncology	9 (17)	5 (19)	1
	Radiology	4 (4)	2 (4)	1
	Pathology	3 (3)	0 (0)	0.55
Concerns raised *n* (%)	Diagnosis	16 (17)	15 (28)	0.14
	Progression/metastases	43 (45)	22 (42)	0.73
	Resectability	7 (7)	3 (6)	1
	Management	26 (27)	12 (23)	0.70
	Pathology	15 (15)	8 (15)	1
Specialty input *n* (%)	Surgery	89 (93)	49 (93)	1
	Medical oncology	54 (56)	31 (59)	0.86
	Radiation oncology	17 (18)	13 (25)	0.39
	GI[a]	5 (5)	4 (8)	0.72
	Radiology	18 (19)	11 (21)	0.83
	Pathology	10 (10)	6 (11)	1
Agreement with initial plan *n* (%)	Surgery	81 (91)	16 (33)	< 0.001
	Medical oncology	50 (91)	18 (56)	< 0.001
	Radiation oncology	16 (94)	4 (25)	< 0.001
	GI[1]	2 (100)	1 (33)	0.4
	Radiology	15 (83)	6 (50)	0.10
	Pathology	7 (78)	2 (33)	0.14

[a] Gastroenterology/endoscopy

TABLE 4

Multivariate analysis for predicting any change in management and major versus minor change recommendations

			Any change		Major change	
Variable	**Referent**		**OR (95 % CI)**	***p* value**	**OR (95 % CI)**	***p* value**
Concerns	No concern	Diagnosis	2.15 (0.56, 8.21)	0.26	1.74 (0.14, 22.25)	0.67
		Progression/metastases	1.28 (0.34, 4.86)	0.72	2.86 (0.25, 32.91)	0.40
		Resectability	1.04 (0.19, 5.55)	0.97	0.29 (0.02, 5.09)	0.40
		Management	0.97 (0.29, 3.28)	0.96	1.57 (0.12, 21.19)	0.73
		Pathology	1.49 (0.36, 6.10)	0.58	0.65 (0.04, 10.31)	0.76
Disease site	Liver	Pancreaticobiliary	1.50 (0.60, 3.76)	0.63	1.57 (0.27, 9.16)	0.74
		UGI (gastric and small bowel)	1.54 (0.45, 5.33)		0.46 (0.04, 4.95)	
		LGI	0.81 (0.28, 2.33)		1.59 (0.21, 12.28)	
Level of certainty	Certain	Somewhat certain	1.60 (0.55, 4.64)	0.61	1.09 (0.12, 10.08)	0.68
		Uncertain	1.16 (0.41, 3.32)		0.57 (0.07, 4.68)	
Length of discussion	<3 min	≥3 min	1.31 (1.05, 1.64)	0.02	0.73 (0.46, 1.15)	0.18
Surgeon agreement with original plan	No	Yes	0.05 (0.02, 0.14)	< 0.001	0.03 (0.003, 0.34)	0.005

TABLE 5

Univariate analysis of presentation and discussion details for major versus minor recommended changes

		Minor change	Major change	*p* value
Total	*n* (%)	15 (28)	38 (72)	
Patient seen before presentation *n* (%)	Yes	12 (80)	26 (68)	0.51
Specialty selecting and presenting *n* (%)	Surgery	12 (80)	25 (66)	0.55
	Medical oncology	3 (20)	9 (24)	
	GI[a]	0	4 (11)	
Presentation time	Median (range 1–9 min)	4	3	0.51
Most senior presenter *n* (%)	Attending	4 (27)	17 (45)	0.43
	Fellow	6 (40)	10 (26)	
	Attending + fellow	4 (27)	8 (21)	
	Physician extender	1 (7)	3 (8)	
Level of certainty *n* (%)	Uncertain	2 (13)	5 (13)	0.40
	Somewhat certain	5 (33)	20 (53)	
	Certain	8 (53)	13 (34)	
Pathology reviewed	*n* (%)	9 (60)	22 (60)	1
Radiology reviewed	*n* (%)	15 (100)	34 (90)	0.57
Presentation questions *n* (%)	Surgery	14 (93)	38 (100)	0.28
	GI[a]	1 (17)	1 (7)	0.52
	Medical oncology	7 (50)	10 (29)	0.20
	Radiation oncology	1 (14)	4 (21)	1
Presentation concerns *n* (%)	Diagnosis	3 (20)	12 (32)	0.51
	Progression/metastases	4 (27)	18 (48)	0.22
	Resectability	2 (13)	1 (3)	0.19
	Management	5 (33)	7 (18)	0.29
	Pathology	3 (20)	5 (13)	0.67
Specialty discussion input *n* (%)	Surgery	15 (100)	34 (90)	0.57
	GI[a]	0 (0)	4 (11)	0.57
	Medical oncology	10 (67)	21 (55)	0.54
	Radiation oncology	2 (13)	11 (29)	0.31
Agreement with original plan *n* (%)	Surgery	10 (67)	6 (18)	0.002
	GI[a]	1 (100)	0 (0)	0.33
	Medical oncology	6 (60)	12 (55)	1
	Radiation oncology	1 (50)	3 (25)	0.51

[a] Gastroenterology/endoscopy