

recommend to the patient, these differences can be reconciled before the patient is presented with the information.

From an institutional point of view, the existence of such a clinic gives the cancer program at that hospital an easily identified and branded image of excellence. It is evident that the care of this type of cancer is of particular concern for the institution, because the institution has brought experts together to review each patient's situation individually. Additionally, there may be a halo effect in which the institution becomes known as providing a higher level of cancer care or medical care in general. In this way, the institution may achieve "brand loyalty" with the patient as well as with the patient's family and friends.

In summary, I came to the concept of the multidisciplinary cancer clinic as a skeptic. However, during the past few years as I have participated in this process, I have become a true believer in the advantages of this model of patient care. Although the barriers to forming multidisciplinary cancer clinics are formidable and the decisions to be made are numerous, there are significant rewards for the patient and providers that make this effort worthwhile.

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Models of Multidisciplinary Cancer Care: Physician and Patient Perceptions in a Comprehensive Cancer Center

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Abstract

Purpose: Multidisciplinary clinics (MDCs) play a prominent role in coordinating complex cancer care delivered by multiple providers from different disciplines. The structure of such clinics and clinicians' perceptions of the advantages and disadvantages of practicing in MDCs have not been well characterized.

Methods: We surveyed and interviewed medical providers who participate in cancer MDCs at our comprehensive cancer center about the structure of the MDCs in which they work, their satisfaction working in these clinics, and the perceived benefits and disadvantages. Press-Ganey patient satisfaction scores were also examined.

Results: We identified two care models: one in which patients are seen sequentially by physicians from each discipline, and a second model in which patients are seen concurrently by physi-

cians from each discipline. Of the 141 survey respondents from surgical oncology, medical oncology and radiation oncology, more than 90% of providers enjoyed working in an MDC and more than 75% preferred to see new patients in an MDC. Additionally, 90% believed that patients perceived the clinics to be valuable for comprehensive, coordinated, and appropriate care. However, one third of the physicians thought the clinics were not an efficient use of their time. Participants who practice in the concurrent model of care and surgical oncologists were more likely to express frustration with the inefficiency of MDCs. Patients seen in each clinic model uniformly expressed high satisfaction with the coordination of care.

Conclusion: MDCs are valued by oncology patients and providers. Although they are personally and professionally satisfying for physicians, the use of this care model is perceived as inefficient by some caregivers.

Introduction

During the past three decades, multidisciplinary clinics (MDCs) have played an increasingly prominent role in the care of patients with cancer in both the community and in academic cancer centers.¹⁻³ Their development has been promoted in health care management literature and by the National Cancer Institute.⁴⁻⁶ Intuitively, a multidisciplinary approach provides a rational and coordinated mechanism for evaluation and treatment of patients with complex diseases by bringing health care providers in the surgical, medical, and radiation oncology disciplines together.⁷ Yet, each discipline functions in a different environment with different requirements and incentives that can undermine seamless coordination. Additionally, the needs of each disease-based MDC may differ—particularly in large academic centers with highly specialized providers in each discipline who treat patients with a single disease—requiring different models of multidisciplinary care that are suitable for patients with each cancer type.

In 1997, ambulatory care at our cancer center was organized into 12 distinct disease centers, including 10 centers that focus on solid tumor oncology, each specializing in the care of a specific cancer type (eg, breast oncology, thoracic oncology, GI oncology, and so on). A commitment was made to support and provide multidisciplinary care in these centers. The structure of these MDCs was not defined by the institution; rather, each disease-based MDC was allowed to evolve based on the needs of the clinicians and their patients.

To understand the development and impact of the MDCs, we surveyed physicians, nurse practitioners, and physician assistants who participate in MDCs at our cancer center. We sought to examine the relationship between perceptions of the disease group members and the organization of their MDCs. We also sought to understand whether differences existed in patient satisfaction, which we assessed using Press-Ganey scores, with the structures of the various MDCs or the results of the provider survey.

Methods

Models of Care

We developed and distributed a Web-based questionnaire to all surgeons, medical oncologists, radiation oncologists, dermatologists, nurse practitioners, and physician assistants who participate in MDCs at the main campus of the Dana-Farber Cancer Institute. The questionnaire sought to ascertain the structure of multidisciplinary care in each of the multidisciplinary clinics of the 10 solid tumor disease centers. We excluded disease centers (eg, the leukemia center) that did not, according to the particular needs of their patients, use a multidisciplinary care model. To further characterize the MDCs, we also interviewed selected members of each discipline in each of these 10 disease centers. We asked clinicians how and why these models had evolved and about the basis for such changes.

Provider Perspectives

The Web-based questionnaire and clinician interviews elicited providers' perspectives of the advantages and drawbacks of the MDCs. We also queried providers about the efficiency of the clinics, the clinics' value for patients, providers' personal preferences for working in these clinics, perceptions of patient satisfaction and, in an open-ended manner, any other comments or suggestions for improving the MDCs.

Patient Satisfaction

To examine the association between the structure of the clinics or the perceptions of clinicians and patient satisfaction, we analyzed Press-Ganey patient satisfaction scores for each MDC. Specifically, we examined patients' responses to questions about the degree to which staff worked together to provide care, the degree to which care was well-coordinated among doctors/other caregivers, the overall rating of care given at the facility, and the likelihood of recommending the services to others. The answers to these questions were reported using a modified Likert scale reported as ratings from 1 to 5 (1 = very poor, 2 = poor, 3 = fair, 4 = good, and 5 = very good). These scores were then converted into a numerical scale from 0 to 100 (1 = zero, 2 = 25, 3 = 50, 4 = 75 and 5 = 100). Means and ranges for the answers were then computed.

Results

Models of Care

Models of multidisciplinary care varied among disease centers, but they seemed to cluster around two primary models. The first model, which we termed the "sequential model," is characterized by centralized scheduling of patients by a new patient coordinator. The coordinator gathers medical information from the patient by telephone (frequently with clinical back-up of a nurse) and schedules the patient to see the appropriate providers from radiation, surgical, and medical oncology. In this model, patients are generally scheduled to see the physicians sequentially, with each physician rendering his or her opinion and recommended treatment plan. Frequently, one of these providers assumes the coordinating, or quarterback, role. Physicians generally do not see the patient together, but they communicate with one another between visits. By the end of a day, the patient would receive a full set of consultations with the appropriate disciplines and leave the clinic with a single, coordinated treatment plan.

The second model begins in the same fashion, with a new patient coordinator who gathers the necessary medical information and schedules for the patient to see all the appropriate providers on the same day. In this model, however, the practitioners from each discipline see the patient concurrently. In this concurrent model, the patient is initially evaluated by a member of a team of physicians made up of members from each discipline. This provider presents the patient's case to the physicians from the other disciplines. The team usually reviews any radiologic scans as a group and subsequently interviews and examines

Table 1. Clinician Rating of MDCs (n = 141)

Question	Agree or Strongly Agree (%)	Neutral (%)	Disagree or Strongly Disagree (%)
MDC runs efficiently	51.9	26.3	21.8
MDC is efficient use of clinician's time	65.7	18.7	15.6
Clinician enjoys working in MDC	90.3	9.0	0.7
Clinician prefers to see new patients in MDC	76.3	19.3	3.7
MDC allows clinician to provide more comprehensive, coordinated, and appropriate care	89.7	9.6	0.7
MDC generates more referrals	48.9	39.1	12.0
Patients appreciate unique care of MDC	89.7	10.4	0.0
MDC attracts patients	81.5	17.0	1.5

Abbreviation: MDCs, multidisciplinary clinics.

Table 2. Rating of MDCs by Clinician Type

Question	Medical Oncologists (n = 56; %)		Radiation Oncologists (n = 12; %)		Surgical Oncologists (n = 26; %)	
	Agree	Disagree	Agree	Disagree	Agree	Disagree
MDC runs efficiently	64.3*	12.5*	58.3*	16.7*	19.2	57.7
MDC is efficient use of clinician's time	71.4*	7.1*	58.3	25.0	46.1	38.5
Clinician enjoys working in MDC	91.1	0.0	83.3	0.0	88.5	3.8
Clinician prefers to see new patients in MDC	82.1	0.0	75.0	0.0	65.4	11.5
MDC allows clinician to provide more comprehensive, coordinated, and appropriate care	87.5	1.8	100.0	0.0	88.5	0.0
MDC generates more referrals	44.6	14.3	58.3	8.3	46.1	19.2
Patients appreciate unique care of MDC	85.7	0.0	100.0	0.0	80.8	0.0
MDC attracts patients	83.9	1.8	91.7	0.0	69.2	3.8

NOTE. Percentages do not add up to 100 because "neutral" responses are not included.

Abbreviation: MDCs, multidisciplinary clinics.

* $P < .05$ compared with surgical oncologist responses.

the patient together. Together, they present the options and a consensus treatment plan to the patient.

Although the MDC of each disease group has its own particular features, the disease group care models tended to cluster into one of these two approaches. In diseases for which concurrent therapies are frequently employed and for which coordination of care is particularly complicated, the concurrent model was frequently used. This model is seen in the thoracic, GI, head and neck, melanoma, sarcoma, and neuro-oncology clinics. In diseases for which sequential therapy was found, coordination of care is generally less complex. This model was used in breast, gynecologic, cutaneous, and genitourinary oncology clinics. In each group, regardless of clinic model (sequential *v* concurrent), a multidisciplinary, case-based tumor board is conducted with members of each discipline in attendance and frequently includes pathologists and radiologists. These conferences tend to review the most difficult cases seen over the previous week and include a mixture of case management and educational components.

Provider Perspectives

Of the 141 respondents to the Web-based survey, approximately 20% were surgeons (response rate 71%), 40% were medical oncologists (response rate 92%), 10% were radiation oncologists (response rate 74%), 20% were nurse practitioners/

physician assistants, 5% were dermatologists, and 5% were other providers. Eighty percent attended a MDC at least once a week. Of that 80%, 20% saw only new patients during these visits; 20% saw both new patients and returning patients with specific issues requiring multidisciplinary evaluation; and 60% saw new patients, returning patients with specific issues, and returning patients for routine follow-up visits.

More than 90% of respondents reported that they enjoyed working in the MDC; less than 1% said that they did not (Table 1). Three quarters of respondents preferred to see new patients in the MDC, whereas less than 4% preferred a different venue. Nearly half thought that practicing in an MDC resulted in more referrals. Providers also perceived that patients appreciated the unique care provided by the MDC (90%) and that patients came to the MDC because it provided the opportunity to see the specialists they needed in a single visit and coordinated manner (80%). Although half thought their MDCs ran efficiently, half were neutral about this or thought the clinics did not run efficiently. Similarly, one third indicated that the clinics were not an efficient use of their time.

The interviews with providers corroborated these concerns about efficiency. Surgeons, in particular, were less likely than other providers to believe that MDCs ran efficiently or were an efficient use of their time (Fisher's exact test $P < .05$; Table 2).

Table 3. Rating of MDCs by Clinic Type

Question	Sequential Model (n = 47; %)		Concurrent Model (n = 71; %)	
	Agree	Disagree	Agree	Disagree
MDC runs efficiently	61.7	17.0	45.7	28.6
MDC is efficient use of clinician's time	74.5	6.4*	62.5	22.2
Clinician enjoys working in MDC	91.5	0.0	90.0	1.4
Clinician prefers to see new patients in MDC	72.3	2.1	84.3	4.3
MDC allows clinician to provide more comprehensive, coordinated, and appropriate care	85.1	2.1	93.0	0.0
MDC generates more referrals	42.6	12.8	55.7	10.0
Patients appreciate unique care of MDC	76.6*	0.0	97.2	0.0
MDC attracts patients	72.3*	0.0	88.7	2.8

NOTE. Percentages do not add up to 100 because "neutral" responses are not included.

Abbreviation: MDCs, multidisciplinary clinics.

* $P < .05$ compared with concurrent clinic responses.

Table 4. Patient Satisfaction by MDC Model, Measured Using Press-Ganey Patient Satisfaction Scores

Question	Sequential Model		Concurrent Model	
	Mean	Range	Mean	Range
Degree to which staff worked together to provide care	93.4	91.7-94.2	92.6	91.2-95.4
Level of care coordination among doctors	93.7	93.0-94.6	93.5	92.3-95.3
Overall care received	95.8	95.4-96.7	95.7	94.7-97.0
Likelihood of recommending services to others	96.8	96.6-97.5	96.8	95.7-97.9

Abbreviation: MDC, multidisciplinary clinic.

However, surgeons did report similar degrees of professional satisfaction with the clinics; believed that the MDC allowed them to deliver more comprehensive, coordinated, and appropriate care; and agreed that patients appreciated the care provided by the MDC and came specifically for that coordinated care (Table 2).

We compared the responses of clinicians in MDCs that used sequential models with those using concurrent care models, pooling provider responses (Tables 2 and 3). Providers who worked in concurrent care clinics were more likely to report that their MDC was not an efficient use of their time (Fisher's exact test $P < .05$). In contrast, this group was more likely to report that patients appreciated the care uniquely provided in the MDC and that patients came because of the ability to see their specialists in a coordinated fashion (Fisher's exact test $P < .05$).

Patient Satisfaction

Press-Ganey patient satisfaction scores demonstrated remarkably high and consistent levels of satisfaction for all the MDCs at the cancer center. In aggregate, the scores for the four questions assessed were: the degree to which staff worked together to provide care (93.0%), the level of care coordination among doctors (93.4%), the overall care received at the facility (95.5%), and the more global assessment of the likelihood that patients would recommend services (96.6%). The mean scores for the different MDC models of care and the range of those scores are listed in Table 4. No significant differences in patient

satisfaction scores were seen between individual disease groups or multidisciplinary care models.

Discussion

MDCs at our comprehensive cancer center evolved into two distinct care delivery models: sequential and concurrent. The model that a disease center adopts appears to reflect the relative need for communication and coordination among the different disciplines participating in the care of a patient. Patient satisfaction was uniformly high across the clinics. Providers expressed satisfaction and endorsed many advantages to working in an MDC.

Patients attending sequential model clinics tended to have diseases for which surgery, radiation, and chemotherapy occur at separate and distinct times in the patient's treatment course. Although coordinated transitions of care are needed, these are relatively straightforward, often requiring a single handoff from one discipline to the next at the conclusion of one treatment modality. The need for frequent or complex communication is low. In some cases, the treatment modalities may be mutually exclusive (eg, surgery *v* radiation for early-stage prostate cancer). In other cases, treatment decisions of one discipline cannot be made before completion of another discipline's treatment (eg, chemotherapy after surgery in early-stage ovarian or breast cancer).

In contrast, concurrent clinics appear to have evolved for diseases requiring frequent handoffs between disciplines or for

diseases that require concurrent treatments by different disciplines (eg, combined chemotherapy and radiation therapies). These concurrent clinics require greater coordination and interdependency among providers. They are also perceived to be less efficient than clinics in which such interdependency is not essential. The need for and delivery of such highly integrated care appears to account for providers' perceptions that these clinics provide significant value to patients.

The high level of interaction among providers that is imposed by use of MDCs may come at a cost. Surgeons, in particular, experienced MDCs work inefficiently. Many surgeons at our cancer center see patients in the MDCs as well as in their private offices. In some cases, the surgeons see only new patients in the MDC and returning and postoperative patients are seen in their other offices. They observe that MDCs are frequently ill-equipped for their patients' needs (eg, lacking surgical supplies, bathrooms off exam rooms, and appropriately trained clinical support staff) for the surgeons to function as efficiently as they can in their home offices. Some surgeons complain that they can see eight times as many patients in their surgical clinic than they can in the MDC. Financial pressures for surgeons are more acutely felt on an individual basis than for medical or radiation oncologists in the cancer center studied in this report, who are generally salaried and for whom a slower throughput of patients is not as tightly linked to their incomes.

Three MDCs are conducted in surgical clinics at a sister institution, with medical oncologists attending the clinics to see new patients only. In these cases, the medical oncologists have the same efficiency complaints that the surgeons have when they participate in the MDCs at the comprehensive cancer center. As a corollary, the handful of surgeons who are based at the cancer center, or those who have clinics with dedicated space and the ability to schedule return and new patients during their sessions, were less likely to report that their clinics ran inefficiently. In other words, differences in perceived efficiency between surgeons and their medical and radiation oncology colleagues may reflect inherent differences in the characteristics of their practices and the infrastructure that is available to support them.

Regardless of the multidisciplinary care model, scores for patient satisfaction with coordination of care, the ways in which staff worked together, overall care, and likelihood of recommending services to others were extremely high for all the MDCs we studied. It may be that a ceiling effect was introduced by the Press-Ganey survey design, whereby all groups scored in the highest range of the survey instrument; perhaps that instrument is insufficiently discriminatory to detect a true difference between care models. Alternatively, the equivalence of scores

may support the idea that the different MDCs provide the appropriate level of care coordination for each disease type or possibly that providers will make whatever level of effort is necessary to provide the care patients need. It also may be that patients generally have such poor experiences receiving coordinated medical care that any modicum of perceived coordination exceeds their expectations.⁸⁻¹⁰

In conclusion, MDCs offer a rational, coordinated approach to the assessment and treatment of complex oncologic diseases. Providers recognize the value these clinics offer patients. Providers also perceive value for themselves that comes from working in MDCs, both receiving professional satisfaction and deriving referrals. However, these benefits appear to come at some cost. Surgeons in particular found this setting less efficient than their single-practice clinics, which may be more customized to their practice needs. These inefficiencies may occur for a variety of reasons, but they might be mitigated by efforts to more thoroughly support and integrate surgical practices into the design and function of the clinics. As workforce and financial resources become increasingly limited, aggravating the strains on an already burdened health care system, the dual mandates of preserving value and improving efficiency will require that we strive toward this end.

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Effect of Initiating a Multidisciplinary Care Clinic on Access and Time to Treatment in Patients With Pancreatic Adenocarcinoma

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Abstract

Purpose: Neoadjuvant therapy for pancreatic adenocarcinoma requires referral to multiple specialists before initiating therapy. We evaluated the effect of establishing a multidisciplinary clinic (MDC) for patients with newly diagnosed pancreatic adenocarcinoma on treatment access and time to therapy.

Methods: Patients with newly diagnosed pancreatic adenocarcinoma diagnosed and treated at our center were included. Two patient groups were defined: preclinic represented those patients diagnosed before 2008 and MDC represented those patients diagnosed since 2009 who were treated in the newly created MDC and were initially candidates for neoadjuvant therapy. The primary outcomes were days from diagnosis to first treatment (initiation of chemotherapy or external beam radiation),

days to completion of all required consultations, and number of visits needed before initiation of therapy.

Results: Ninety-seven patients were diagnosed and treated at our medical center from 2003 to 2008; 22 were treated in 2009 after the implementation of the MDC. Compared with the pre-clinic group, patients treated in the MDC had shorter times from biopsy to treatment (7.7 days v 29.5 days, $P < .001$), shorter time to completion of all required pretreatment consultations (7.1 days v 13.9 days, $P < .001$), and fewer visits to complete all consultations (1.1 v 4.3, $P < .001$). Thirty-three percent of patients seen in the MDC enrolled onto clinical research trials.

Conclusion: In patients with pancreatic adenocarcinoma undergoing neoadjuvant therapy, the establishment of a multidisciplinary pancreas tumor clinic led to improved patient access to consultations and shorter time to initial treatment.

Introduction

Pancreatic adenocarcinoma remains a devastating disease, with 5-year mortality rates of approximately 95% and a median time from diagnosis to death of 5 months.¹⁻³ Because mortality rates remain stagnant with the use of up-front operative resection, centers increasingly are treating patients with neoadjuvant chemoradiotherapy before surgery.⁴⁻⁸ Although prospective, randomized comparison with conventional up-front resection is lacking, retrospective studies have demonstrated that neoadjuvant therapy provides better local control of disease and has in specific cases enabled patients with previously unresectable tumors to become candidates for surgery.⁹

Since 2003, our center has almost exclusively used neoadjuvant chemoradiotherapy in patients with resectable or borderline resectable pancreatic adenocarcinoma. This approach is also used in patients with locally unresectable disease in an attempt to “downstage” for possible operative intervention. Be-

fore the initiation of treatment, this therapeutic approach requires endosonographic, pathologic, and radiographic staging, along with medical, surgical, and radiation oncology consultation. In addition, patients are routinely referred for palliative care and nutrition evaluation. Although occasionally these appointments can be scheduled concurrently on the same day, most often patients must present multiple times for consultations before the initiation of treatment. The need to return for multiple visits before initiating therapy, especially in patients who live a long distance from our medical center, can create anxiety, especially if there is a patient perception of treatment delay. Furthermore, scheduling multiple visits can be an inefficient undertaking for administrative staff.

Multidisciplinary care has been increasingly advocated as cancer patients are requiring more complex, multimodality therapy. Multidisciplinary cancer clinics can conceivably facilitate establishment of the correct diagnosis, accurate staging, appropriate therapy, and accrual onto clinical trials.¹⁰⁻¹² Al-