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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 preclinic 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-

though few data exist about the impact of multidisciplinary clinics on important clinical outcomes, one group has reported that after establishing a multidisciplinary pancreatic cancer clinic, 23.6% of their patients had a change in their recommended management and 77.8% of patients enrolled in the National Familial Pancreas Tumor Registry.¹³

In an effort to streamline time to treatment and improve patient access, our center developed a multidisciplinary pancreas tumor clinic (MDC) in January 2009. The clinic meets weekly and is exclusively for patients with newly diagnosed pancreatic adenocarcinoma. It is coordinated by the Pancreas Disorders Center in the section of Gastroenterology and Hepatology and is staffed by medical, surgical, and radiation oncologists; palliative care specialists; clinical nutritionists; and research coordinators.

Our purpose in performing this study was to evaluate the effect of MDC implementation on important process outcomes including days from diagnosis to treatment, days to completion of all required consultations, and number of visits needed before initiation of therapy in patients before and after establishment of the MDC. We hypothesized that patient access and time to treatment would improve after this intervention.

Methods

Patients were retrospectively identified using records from the Dartmouth-Hitchcock tumor board registry, and this study was approved by the Dartmouth Committee for the Protection of Human Subjects (No. 22,134). Patients were categorized into two groups. The preclinic group represents those patients treated at our center for pancreatic adenocarcinoma between 2003 and mid-2008. We chose 2003 as the initial time of enrollment because at that time our center reached a consensus, on the basis of our own studies and those of others, that neoadjuvant treatment was preferred, even for patients with resectable tumors.^{2,4-6} All of these patients were treated exclusively at our center (radiation, chemotherapy, operative intervention, and so on). The MDC group represents those patients who were seen in the MDC from the time of its established in January 2009 to January 2010. All included patients were considered candidates for neoadjuvant treatment; however, not all of the patients underwent this therapy after being seen in the MDC. Patients were excluded from the study if they had been diagnosed at another center; sought another opinion before initiation of treatment at our center; or once diagnosed at our center, sought treatment elsewhere.

Patients referred to the MDC were only those with newly diagnosed pancreatic adenocarcinoma. These patients were referred after endoscopic ultrasound fine needle aspiration of a pancreatic mass. The MDC was coordinated via the Section of Gastroenterology and Hepatology, where most referrals originate, as a result of the preference for endoscopic ultrasound-guided fine needle aspiration for diagnosis.¹⁴ In the morning before the MDC, all patients' cases were presented in the multidisciplinary gastrointestinal tumor board, where their disease was categorized as resectable, borderline resectable, locally unresectable, or metastatic.

The MDC is held every week and is staffed by physicians from medical oncology, radiation oncology, and surgical oncology, as well as palliative care providers and clinical nutritionists. All patients referred to our center for evaluation of newly diagnosed pancreatic adenocarcinoma were seen in the clinic after its implementation. On the basis of recommendations from the MDC, patients were started on either neoadjuvant treatment or best supportive care palliative chemotherapy.

For the purposes of the study, treatment initiation was defined as the first day of chemotherapy or the day of external-beam radiation simulation. Patients underwent neoadjuvant chemoradiotherapy using one of three regimens: (1) cetuximab 400 mg/m² intravenous (IV) once followed by 250 mg/m² IV weekly and gemcitabine biweekly 50 mg/m² IV over 6 weeks with concurrent radiotherapy 54 Gy over 28 fractions; (2) docetaxel 65 mg/m² IV and gemcitabine 4,000 mg/m² IV given on days 1, 15, and 29, followed on day 43 by radiotherapy at 50.4 Gy, with gemcitabine 50 mg/m² IV twice weekly for 12 doses; (3) radiotherapy at 50.4 Gy in 28 fractions, concurrent with gemcitabine 50 mg/m² biweekly for 6 weeks. At the completion of neoadjuvant chemoradiotherapy, most patients underwent pancreaticoduodenectomy. Patients with unresectable or metastatic tumors were offered palliative chemotherapy (Figure 1).

The primary outcomes were the days from diagnosis to therapy, days to completion of all required pretreatment consultations, and number of visits needed before treatment initiation in patients before and after establishment of the MDC. Patient were excluded from analysis if their therapy was delayed because of laboratory abnormalities (ie, elevated liver tests) or delays in scheduling because of patient request. The secondary outcome was the number of patients seen in the MDC who enrolled subsequently in clinical trials.

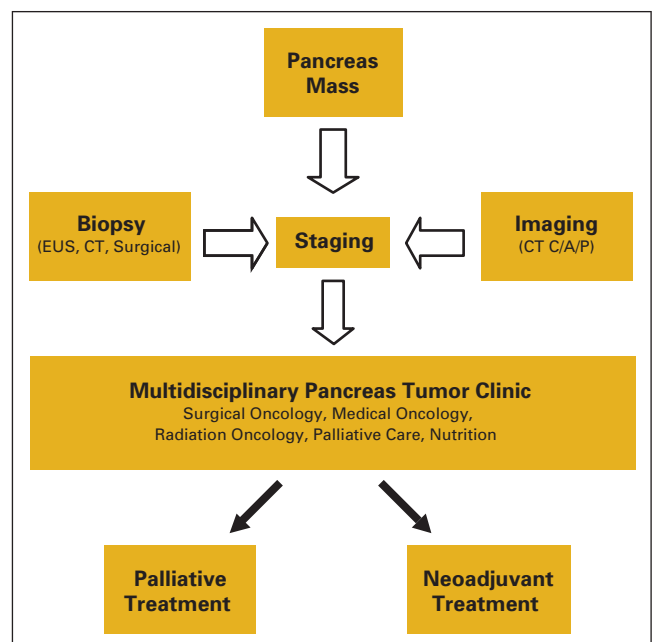


Figure 1. Multidisciplinary pancreas tumor clinic care algorithm.

Table 1. Baseline Patient Characteristics

Characteristic	Preclinic	Multidisciplinary Clinic	P
No. of patients	43	22	
Age, years	63	70	.043
Gender			.072
Male	22	8	
Female	21	14	
Treatment regimen, %*			
Neoadjuvant therapy	91	64	< .001
Palliative therapy	9	36	

* Neoadjuvant therapy was used in patients with resectable, borderline resectable, or locally unresectable (without metastases) disease for downstaging before planned pancreaticoduodenectomy. Regimens included single-agent gemcitabine, gemcitabine and docetaxel, and gemcitabine plus cetuximab. Radiation therapy was used in patients considered appropriate for planned pancreaticoduodenectomy. Palliative chemotherapy was used in patients with metastatic or locally unresectable disease who did not wish to pursue a neoadjuvant approach.

Descriptive statistics were used to characterize our population and are reported as means, standard deviations, and 95% confidence intervals. The two-tailed Fisher's exact test was used to compare categorical variables and the two-tailed Student's *t* test for continuous variables. An alpha level of 0.05% was set for significance. Analysis was performed using Microsoft EXCEL (Microsoft Corporation, Redmond, WA) and Graphpad (Graphpad Software, Inc., San Diego, CA).

Results

From 2003 to mid-2008, we identified 97 patients treated at our center with the intent of pursuing neoadjuvant chemoradiotherapy after the diagnosis of pancreatic adenocarcinoma. Each patient was diagnosed and initiated treatment at our center. For the purposes of the primary outcomes, 54 patients were excluded because they had treatment initiation delayed as a result, for example, of elevated liver tests or patient preference (52) or a desire to seek further consultation elsewhere (two).

From January 2009 to January 2010, 54 patients were seen in the MDC. Of those patients, 27 were either diagnosed at another institution (11), received their initial treatment elsewhere (nine) or did not receive any subsequent therapy after being initially evaluated (seven). Of the 27 remaining patients, five had treatment initiation delayed as a result of either elevated

liver tests that precluded therapy or patient request. This left 22 patients for evaluation in the MDC group.

At each visit to the MDC, patients were seen by medical, radiation, and surgical oncology physicians, along with palliative care and nutrition providers if they were deemed as possible candidates for neoadjuvant treatment. Patients offered palliative chemotherapy were seen by medical oncology, palliative care, nutrition, and occasionally surgical oncology.

Table 1 shows the baseline patient characteristics of the two groups. Patients seen in the MDC were older and less likely to undergo neoadjuvant therapy. As of the writing of the manuscript, six patients had undergone pancreaticoduodenectomy, 10 were undergoing neoadjuvant multimodality therapy or palliative chemotherapy, and six had died (median survival after diagnosis, 6.1 month) in the MDC group. The median survival in the preclinic group was 13.2 months.

The primary clinical outcomes are shown in Table 2. The mean time from biopsy to initiation of treatment in the MDC group was 22 days shorter than in the preclinic group after implementation of the MDC. Consultations were completed in a more timely fashion in the MDC group, and the number of visits to our center before the initiation of treatment was 300% lower in the MDC group.

Thirty-three percent of those patients seen in the MDC enrolled onto a clinical trial at the time of their initial consultations. Accurate data were not available to determine the rate of clinical trial enrollment in patients in the preclinic group.

Discussion

This analysis demonstrates that initiating a multidisciplinary pancreas tumor clinic for patients believed to be candidates for neoadjuvant therapy secondary to pancreatic adenocarcinoma shortens time to treatment, improves wait times for completion of all required consultations, and limits the number of clinic-based visits before therapeutic intervention. The clinic also provides an opportunity for all patients to be seen by palliative care and nutrition services in a coordinated setting. These processes of care improvement are important in patients with such a limited life expectancy. In addition, one third of patients seen in the clinic enrolled onto a research trial.

The multidisciplinary model represents one component of integrated care, which also includes patient centeredness (that patients are actively involved in decisions about their

Table 2. Primary Clinical Outcomes

Outcome	Preclinic (n = 43)		Multidisciplinary Clinic (n = 22)		P
	Mean	95% CI	Mean	95% CI	
Time to first treatment from time of biopsy, days	29.5	27.3 to 31.7	7.7	2.1 to 13.5	< .0001
Completion of all required consultations, days	13.9	12.5 to 15.4	7.1	4.6 to 10.8	< .001
General surgery	7.6				
Radiation oncology	9.2				
Medical oncology	10.9				
Number of visits to complete all consultations	4.3		1.1		< .0001

own care) and organization of care (seamless and continuous care is given with optimal coordination and organization of the total care process).¹⁵ Multidisciplinary clinics have been used effectively in several diseases, such as diabetes and heart failure, but limited data exist that specifically focus on malignancy.^{11,15-18} The only report specifically addressing the effect of a multidisciplinary pancreatic cancer clinic on patient care demonstrated that the coordinated effort in the clinic led to a change in management in one quarter of patients.¹³ However, the article did not highlight any change in important patient process outcomes.

Initiating a neoadjuvant approach in pancreatic adenocarcinoma requires extensive resource allocation and planning. At minimum, patients must receive a tissue diagnosis; appropriate staging, usually with computed tomography and sometimes diagnostic laparoscopy; and serologic testing. Medical oncology, radiation oncology, and surgical oncology consultations need to be completed in the context of patient and familial anxiety about delayed treatment. Palliative care consultation is usually appropriate, as is nutritional evaluation.¹⁹ Furthermore, enrollment in clinical trials can potentially be expedited by having a research coordinator present in the clinic.²⁰

We have discovered advantages to using the MDC model for neoadjuvant disease in several key areas that have the immediate clinical impact of improving the quality of care. The MDC allows efficient scheduling at the time of diagnosis, thus helping to allay patient anxieties with regard to delay of care. One visit spread over several hours, as opposed to multiple short appointments over several days, makes it easier for family members to attend all necessary consultations. Our experience is that patients generally do not feel overwhelmed by seeing multiple providers on the same day. Many of our patients travel several hours to visit the clinic, so having to return for multiple visits can be especially burdensome.

Having a weekly clinic also provides the initial diagnostic clinician with a centralized, standardized referral setting. Treating clinicians have the opportunity to collaborate in the clinic between appointments, thereby improving efficiency and potentially altering treatment decisions through shared discussion. Universally, treating provider satisfaction has improved with the initiation of the MDC. Higher patient volumes also likely contribute to better surgical outcomes, especially given the skills required to maintain proficiency with Whipple resection.²¹ We also have not noted any impediments to multiple providers billing under the same diagnosis on the same day. Finally, the MDC serves as a focal point for research study enrollment, with one third of our patients enrolling onto clinical trials.

This study has potential weaknesses that may limit the clinical application of its results. Because of the aggressive nature of pancreatic adenocarcinoma, we believe improved time to treatment and patient access improves patient satisfaction, but we did not specifically evaluate this outcome. We also did not evaluate whether the MDC resulted in a change in the

number of patients referred to our center. Finally, more patients in the preclinic group underwent neoadjuvant chemotherapy. The reason for this finding is likely the improved quality of care offered by the MDC, as only patients who received all of their care at our center (and therefore underwent neoadjuvant therapy) were included in the preclinic group. Patients in the MDC group were more likely to have palliative therapy administered at our center, probably because of the efficiency of their care.

In conclusion, this study demonstrates that implementing a multidisciplinary pancreas tumor clinic shortened our patient's time to therapy, shortened the time to complete all required consultations, and resulted in a drastic reduction in the number of pretreatment visits. This focused intervention dramatically improved our ability to efficiently evaluate and treat patients with newly diagnosed pancreatic adenocarcinoma. Although implementation of this clinic alone is not likely to result in improved patient mortality, we believe it has improved the quality of care we provide. As neoadjuvant treatment for pancreatic adenocarcinoma is becoming a more popular therapeutic modality, the multidisciplinary clinic model should be considered by high-volume centers.

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Authors' Disclosures of Potential Conflicts of Interest

The authors indicated no potential conflicts of interest.

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A Patient's Perspective on the Multidisciplinary Liver/Pancreas Tumor Clinic: An All-in-One Resort

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My story starts on July 20th when I was at my primary care doctor's office receiving an ultrasound of my gallbladder. I had been experiencing unusual symptoms over the past several months, and up until that day, no one could find the source of my problem. Little did I know that major trouble was lurking in the background and that help would come from the Multidisciplinary Liver/Pancreas Tumor Clinic.

While the technician was performing the ultrasound, I said to her, "That is the spot that hurts. It is right there. Keep digging. You have it!" A few minutes after the test, I consulted with my doctor. The results were not good, and he was concerned that I might have pancreatic cancer.

The next day I had a computed tomography (CT) scan, and that afternoon the phone rang. It was devastating news. My doctor informed me that the radiologist thought I had cancer and that he wanted me to see a surgeon who is a specialist of the liver and pancreas. My appointment was scheduled for the following Monday.

Shortly after my doctor talked to me, the nurse navigator from the Liver/Pancreas Clinic called me to explain all the necessary tests that needed to be done before my appointment.

She also made sure I understood all the details of the tests and how they fit into the decision making of the doctors investigating my case. She scheduled a magnetic resonance imaging (MRI) scan for the next day.

I was heartbroken with the news. The navigator was very reassuring and did not want me to panic. In her calm and sweet voice, she explained to me that they have many pancreatic cancer survivors. She told me that on Monday morning my CT scan, blood work, and MRI would be presented to a team of 50 medical personnel. I felt fortunate and relieved that so many people would be examining my case. I thought "more heads are better than one."

There are many benefits of having a nurse navigator. I was overwhelmed by the news of having pancreatic cancer and was being treated at a huge hospital with several campuses. The nurse navigator was someone I could talk to, and she clearly cared about me. She knew all the necessary connections at the hospital and was able to take a large institution and turn it into a cozy neighborhood. With her guidance, I had an easy time working my way through the hospital, getting the best health care. The nurse navigator translated the expertise of the medical team and gave me confidence. She was the patient advocate who