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Multidisciplinary Reference Centers: A Beneficial Approach for Neuroendocrine Tumor Disease Management

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BACKGROUND

- Neuroendocrine tumors (NET) can be challenging to diagnose and treat as they are a heterogeneous and complex group of malignancies that are uncommon and poorly understood.
- Multidisciplinary care is recommended for the management of patients with complex conditions such as cancer.[1]
- The multidisciplinary reference center (MRC) style of patient management requires a team approach to healthcare that involves all relevant medical and allied health disciplines.[1] Multidisciplinary care for cancer patients has been associated with improvements in diagnosis, treatment planning, survival, patient satisfaction, clinician satisfaction, and financial efficiency.[2,3]
- There is no single, universal model of multidisciplinary care, but most MRCs aim to facilitate multiple consultations during a single patient visit. MRC care also requires robust and continued communication among the healthcare team, typically facilitated by the 'case conference' or 'tumor board' where healthcare providers of different specialties gather to review and discuss the next steps in a patient's treatment.
- Although improved outcomes in ovarian, breast, and lung cancers have been achieved with the MRC approach, MRCs focusing on NET are uncommon. Treatment of patients with NET in a MRC may improve clinical outcome by integrating expert care from multiple specialties, reducing delays in treatments and referrals, facilitating clinical trial enrollment, and improving patient satisfaction.
- This poster will highlight the need for MRC care in rare cancers using the example of NET and provide information regarding the establishment of a MRC at Sunnybrook Odette Cancer Center (OCC) in Toronto, Canada.

METHODS

- A PubMed (Medline) literature search was performed to review the outcomes of patients with cancer that were treated with a multidisciplinary team approach; the potential benefit of multidisciplinary care for the management of patients with NET was assessed.

RESULTS

MRCs and Common Cancers

- Multidisciplinary care for patients with more common cancers has been associated with improvements in diagnosis time, treatment planning, patient satisfaction, and patient survival.
- In a study by Gabel *et al*. of women with breast cancer treated 1 year before or 1 year after the opening of a multidisciplinary breast cancer clinic (MDBCC), those who received MRC care had significantly decreased time between diagnosis and the initiation of treatment (42.2 days vs 29.6 days; $P<0.0008$) that remained significant after patients in the multidisciplinary clinical group that underwent lumpectomy (diagnosis to treatment time = 0 days) were excluded ($P<0.001$). Additionally, MDBCC patients reported increased patient satisfaction.[4]
- Among women with breast cancer, better survival rates were achieved by women under the management of clinicians seeing >30 new patients/year with access to a multidisciplinary setting.[5] High-volume centers appear to yield better management and survival.
- A retrospective study of patients in England with head and neck cancer treated in 1996–1997 and 1999–2000 compared the 2-year survival of patients treated in the period prior to, and after, the standards for the treatment of head and neck cancer care were changed to include a multidisciplinary approach. Management at a multidisciplinary clinic led to improved 2-year survival. The overall 2-year survival was 64.1% in 1997 and 65.1% in 2000.[6]
- The results of a study by Forrest *et al*. comparing patients with inoperable non-small-cell lung cancer (NSCLC) treated prior to the introduction of multidisciplinary team care (1997) versus those treated after multidisciplinary care was introduced (2001) demonstrated that patients were significantly more likely to receive chemotherapy (7% vs 23%; $P<0.001$) and achieved significantly lengthened median survival time (3.2 months vs 6.6 months; $P<0.001$) when treated with a multidisciplinary approach.[7]
- A study of women with ovarian cancer found that management at a multidisciplinary clinic led to a significant 5-year survival advantage (35.4% vs 19.2%; $P<0.001$) that remained significant after adjusting for different rates of chemotherapy utilization ($P<0.01$).[8]

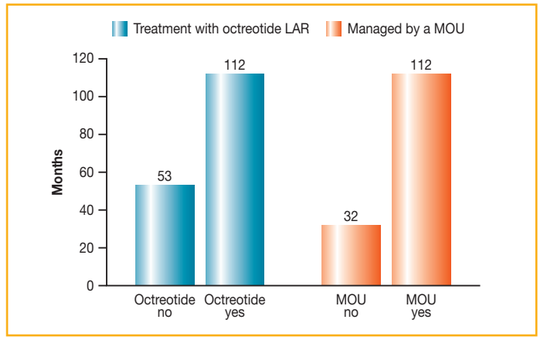
Table 1. The Impact of Multidisciplinary Treatment on Common Cancers; Significant Advantages in Patient Outcomes

Common cancer type	Advantage of multidisciplinary treatment
Breast cancer	Patients demonstrated a reduced time from diagnosis to treatment (42.4 days vs 29.6 days; $P<0.0008$)
Head and neck cancer	2-year survival rates were improved (65.1% vs 64.1%)
NSCLC	Median survival time was significantly lengthened (6.6 months vs 3.2 months; $P<0.001$)
Ovarian cancer	5-year survival rates were significantly improved (35.4% vs 19.2%; $P<0.001$)

MRCs and NET

- A single-center analysis of treatment patterns and survival of patients with metastatic NET managed by a medical oncology unit (MOU; a MRC surrogate) determined that management through a MOU and increased use of long-acting somatostatin analogs contributed to improved patient outcome.
  - Compared with patients managed by individual specialists (n=21), MOU patients (n=28) had better disease monitoring, were frequently enrolled in clinical trials (0% vs 7%), had an increased likelihood of treatment with chemotherapy (0% vs 7%), and were more likely to receive octreotide LAR (10% vs 79%)[9]
  - The median survival for patients who received octreotide LAR was 112 months compared with 53 months for those who did not ($P=0.021$, hazard ratio: 2.46). The median survival of patients managed by a MOU was 112 months, compared with 32 months for those managed by another specialty service (Figure 1)[9]

Figure 1. Median Survival of Metastatic Intestinal NET Patients



- In a single-center analysis of 146 patients with metastatic intestinal NET treated with multidisciplinary care, median survival from time of diagnosis of distant metastases was 103 months (95% CI 88–118 months; range 8–250+ months), the absolute 5-year survival rate was 75%, (95% CI 67–81%), and the 10-year survival rate was 38% (95% CI 28–47%) [Table 2] which represents a favorable outcome from multidisciplinary care. Patients with an identifiable mid-gut primary tumor reported a median survival of 110 months which represents the longest life expectancy documented in published reports of metastatic NET.[10]

Table 2: Survival Rates from Time of Diagnosis of Metastasis

Time	Survival (%)
103 months (median)	50%
60 months (5 year)	75%
120 months (10 year)	38%

DISCUSSION

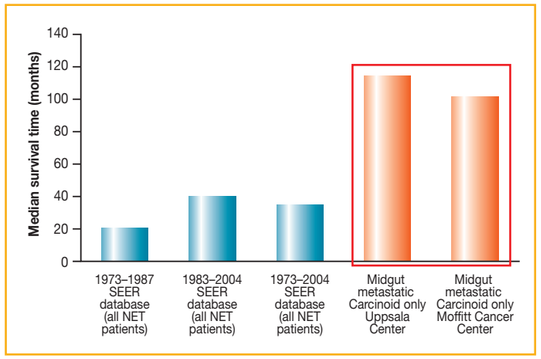
Treatment Guidelines Recommend a Multidisciplinary Treatment Approach

- A NET-carcinoid summit organized in 2007 by the US National Cancer Institute determined that there is: (1) a lack of access to sensitive and specific imaging to diagnose NET; (2) variable local resources and expertise in treatment; and (3) a paucity of high-quality clinical trials.[11] The consensus was to encourage the development of regional MRCs and to establish multicenter clinical trials.
- The 2009 National Comprehensive Cancer Network (NCCN) clinical practice guidelines for NET state that: "The appropriate diagnosis and treatment of neuroendocrine tumors requires collaboration between specialists in multiple disciplines, using specific biochemical radiologic, and surgical methods. Specialists include pathologists, endocrinologists, radiologists, as well as medical, radiation, and surgical oncologists."[12]
- The North American Neuroendocrine Tumor Society (NANETS) has developed treatment guidelines in which multidisciplinary care is highlighted as the most effective management strategy.[13] However, development of treatment guidelines is distinct from the development of MRCs that deliver integrated care.
- The following organizations have recently updated their treatment recommendations and now recognize the benefit of a multidisciplinary treatment approach:
  1. European Neuroendocrine Tumor Society[14]
  2. North American Neuroendocrine Tumor Society[13]
  3. Canadian consensus guidelines[15]
  4. National Comprehensive Cancer Network[12]
  5. Nordic guidelines for diagnosis and treatment of NET[16]

Multidisciplinary Approach Can Optimize Patient Outcomes

- Multidisciplinary centers are associated with improved survival for patients with NET.
- Median survival of patients with metastatic NET treated at 'centers of excellence' is ≥3 times higher than median survival of patients with NET in the SEER database (Figure 2).

Figure 2. Comparison of Median Survival of NET Patients



Successful NET MRC Structure

- The establishment of the NET MRC at Sunnybrook OCC in Toronto, Canada established an improved method for patient care.
- The MRC approach addresses the needs of patients with NET beginning with a review by both medical and surgical oncology teams to formulate a coordinated treatment plan. An integrated, individualized management plan for the NET patient includes input from endocrinology, diagnostic radiology, and interventional radiology with the objective of developing a treatment plan that is discussed with the patient and conveyed and discussed with the referring doctor.[17]
- In contrast to the typical flow of patient care which may or may not involve collaboration (Figure 3a), patients treated with the multidisciplinary treatment approach experience consistent assessment by multiple arms of care, improved coordinated decision making, and a reduced chance of duplicated tests and/or contradictory plans of care (Figure 3b).[17]

Figure 3a. Typical Flow of Care for a NET Patient Without Integrated Care

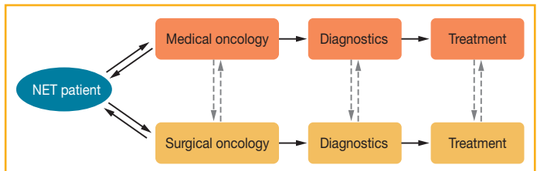
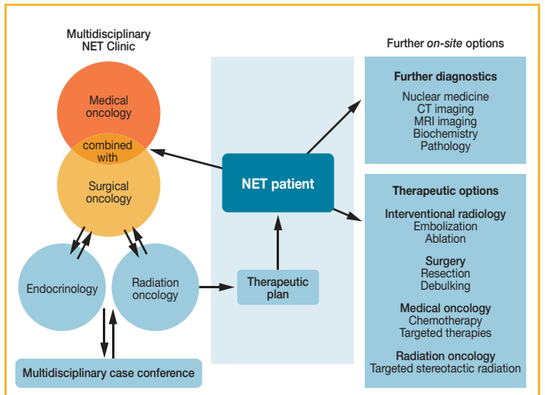


Figure 3b. Patient-centered Flow of Care in the Multidisciplinary NET Clinic



CONCLUSIONS

- **Multidisciplinary treatment is recommended by recent treatment guidelines and should be a goal of healthcare systems.[17]**
- **NET treatment in a MRC can improve patient outcomes, including reducing the time between diagnosis and treatment and increasing patient survival time.**
- **MRCs dedicated to NET will not only further research in the area of NET by facilitating enrollment in large randomized trials, but have the added benefit of providing patients with new treatment options that would not be available in a non-MRC setting.**

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