Survival of Patients with Neuroendocrine Tumors in Ontario over last 15 years

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Background

- Increasing incidence of neuro-endocrine tumors (NETs) have been shown worldwide
- Recent data has confirmed a greater that 2x increase in NETs incidence from 1994-2009 in the province of Ontario, Canada (pop of approx 13 million people)
- Little is known about trends in survival or factors associated with survival during this period among this population

Objective

- To examine survival and associated prognostic factors of NETs patients in Ontario, Canada from 1994-2009

Methods

- A population based study was initiated using the Ontario Cancer Registry (OCR), cross-linked with the Registered Persons Database and the Canadian Institute of Health Information (CIHI) Discharge Abstract Database
- All NETs diagnosed between January 1994 and December 2009 were collected using ICD-9 diagnostic codes and ICD-O histology codes
- Baseline demographic, clinical and outcomes data were abstracted
- Overall Survival (OS) was calculated using Kaplan-Meier methodology and comparison between the groups was performed with long-rank test
- A multivariate model using Cox proportional-hazards regression was employed to test for factors independently associated with survival

Results

- A total of N=5619 cases were identified
- The 5-y OS among age groups: ≤ 50 (79%), 51-60 (67%), 61-70 (59%) and ≥ 71 (39%) [p < 0.0001]
- 5-year OS was compared for patients with and without metastatic disease after diagnosis (69.0% vs 40.1%, p<0.0001)

Table 1:
Probability of Recurrence-free Survival (RFS) and overall survival (OS)

	RFS	OS
One Year	0.81	0.81
Five Year	0.71	0.61
Ten Year	0.65	0.47

Figure 2: Overall survival of NET patients with adjustment for age by sex

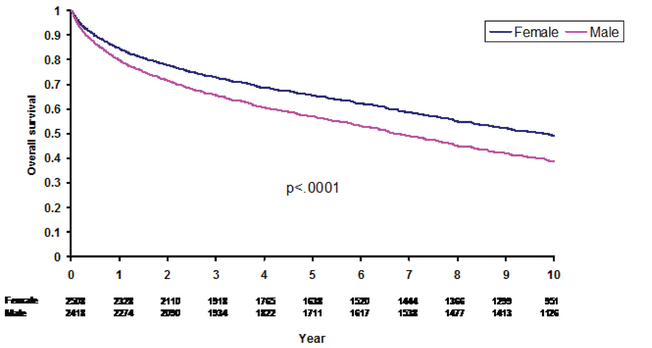

Figure 1: Age-adjusted Overall Survival of NETs patients, by cancer primary site.

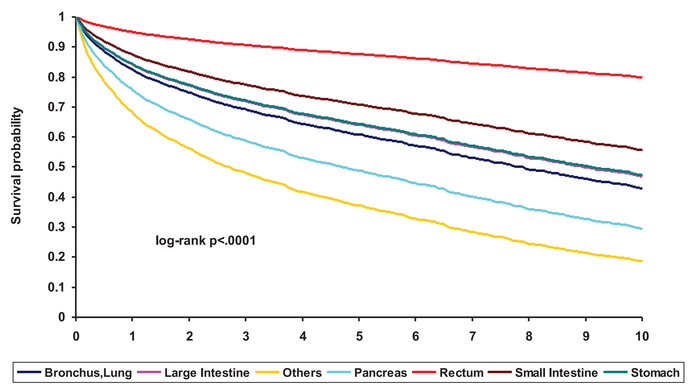

Figure 3: Multivariate analysis of survival (Cox proportion model)

Variable		Hazard Ratio (95% CI)	p value
Male		**1.296 (1.188-1.415)**	<.0001
Age		**1.042 (1.038-1.045)**	<.0001
Income quintile (ref=5th)	1	**1.249 (1.093-1.428)**	0.0011
	2	1.088 (0.949-1.247)	0.2244
	3	0.983 (0.856-1.127)	0.8016
	4	1.088 (0.949-1.249)	0.2265
Cancer recurrence		**1.901 (1.737-2.082)**	<.0001
Rural resident		**1.129 (1.000-1.275)**	0.0499
Primary site (ref=Bronchus, Lung	Small Intestine	**0.587 (0.507-0.679)**	<.0001
	Rectum	**0.343 (0.269-0.437)**	<.0001
	Large Intestine	0.940 (0.807-1.093)	0.4197
	Pancreas	**1.396 (1.198-1.627)**	<.0001
	Stomach	0.819 (0.653-1.028)	0.0848

Discussion

- Survival among NETs patients decreases over time with less than 50% survival at 10 years
- Poor outcome factors include male sex, age of diagnosis, pancreatic primary, rural status and low income quintile
- The decreased survival among male patients is poorly understood and needs to be explored further
- It is possible that rural residence and low income may be related to decreased access to health care resources and possibly delayed diagnosis or sub-optimal treatments in this uncommon malignancy

Conclusion

- Survival appears to vary significantly according to anatomical site along with some demographic and socioeconomic factors
- Efforts should be made to promote awareness of this disease and to offer access to specialized health care for NET patients living in remote areas

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