Diagnostic discrepancies between second-opinion and referring pathology reports of neuroendocrine tumors

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Introduction

The nomenclature and histologic classification schemes for neuroendocrine tumors (NETs) have historically been heterogeneous and inconsistent. However, clinicians require specific descriptors to determine treatment plans for patients.

Klimstra, *et al*. published a set of NET pathology reporting guidelines (2010). Using these guidelines, we undertook a systematic evaluation of discrepancies between referring versus Stanford second-opinion NET pathology reports.

Methods & Materials

Study period: April 1998 – December 2012
Tool: Stanford Cancer Center Research Database

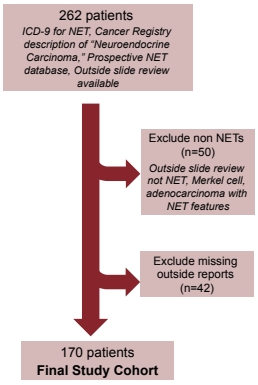


Table 1: Variables examined in pathology reports

Primary site	Mitotic rate
Anatomic site of tumor	Ki-67 labeling index
Diagnosis	Presence of multicentric disease
Specimen type	Presence of nonischemic tumor necrosis
Size	Resection Margins (positive/negative)
Unusual histologic features	Extent of invasion
Chromogranin, synaptophysin staining	Presence of vascular invasion
Grade	Presence of perineural invasion
Degree of Differentiation	Lymph node metastases
TNM staging	Pathologist and Institution

Results

Table 2: Demographics

Variable	n	%
Sex		
Male	76	45
Female	94	55
Mean Age (years)	57	
Race		
White	111	65
Asian	17	10
Black	6	4
Hawaiian/Pacific Islander	2	1
Other / Unknown	34	20
Primary sites		
Pancreas	47	28
Small intestine	29	17
Large intestine/ appendix	12	7
Lung & Bronchus	16	9
Other / Unknown / Missing	66	39
Specimen Type		
Core Biopsy	96	56
Resection	43	25
Fine Needle Aspirate	29	17
Other	2	1

Figure 1: Histology Discrepancies

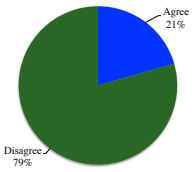
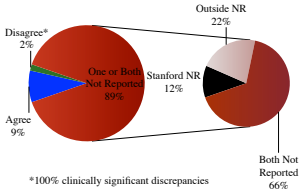


Table 3: Histology Discrepancies

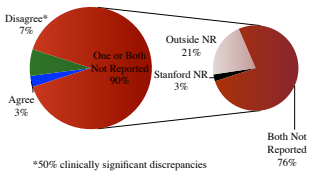
	Stanford	Outside
Unique terms used	14	49
Insignificant discrepancies	89 (66%)	
Significant discrepancies	46 (34%)	

Figure 2: Grade Discrepancies



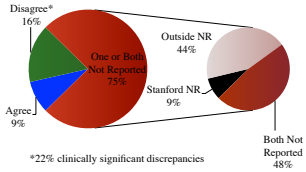
*100% clinically significant discrepancies

Figure 3: Ki-67 Discrepancies



*50% clinically significant discrepancies

Figure 4: Mitotic Index Discrepancies



*22% clinically significant discrepancies

Table 4: Agreements and discrepancies by year of diagnosis

Variable	1998-2002 (n=3)			2003-2007 (n= 35)			2008-2012 (n= 132)		
	Reported (%)		One or Both Not Reported (%)	Reported (%)		One or Both Not Reported (%)	Reported (%)		One or Both Not Reported (%)
	Agree	Disagree		Agree	Disagree		Agree	Disagree	
Histology	0	100	0	14	86	0	23	77	0
Grade	0	0	100	0	0	100	11	2	86
Ki-67	0	0	100	0	3	97	4	8	88
Mitotic Index	0	0	100	0	11	89	11	17	71

Table 5: Agreements and discrepancies by type of outside institution

Variable	Academic Hospital (n= 29)			Non-Academic Hospital (n= 139)		
	Reported (%)		One or Both Not Reported (%)	Reported (%)		One or Both Not Reported (%)
	Agree	Disagree		Agree	Disagree	
Histology	24	76	0	20	80	0
Grade	10	3	86	9	1	91
Ki-67	10	7	83	1	7	91
Mitotic Index	17	24	59	7	14	78

Table 6: Agreements and discrepancies by Stanford Pathologist

Variable	Stanford NET Pathologist (n=83)			Stanford General Pathologist (n=87)		
	Reported (%)		One or Both Not Reported (%)	Reported (%)		One or Both Not Reported (%)
	Agree	Disagree		Agree	Disagree	
Histology	17	83	0	24	76	0
Grade	10	2	88	8	1	91
Ki-67	5	5	90	1	9	90
Mitotic Index	13	17	70	5	15	80

Conclusions

Clinically relevant differences were frequently found between Stanford and referring NET pathology reports.

- Most Histological Diagnoses were discrepant, a third (34%) of which were clinically significant.

For the variables Grade, Ki-67, and Mitotic Index, most were not reported by one or both institutions.

- Of those specimens missing a reported value by just one institution, the majority were missing reported values from the outside institution.
- Reporting improved over time for these variables.
- Reporting was slightly better for academic hospitals.
- Reporting was slightly better for Stanford NET pathology experts.

Future studies of NET pathology discrepancies are warranted to allow additional time for adoption of the 2010 guidelines.

References

1. Klimstra DS, Modlin IR, Adsay NV, *et. al*. "Pathology Reporting of Neuroendocrine Tumors: Application of the Delphic Consensus Process to the Development of a Minimum Pathology Data Set." The American Journal of Surgical Pathology 34.3 (2010): 300-13.
2. Klimstra DS, Modlin IR, Coppola D, *et. al*. "The Pathologic Classification of Neuroendocrine Tumors." Pancreas 39.6 (2010): 707-12.

Acknowledgements

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