Pattern and Clinical Predictors of Lymph Node Involvement in Neuroendocrine Neoplasms of the Pancreas

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Background: Well differentiated pancreatic neuroendocrine neoplasms (PNENs) are often indolent neoplasms without pathological lymph node metastasis (pN1). Therefore, in patients with low risk of pN1, surgery can be limited and a lymphadenectomy could be avoided.. Well differentiated pancreatic neuroendocrine neoplasms (PNENs) are often indolent neoplasms without pathological lymph node metastasis (pN1). Therefore, in patients with low risk of pN1, surgery can be limited and a lymphadenectomy could be avoided. Well differentiated pancreatic neuroendocrine neoplasms (PNENs) are often indolent neoplasms without pathological lymph node metastasis (pN1). Therefore, in patients with low risk of pN1, surgery can be limited and a lymphadenectomy could be avoided.

Methods: The combined prospective databases from the Surgical Department of the University of Verona and the Beaujon Hospital were queried. Clinical and pathological data of all patients with resected (R0 or R1), pathologically confirmed non-functioning PNEN between 1993 and 2009 were retrospectively reviewed. Multiple logistic regression analysis was performed.

Results: Data were analyzed for 194 patients who underwent resection in both departments. Metastases were present in the dissected lymph nodes of 58 patients (30%). The 5-year disease free survival for patients with pN1 was significantly lower than for those without nodal metastases (66% vs 93%, *P*<0.0001). Multivariable analysis suggested the significant independent factors associated with pN1 were radiological nodal status (rN) (odds ratio 3.4, P=0.008), localization in the pancreatic head (odds ratio 3.4, *P*=0.002) and the degree of differentiation (G2 vs G1 odds ratio 3.5, *P*=0.001). Overall, the 94% of patients with rN0 PNEN-G1 of the body were pN0. When the degree of differentiation was excluded, on multivariable analysis rN1 (odds ratio 4.1, *P*=0.001), localization in the pancreatic head (odds ratio 3.2, *P*=0.002), and radiological size > 4 cm (odds ratio 2.5, *P*=0.012) were independent predictors of pN1. Both the predictive models showed the area under the ROC curve to be 80%.

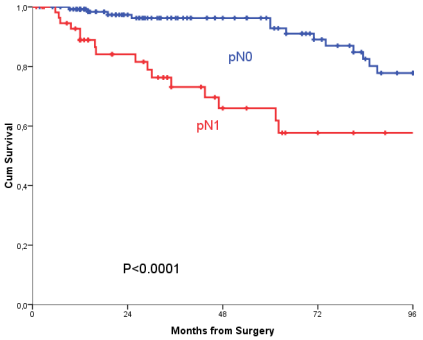

Figure 2:
Comparison of DFS between pN0 and pN1 patients with PNEN after resection with curative intent

	Odds Ratio	95% CI		P (Multivariable)
Site of neoplasm				
Body/tail	1			0.002
Head	3.406	1.565	7.412	
LN mets on CT				
No	1			0.008
Yes	3.416	1.377	8.747	
WHO classification				
NET-G1	1			0.001
NET-G2	6.338	2.087	19.254	

Table 2:
Multivariable analysis of clinical predictors of pN1 in PNEN

	Hazard Ratio	95% CI		P (Multivariable)
Resection margins				
R0	1			
R1	5.628	1.671	18.958	0.005
Liver metastases				
No	1			0.007
Yes	3.653	1.437	9.285	
WHO classification				
NET-G1	1			
NET-G2	6.338	2.087	19.254	0.001
Lymph node status				
N0	1			0.045
N1	2.291	1.019	5.154	

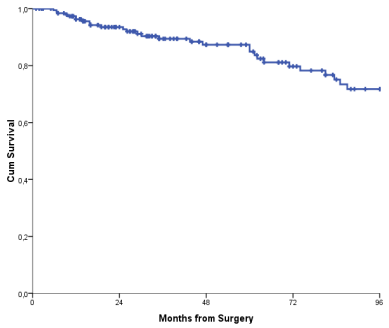

Table 1: Multivariable analysis of predictors of disease free survival after resection for PNEN
Figure 1: Disease free survival of the entire cohort

Conclusion: Patients with PNEN-G1 of the pancreatic body, in the absence of radiological node involvement, have a very low risk of pN1. In patients with PNET-G2, lymph node dissection should be performed in an attempt to better stage the disease and prevent recurrence. When a preoperative cytological diagnosis is not achieved, the radiological size of the lesion is a powerful alternative predictor of pN1. The analyses demonstrate that the risk of pathological nodal involvement in PNEN patients can be estimated by a clinical predictive model. Further testing on an independent data set is desirable. .