

Title: Evaluation of the Current Treatment Strategies for Pancreatic Neuroendocrine Tumors <1 cm

Background: The management of pancreatic neuroendocrine tumors (PNET) varies between observation (O), pancreatic resection (PR) and enucleation (E). Currently, size, grade and location are used to determine which treatment strategy may be employed. We sought to evaluate each strategy and further clarify the role for surgery.

Methods: Utilizing the National Cancer Database we identified patients with pancreatic neuroendocrine tumors and stratified based upon size <1cm. Mann-Whitney U and Kruskal were used to compare continuous variables and Pearson's Chi-square test was used to compare categorical variables. Unadjusted survival analyses were performed using the Kaplan-Meier method. Multivariate analysis (MVA) was performed to identify predictors of survival. All statistical tests were two-sided and $p < 0.05$ was considered significant.

Results: We identified 1,214 patients with a median age of 62 (18-90). There were 540 (44.5%) males and 674 (55.5%) females, $p < 0.001$. Tumors were more often located in the body/tail 54.1% vs head 19.2% or other 26.7%, $p < 0.001$. Tumors were well differentiated (WD) 61.8% vs 6.9% poorly differentiated (PD), $p < 0.001$. Patients were treated via PR 749(61.7%), E 79(6.5%), or O 386 (31.8%), $p < 0.001$. Node positive disease was identified in 1.2% of patients. R0 resections were performed in 90.6% of patients. Univariate and multivariate analysis revealed age $p < 0.001$, tumor location $p < 0.001$, grade $p < 0.001$, stage $p < 0.001$, and surgery (E or PR) $p < 0.001$ were all predictors of survival. The median and 5-year survival in the O group with WD tumors was not reached (NR) (77%) vs 142.6 months (87%) in the surgery groups, $p < 0.04$. Similarly in the PD tumors the median and overall survival was 32.9 months and 24% in the O vs NR and 81%, $p < 0.001$ in the surgery cohort. There were no differences in survival in patients undergoing PR or E, $p = 0.09$.

Conclusions: While observation is an acceptable option for the management of small <1cm WD PNET, we found an improvement in survival in the patients undergoing surgery. Enucleation and pancreatic resection did not differ in overall survival. Surgery for PNET should be considered as the first line treatment of these patients.