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Improvements in long-term survival for neuroendocrine neoplasm patients (2000-2025) reflecting over 2000 cytoreductive surgeries

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BACKGROUND

This study evaluated the impact of a dedicated surgical program on the outcomes of patients with neuroendocrine tumors (NETs). Because NETs are slow-growing and patients often survive for decades after surgery, long-term survival may be underrepresented in low-volume centers or multi-institutional meta-analyses. In 2017, our group published a single-center experience from 1000 cytoreductions (2000-2016). Since 2017, an additional 1010 cytoreductions have been performed, creating the largest single-institution report to date. We evaluated whether: 1) extended surveillance or increased cohort size impacts the accuracy of computed surgical survival, 2) overall survival has increased over the last quarter century, and 3) survival differs between surgical and non-surgical NET patients.

METHODS

Our institution's Neuroendocrine Cancer Program maintains a database of >9,000 treated patients using electronic medical records and Social Security master death database. Overall survival, length of follow-up, primary and metastatic tumor location, and demographic information were analyzed using Kaplan-Meier curves to calculate median overall survival (mOS) and 10-year survival.

RESULTS

(i) Effect of extended surveillance on original (2000-2016) cohort mOS (n=790): Follow-up increased from 11±8yrs to 15±4yrs, capturing an additional 240 deaths (469 total). Despite these additional data, computed mOS for pancreatic NET (PNET) (122 months, N=89) and Small Bowel NET (SB-NET) (172months, N=569) patients was not significantly different from previously published results. (ii) Impact of expanding the surgical cohort (2000-2025)(N-1611) on mOS: Ninety-day postsurgical mortality was 1.14%. Follow-up was 14±7yrs. PNET (N=387) mOS increased to 139 months (p=0.01) with a larger cohort (387 vs 89). In contrast, increasing the SB-NET cohort (N=964) did not affect mOS (173months). (iii) Improvements in overall survival: Ten-year survival for surgical PNET and SB-NET patients diagnosed between 2015-2025 (67%, 74%) was significantly greater compared to patients

diagnosed between 2007-2025 (58%, 65%) ($p<0.01$). No improvement was observed in non-surgical patients. (iv) Surgical vs non-surgical outcomes: Ten-year survival was significantly greater in surgical patients for PNET (58% vs 33%) and SB-NET (65% vs 56%) than in non-surgical patients ($p<0.01$).

CONCLUSIONS

Surgical cytoreduction in NET patients has low morbidity/mortality rates and results in extended survival. A larger PNET cohort more accurately calculated survival. Survival improved over 25-years, likely reflecting improvements in perioperative management. Surgical cytoreduction should play a major role in NET patient care. Accurate evaluation of survival is difficult without access to large, standardized subspecialty cohorts. Decades of comprehensive surveillance is required for statistical power.

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