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Long-term Survival Outcomes After Minimally Invasive Surgery for Ileal Neuroendocrine Tumors

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BACKGROUND

Ileal neuroendocrine tumors (i-NETs) are characterized by their multifocality and bulky mesenteric mass. Although various guidelines mention possible benefits of using minimally invasive surgery (MIS) for i-NETs, none offer recommendations regarding specific techniques or established criteria for patient selection. Having shown that MIS utilizing a hand-access port device has favorable short-term outcomes and achieves the goals of surgery for i-NETs, we sought to analyze long-term survival outcomes of MIS.

METHODS

One hundred sixty-eight patients who underwent resection of primary i-NETs at a single institution between January 2007 and February 2023 were retrospectively studied. Patients were categorized into the MIS or open surgery cohort on an intention-to-treat basis. Open surgery was selected mainly based on the need for hepatectomy or bulky mesenteric mass resection. Overall survival was analyzed using log-rank tests with propensity-score matching (PSM) and Cox proportional hazards regression. PSM was performed to reduce standardized mean differences of the variables to less than 0.2.

RESULTS

One hundred twenty-nine (77%) patients underwent MIS and thirty-nine (23%) underwent open surgery. Twenty-seven MIS patients were converted to an open procedure. The median follow-up time was 49 mos (IQR = 23, 87 mos). In the PSM cohorts, overall survival did not differ significantly between the MIS and open surgery cohorts (median 99 mos [95% CI 91–NA] vs. 103 mos [86–NA]; $p = 0.77$, HR 0.87 [95% CI 0.33–2.2]; $p = 0.77$).

Table. Surgical outcomes in the propensity-score-matched cohorts.

		Surgical Procedure, N (%)		
Characteristic	N	Open, N = 31	MIS, N = 55	p-value*
Incomplete mesenteric lymph node dissection	86	6 (19)	10 (18)	1
Microscopically positive mesenteric margin	86	5 (16)	11 (20)	0.77
Complete mesenteric lymph node dissection	86	20 (65)	34 (62)	1
Estimated blood loss (ml), median (IQR)	82	100 (35,150)	50 (20,100)	0.0071
Postoperative complications ≥ G3	86	2 (6.5)	2 (3.6)	0.9
Length of stay (days), Median (IQR)	86	6 (5, 7)	5 (4,7)	0.098
Survival status Dead	86	7 (23)	13 (24)	1
Follow-up months, Median (IQR)	86	46 (16, 82)	53 (33, 79)	0.31

SSA, Somatostatin analogue; PRRT, Peptide receptor radionuclide therapy.

* Wilcoxon rank-sum or Fisher's exact test were used.

CONCLUSIONS

MIS is an alternative to open surgery for i-NETs, achieving similar short- and long-term oncological outcomes, and less blood loss. Bulky mesenteric mass and plan for concurrent liver resection are potential criteria for open surgery.

ABSTRACT ID 28492