

Evaluating nationwide application of minimally invasive surgery for small bowel neuroendocrine neoplasms and the impact on survival

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Background: Open surgery for small bowel neuroendocrine neoplasms (SB-NEN) is still considered standard of care, mainly because of frequently encountered multifocality and central mesenteric masses. The aim of this study was to evaluate surgical approach for SB-NEN at a national level and to determine predictors for overall survival.

Methods: Patients with SB-NEN who underwent surgery between 2010-2015 were included from the Netherlands Cancer Registry. Patient and tumour characteristics were compared between laparoscopic and open approach. Overall survival was assessed by Kaplan-Meier and compared with the Log-rank test. Independent predictors were determined by Cox proportional hazards model.

Results: In total, 482 patients were included, of whom 342 (71%) underwent open and 140 (29%) laparoscopic surgery. Patients in the open surgery group had significantly more multifocal tumours resected (24% vs. 14%), pN2 lymph nodes (15% vs. 6%) and stage IV disease (33% vs. 20%). Overall survival after open surgery was significantly shorter compared to laparoscopic surgery (3-year: 81% vs. 89%, 5-year: 71% vs. 84%, $P=0.004$). In multivariable analysis, age above 60 years (60-75, HR 3.38 (1.84-6.23); >75 (HR 7.63 (3.86-15.07)), stage IV disease (HR 1.86 (1.18-2.94)) and a laparoscopic approach (HR 0.51 (0.28-0.94)) were independently associated with overall survival, whereas sex, multifocal primary tumour, grade and resection margin status were not.

Conclusion: Laparoscopy was the approach in 29% of SB-NEN at a national level with selection of the more favorable patients. Laparoscopy remained independently associated with better overall survival besides age and stage, but residual confounding cannot be excluded.

Lay abstract

Open surgery (by means of a big abdominal incision) for small bowel neuroendocrine tumors is still considered standard of care, mainly because of the complexity of removal of these tumors. Although minimally invasive surgery has gained acceptance as a standard approach for other abdominal cancers, it is still not widely accepted for small bowel neuroendocrine tumors due to the complexity of the procedure. Current guidelines do not give clear selection criteria regarding the decision to operate with either an open or minimally invasive approach. Implementation of minimally invasive surgery might be beneficial, as it is associated with better recovery (i.e. shorter hospital stay and less complications after surgery). The aim of this study was to evaluate surgical approach (open or minimally invasive) for small bowel neuroendocrine tumors at a national level and to determine predictors for survival after surgery. Data was collected from the Netherlands Cancer Registry, which contains all cases of cancer in The Netherlands. A total of 482 patients were included of whom 342 (71%) underwent open and 140 (29%) minimally invasive surgery. Minimally invasive surgery had at least similar survival outcomes as patients who underwent open surgery. Hence, no major concerns emerge from the current data and we therefore propose that guidelines should adapt their recommendations such that more patients are amenable for minimally invasive surgery.