

Celiac Plexus Neurolysis vs Opioid Initiation as First-Line Therapy in Unresectable Pancreatic Cancer: Comparing Opioid-Induced Respiratory Failure and Symptom Burden

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Introduction

Unresectable pancreatic cancer causes severe pain that affects daily activities. Opioids are the main treatment for cancer pain but can cause significant side effects, including respiratory failure, dependence, constipation, nausea/vomiting, and lower survival rates [1]. Opioid-related respiratory failure is a serious, yet potentially preventable, complication. Celiac plexus neurolysis is used as an adjuvant treatment for refractory pain [2], but its effect on respiratory failure has not been previously studied.

Methods:

A retrospective cohort study was performed using TriNetX comparing patients with unresectable pancreatic cancer who received early celiac plexus neurolysis with those managed exclusively with opioid therapy. Patients with unresectable pancreatic cancer who received early celiac plexus neurolysis (CPN; n=349) were compared with those managed exclusively with opioid therapy (n = 36,130). The index event was the first diagnostic code for pancreatic malignancy, with outcomes assessed one day after diagnosis. The primary outcome was opioid-induced respiratory failure while secondary outcomes included unrelated respiratory failure, opioid analgesic use, constipation, and nausea/vomiting.

A total of 36,479 patients met the initial inclusion criteria. After applying all eligibility criteria, 33,156 patients were included in our analysis. Following 1:1 propensity score matching, 310 patients from each cohort were included. Baseline characteristics were well-balanced for most variables except for radiation and chemotherapy. Frequencies were analyzed using chi-squared tests, odds ratios with 95% confidence intervals were calculated, and survival was analyzed using Kaplan–Meier curves and log-rank tests. Statistical significance was set at p< 0.05.

Results:

Early neurolysis did not significantly reduce rates of opioid-associated respiratory failure (22.3% in CPN group vs. 23.2% of controls, RR: 0.958 / OR: 0.946; p=0.774), compared with matched controls. The CPN group had higher rates of nausea (14.8% in CPN vs. 9.7% in control, RR:1.533 / OR:1.626; p=0.050) and constipation (16.8% in CPN vs. 9% in control, RR:1.857 / OR:2.030; p=0.004). No significant difference was observed for opioid analgesic use (p=0.764) or the occurrence of unrelated respiratory failure (p >0.99).

Early celiac plexus neurolysis did ***not*** decrease opioid-associated respiratory failure compared with standard opioid therapy but was associated with ***increased*** gastrointestinal adverse effects.



For demographics, full sized figures and additional supplemental tables displaying search strategies or diagnoses or procedures

Discussion:

Our findings demonstrate that early CPN did not decrease opioid-associated respiratory failure compared with standard opioid therapy. This suggests that the timing of CPN for pain control in unresectable pancreatic cancer may not be as critical for outcomes related to opioid-induced respiratory failure. There was also a significant association with constipation, and nausea/vomiting in the CPN cohort. These findings underscore the need for further research into symptom burden and autonomic dysregulation. Additionally, a refined patient selection to identify individuals who may benefit from early neurolytic intervention may foster a more patient-centered approach and personalized medicine.

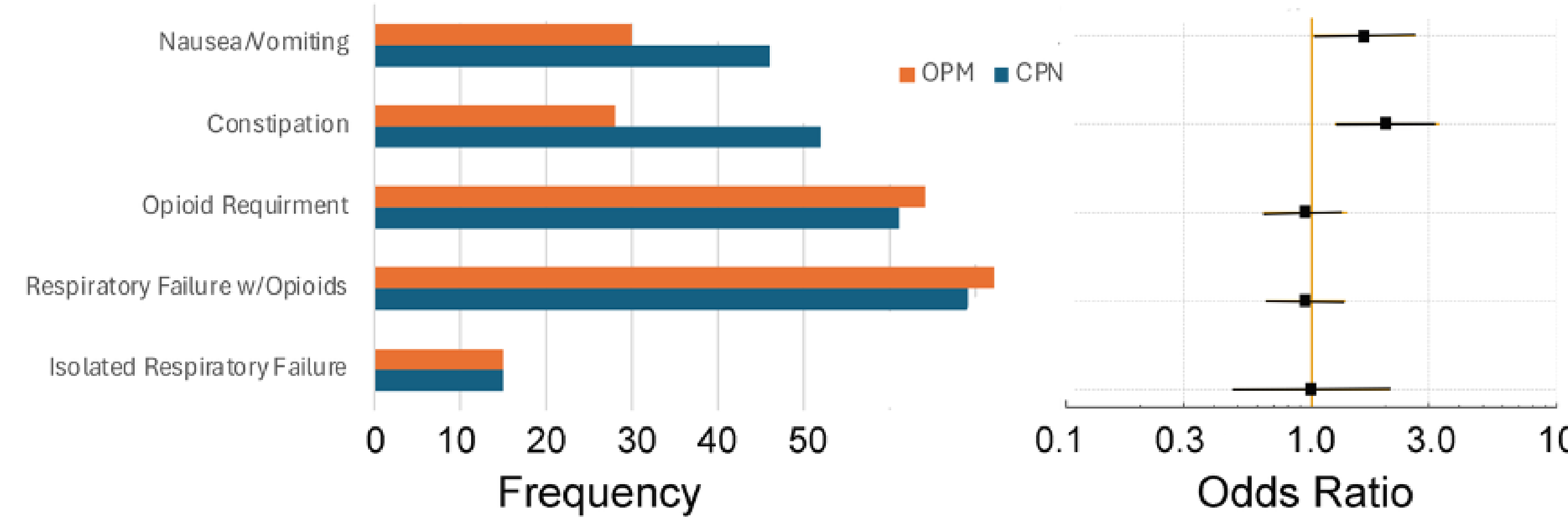


Figure A: The frequencies and odds ratios of the associated complications.

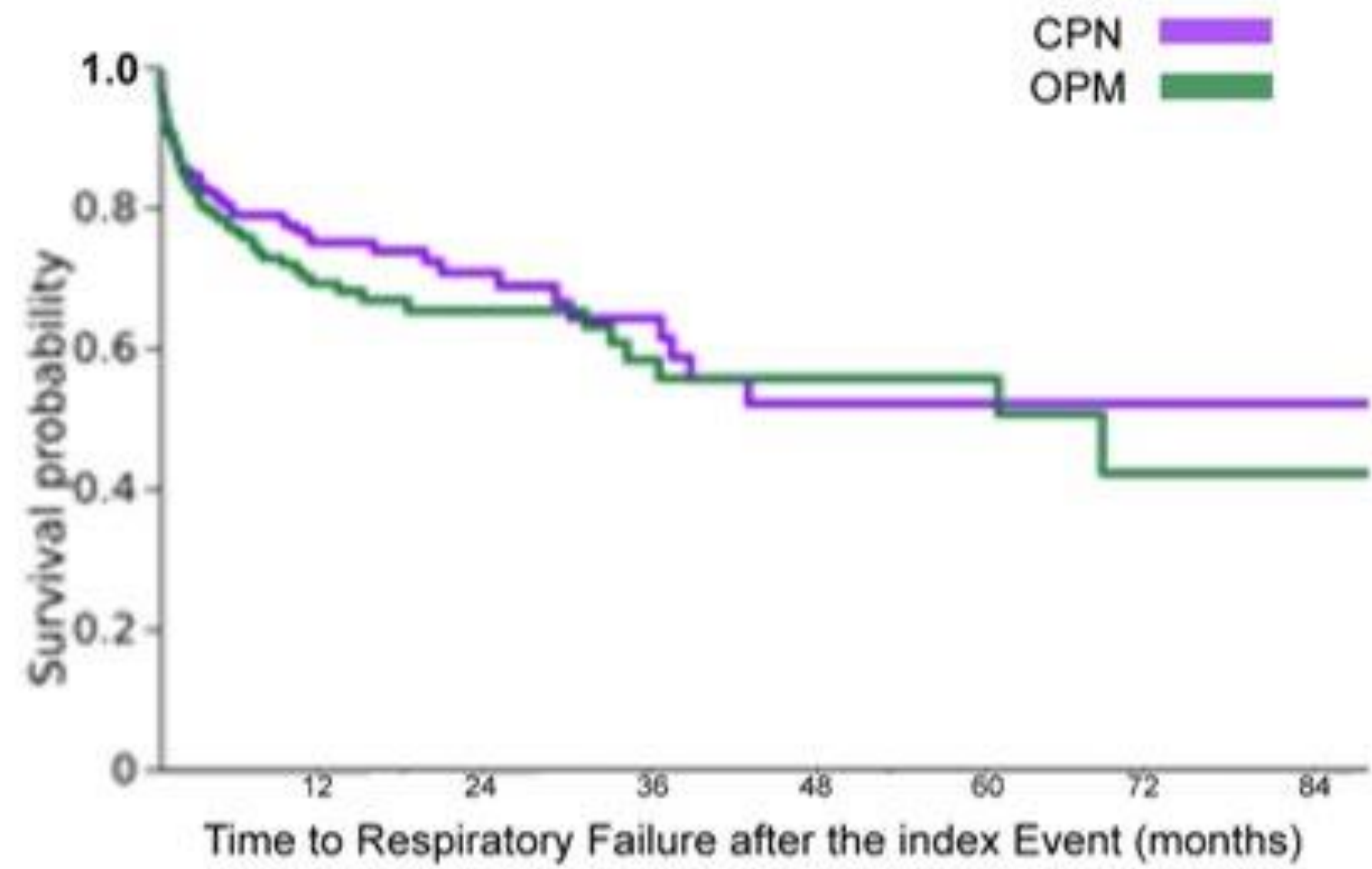


Figure B: Kaplan Meier analysis with survival plot for the occurrence of acute respiratory failure secondary to the use of opioids.

References

- Oh TK, Do SH, Yoon YS, Song IA. Association Between Opioid Use and Survival Time in Patients With Unresectable Pancreatic Cancer: 10Years of Clinical Experience. Pancreas. 2018;47:837-42.
- Nagels W, Pease N, Bekkering G, Cools F, Dobbels P. Celiac plexus neurolysis for abdominal cancer pain: a systematic review. Pain Med. 2013;14:1140-63.