Comparing the Effect of Bilateral versus Unilateral Splanchnic Neurolysis on Opioid Use for Visceral Cancer-Related Pain

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Background

- Percutaneous splanchnic neurolysis is well-established for the management of visceral cancer-related pain when pharmacological options alone are inadequate.
- A unilateral approach may be utilized when factors like organ location or other anatomic distortion prevents bilateral access to the splanchnic nerves.
- Tumor location within the pancreas can impact the effectiveness of the procedure in alleviating pain [1].
- Some prior investigations have associated the procedure with a decrease in daily morphine milligram equivalent (MME) requirements [2]. However, the evidence is mixed [3].
- Little information is available regarding the comparative effectiveness of the procedure in reducing opioid analgesic requirements when performed unilaterally.

Objective

Compare differences in post-procedure patient reported and pharmacy dispensed daily MME between individuals receiving unilateral or bilateral splanchnic neurolysis in a single-site retrospective investigation.

Methods

- This single-site, retrospective, observational cohort study was IRB approved (STUDY00025926).
- Patients receiving bilateral or unilateral neurolysis for cancer-related pain between January 1st 2017 and May 31st 2023 were recruited.
  - Those offered the procedure, but who did not proceed, were included as a comparator.
- EMR review was conducted to obtain patient-reported daily MME figures pre- and post-procedure.
- Oregon PDMP data for our cohort were obtained for comparison and to address reporting bias.

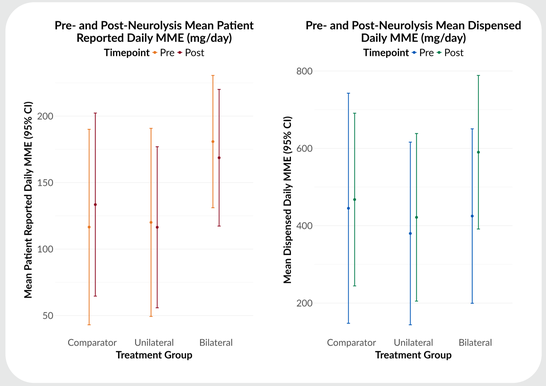


Figure 1: Mean (95% CI) Pre- and Post-procedure daily MME – Patient Reported and PDMP Dispensation Data

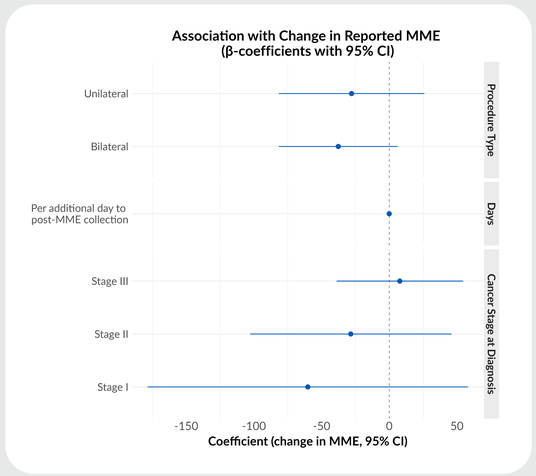


Figure 2: Plot of Multiple Linear Regression Model β-Coefficients relative to Reference

	Unilateral (N=17)	Bilateral (N=49)	Comparator (N=21)	Overall (N=87)	P-value	Standardized Mean Difference
Age					0.967	0.044
Mean (SD)	64.2 (11.9)	64.1 (9.03)	63.4 (13.9)	64.0 (10.8)		
Median [Min, Max]	69.0 [36.0, 83.0]	65.0 [35.0, 83.0]	66.0 [27.0, 84.0]	66.0 [27.0, 84.0]		
BMI (Body Mass Index)					0.689	0.16
Mean (SD)	23.3 (5.57)	24.5 (5.33)	24.1 (3.86)	24.2 (5.03)		
Median [Min, Max]	21.3 [17.5, 35.6]	24.0 [15.8, 47.0]	23.7 [17.2, 33.3]	23.3 [15.8, 47.0]		
Patient reported pain scores before procedure					0.423	0.313
Mean (SD)	5.47 (1.97)	4.92 (2.09)	4.42 (2.61)	4.96 (2.15)		
Median [Min, Max]	6.00 [2.00, 10.0]	5.00 [0, 8.00]	4.50 [0, 9.00]	5.00 [0, 10.0]		
Missing	0 (0%)	0 (0%)	9 (42.9%)	9 (10.3%)		
Patient reported pain scores after procedure					<0.001	1.167
Mean (SD)	0.765 (1.39)	1.06 (1.68)	4.80 (2.95)	1.25 (1.96)		
Median [Min, Max]	0 [0, 5.00]	0 [0, 6.00]	5.00 [0, 8.00]	0 [0, 8.00]		
Missing	0 (0%)	0 (0%)	16 (76.2%)	16 (18.4%)		
Number of days to Post-procedure MME Measurement					0.705	0.116
Mean (SD)	58.5 (69.4)	48.7 (34.4)	58.5 (75.2)	53.0 (53.8)		
Median [Min, Max]	43.0 [1.00, 307]	55.0 [1.00, 189]	44.0 [1.00, 370]	51.0 [1.00, 370]		
Insurance Type					0.944	0.143
Medicare	6 (35.3%)	21 (42.9%)	7 (33.3%)	34 (39.1%)		
Medicaid	4 (23.5%)	8 (16.3%)	4 (19.0%)	16 (18.4%)		
Private	7 (41.2%)	20 (40.8%)	7 (33.3%)	34 (39.1%)		
Missing	0 (0%)	0 (0%)	3 (14.3%)	3 (3.4%)		
NCHS Urban-Rural Classification					0.023	0.569
Large Central or Fringe Metro	16 (94.1%)	30 (61.2%)	16 (76.2%)	62 (71.3%)		
Other	1 (5.9%)	19 (38.8%)	5 (23.8%)	25 (28.7%)		
Cancer diagnosis					0.261	0.241
Digestive System	16 (94.1%)	47 (95.9%)	18 (85.7%)	81 (93.1%)		
Other (including reproductive system, urinary system, lung, and breast cancer)	1 (5.9%)	2 (4.1%)	3 (14.3%)	6 (6.9%)		
Cancer stage at time of diagnosis					0.249	0.445
Stage I	0 (0%)	0 (0%)	2 (9.5%)	2 (2.3%)		
Stage II	1 (5.9%)	2 (4.1%)	2 (9.5%)	5 (5.7%)		
Stage III	2 (11.8%)	8 (16.3%)	4 (19.0%)	14 (16.1%)		
Stage IV	14 (82.4%)	39 (79.6%)	12 (57.1%)	65 (74.7%)		
Missing	0 (0%)	0 (0%)	1 (4.8%)	1 (1.1%)		
Chronic pain prior to cancer diagnosis					0.105	0.364
No	13 (76.5%)	38 (77.6%)	11 (52.4%)	62 (71.3%)		
Yes	4 (23.5%)	11 (22.4%)	10 (47.6%)	25 (28.7%)		
History of depression or anxiety prior to cancer diagnosis					0.095	0.492
No	15 (88.2%)	37 (75.5%)	12 (57.1%)	64 (73.6%)		
Yes	2 (11.8%)	12 (24.5%)	9 (42.9%)	23 (26.4%)		
Survival Time after Procedure (Days)					0.625	0.254
Mean (SD)	160 (143)	255 (329)	237 (294)	235 (297)		
Median [Min, Max]	113 [25.0, 432]	159 [18.0, 1970]	137 [36.0, 1170]	132 [18.0, 1970]		
Missing	5 (29.4%)	4 (8.2%)	7 (33.3%)	16 (18.4%)		

Table 1: Summary of Selected Patient Characteristics at Baseline

Results

- A total of 87 patients met the inclusion criteria, including 49 receiving bilateral neurolysis, 17 receiving unilateral neurolysis, and 21 in the comparator group.
- A multiple linear regression model fitted to examine association of treatment group, days to post-procedure MME measurement, and cancer stage showed no statistically significant association with change in daily MME from baseline **(Table 2).**
- Days to post-procedure MME data collection was not associated with change in measured MME **(Figure 2; Table 2).**
- Substantial interindividual variability in opioid analgesic use was observed in patient-reported and PDMP-derived data **(Figure 1).**

Variable	β-Coefficient	Standard Error	95% CI		P-value
Type of Procedure					
None	0 (ref)	-	-	-	-
Unilateral	-27.85	26.99	-81.57	25.88	0.31
Bilateral	-37.68	22.1	-81.67	6.32	0.09
Days to Post-procedure MME Measurement	-0.05	0.16	-0.37	0.27	0.77
Cancer Stage					
Stage I	-60.17	59.46	-178.53	58.18	0.31
Stage II	-28.43	37.4	-102.87	46.02	0.45
Stage III	7.79	23.47	-38.92	54.5	0.74
Stage IV	0 (ref)	-	-	-	-

Table 2: Multiple Linear Regression Results for Difference in Daily MME

Discussion

- **No statistically significant differences were observed in EMR-obtained patient-reported daily MME** between patients receiving unilateral or bilateral percutaneous splanchnic neurolysis, or no procedure.
- PDMP-derived data shows an increase in mean daily MME across all study groups compared with baseline **(Figure 1)**, though statistical comparison is not possible given the aggregated nature of these data.

References

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