***D.A. Veremiey*[1,2],**
https://orcid.org/0000-0002-6422-114X
***A.Ye. Kryzhanivska*[1],**
https://orcid.org/0000-0001-7720-7374
***S.M. Balaka*[2],**
https://orcid.org/0000-0002-9284-5697

[1] *Ivano-Frankivsk National Medical University, Ivano-Frankivsk*
[2] *"Hospital of St. Panteleimon" of the First Territorial Medical Association of Lviv, Lviv, Ukraina*

DOI: https://doi.org/10.15407/oncology.2026.03.212

CHEMICAL SPLANCHNIC NERVE NEUROLYSIS IN PATIENTS WITH PANCREATIC CANCER: ANALGESIC EFFECTIVENESS AND CLINICAL OBSERVATIONS

Severe pain is common in pancreatic cancer and often remains inadequately controlled despite opioid therapy. Chemical splanchnic nerve neurolysis is a palliative option to reduce visceral pain. ***Aim:*** *to evaluate the effectiveness and safety of chemical splanchnic neurolysis in pancreatic cancer pain and to identify clinical factors associated with response.* ***Materials and methods:*** *retrospective analysis of 46 patients (33 men, 13 women; 34–79 years) with stage III–IV pancreatic cancer who underwent computed tomography (CT)-guided chemical splanchnic neurolysis with 96% ethanol (October 2022 — February 2025). Pain intensity (visual analog scale, VAS) and daily opioid dose (morphine equivalents) were recorded before the procedure and at 1 day, 1 week, 1, 3 and 6 months. Pre-procedure pain duration, complications and mortality were assessed.* ***Results:*** *mean baseline VAS was 8.7. After neurolysis, VAS decreased to 1.9 at day 1 and 2.1 at week 1, remained at 2.1 at 1 month, then rose to 3.3 at 3 months and 4.2 at 6 months. Opioid dose decreased in 72.7% of patients, including complete discontinuation in 21.7%. Five patients (10.9%) had no meaningful analgesia. Transient hypotension occurred in 22 patients (47.8%) and resolved within 6 hours; transient diarrhea occurred in 14 (30.4%).* ***Conclusions:*** *chemical splanchnic neurolysis provides substantial analgesia and reduces opioid requirements in most patients with pancreatic cancer. Shorter pre-procedure pain duration and lower baseline opioid dose may favor response.*

Keywords: *pancreatic cancer; splanchnic nerve; neurolysis; analgesia; opioids; palliative care.*

Pancreatic cancer is one of the most aggressive malignancies and is frequently accompanied by severe chronic abdominal pain, particularly in locally advanced and metastatic stages. Pain is typically visceral in origin and mediated through the splanchnic nerves and celiac plexus, reflecting tumor infiltration, perineural invasion, retroperitoneal extension, and inflammatory mechanisms. Involvement of these neural structures often results in deep, constant epigastric pain radiating to the back, significantly impairing quality of life and functional status.

According to current palliative care guidelines, cancer pain management follows a stepwise pharmacologic approach based on the World Health Organization (WHO) analgesic ladder. Although opioid therapy remains the cornerstone of treatment for moderate to severe cancer pain, a substantial proportion of patients with pancreatic cancer experience inadequate analgesia despite escalating opioid doses. Moreover, long-term opioid therapy is frequently associated with adverse effects such as constipation, sedation, nausea, cognitive impairment, and opioid tolerance, which further compromise patient well-being.

Interventional techniques targeting the celiac plexus and splanchnic nerves have therefore become important adjuncts in the multidisciplinary management of upper abdominal cancer pain. Chemical splanchnic neurolysis involves the injection of neurolytic agents (most commonly ethanol or phenol) into the retrocrural space to destroy afferent sympathetic pain fibers [1–3]. Compared with celiac plexus neurolysis, splanchnic nerve neurolysis may provide more targeted

Цитування: Veremiey D.A., Kryzhanivska A.Ye., Balaka S.M. Chemical splanchnic nerve neurolysis in patients with pancreatic cancer: analgesic effectiveness and clinical observations. Онкологія. 2026. 28, № 3. С. 212–215. https://doi.org/10.15407/oncology.2026.03.212

© PH "Akademperiodyka" of the NAS of Ukraine, 2026. This is an open access article under the CC BY-NC-ND license (https://creativecommons.org/licenses/by-nc-nd/4.0/)

denervation in selected anatomical situations, particularly when tumor distortion of the celiac axis limits optimal spread of neurolytic solution.

Systematic reviews and meta-analyses have demonstrated that neurolytic procedures targeting the splanchnic nerves or celiac plexus result in significant reductions in pain intensity and opioid consumption in the majority of patients with upper abdominal malignancies [1, 3, 4]. Reported response rates range from 60% to 80%, with clinically meaningful decreases in visual analog scale (VAS) scores and sustained analgesic benefit lasting several months. Emerging evidence also suggests that earlier interventional treatment may improve analgesic outcomes and reduce cumulative opioid exposure.

Despite growing international experience, data on CT-guided chemical splanchnic neurolysis remain limited, particularly from Eastern European centers. Furthermore, predictors of response, including pre-procedure pain duration and baseline opioid requirements, require further clarification.

Aim: to evaluate the effectiveness and safety of CT-guided chemical splanchnic neurolysis in patients with pancreatic cancer-related pain and to identify clinical factors associated with analgesic response.

OBJECTS AND METHODS

Study design and ethics. Retrospective single-center study of patients with histologically confirmed stage III–IV pancreatic cancer undergoing chemical splanchnic neurolysis between October 2022 and February 2025 (*Table*). Pain intensity was assessed using the visual analog scale (VAS), presented in [5]. Written informed consent was obtained from all participants.

Table

Patient Characteristics

Parameter	Value
Patients, *n*	46
Men / women	33 / 13
Age, years (mean; range)	59.2 (34–79)
Tumour location in pancreas	
Head	40
Body	4
Tail	2
AJCC stage	
III	8
IV	38
Pain duration before procedure	12 weeks (median 7; range 2–108)
Baseline VAS, mean	8.7 (range 7–10)
Baseline opioid dose, mg morphine/day	150
Chemotherapy	41 (89.1%)
Anesthesia type	
Local/sedation	44
General	2

Note: AJCC — American Joint Committee on Cancer.

Eligibility. Inclusion — pancreatic malignancy; severe abdominal pain (VAS ⩾ 7); suitability for intervention. Exclusion — coagulopathy, active infection, decompensated comorbidities, refusal.

Peri-procedural management. To mitigate sympathectomy-related hypotension, patients hydrated orally for 3 days pre-procedure; an IV line was placed and 1200–1400 mL 0.9% sodium chloride was infused.

Technique. Under computed tomography (CT) guidance, bilateral paravertebral placement of 22-gauge beveled needles into the retrocrural space at T12–L1 was performed (*Fig. 1*). Local anesthesia with 0.5% bupivacaine was standard, and sedation was administered as needed; two patients required general anesthesia with tracheal intubation. After injection of nonionic iodinated contrast (iohexol 350 mg/mL) to confirm spread and 2 mL of 0.5% bupivacaine per side, 8–10 mL of 96% ethanol was instilled on each side.

Assessment. VAS (0–10) and daily opioid dose (morphine equivalents) were recorded at baseline and 1 day, 1 week, 1, 3, and 6 months. Pre-procedure pain

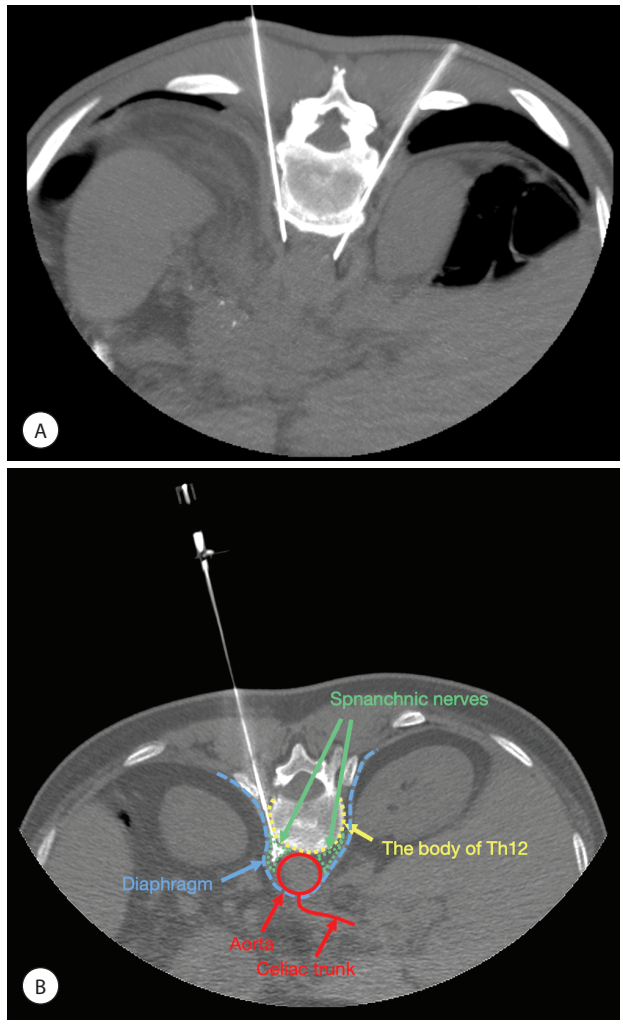


Fig. 1. Technique of CT-guided chemical splanchnic neurolysis

duration, complications and mortality were collected during 6-month follow-up. Analyses performed in SPSS v22 (IBM, USA); $p < 0.05$ considered significant.

RESULTS AND DISCUSSIONS

Below are the results of our retrospective study evaluating the effectiveness and safety of CT-guided chemical splanchnic neurolysis in patients with stage III–IV pancreatic cancer-related pain.

Pain trajectory: mean VAS 8.7 at baseline decreased to 1.9 (day 1), 2.1 (week 1) and 2.1 (month 1), then rose to 3.3 (month 3) and 4.2 (month 6) (*Fig. 2*). Five patients (10.9%) had no sustained benefit; two had ~2 years of pre-procedure pain. In three patients with 6–8 weeks of pain, initial relief was followed by return to baseline within a week.

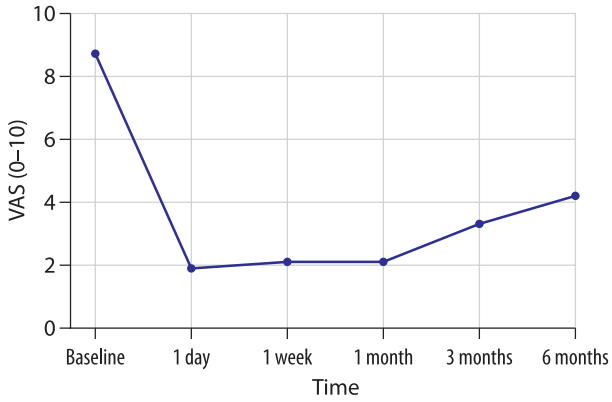


Fig. 2. VAS pain intensity over time after splanchnic neurolysis

Opioid consumption: mean daily dose 150 mg morphine equivalents before neurolysis. After the procedure, dose decreased in 72.7% of patients, including complete discontinuation in 21.7%.

Repeat interventions: with peritoneal carcinomatosis progression, four patients underwent neurolysis of other targets (lumbar or superior hypogastric plexus, pudendal nerves). Non-responders declined further procedures.

Complications: transient hypotension in 22 patients (47.8%) resolved within 6 hours; transient diarrhea in 14 (30.4%). No major infections or permanent deficits.

Mortality: 6 deaths within 1 month and 5 additional within 6 months, all due to tumor progression.

Our results show rapid and clinically meaningful analgesia with opioid-sparing after CT-guided chemical splanchnic neurolysis, consistent with prior literature [1, 3, 4]. Timing appears important: shorter pre-procedure pain duration and lower opioid dose favor response, echoing the findings of Yoon et al. [2]. Non-response despite short pain duration may reflect anatomic variation, limited ethanol spread, or pain generators outside the splanchnic pathway; alternative targets can be considered when peritoneal carcinomatosis dominates.

CONCLUSION

Chemical splanchnic neurolysis is effective and safe for pancreatic cancer pain, enabling opioid reduction or discontinuation in most patients. Early referral after pain onset may improve outcomes.

Funding. No funding was received for this study.

Acknowledgments. We would like to thank our interventional radiology and nursing teams, as well as our patients and their families.

REFERENCES

1. **Goyal S, Kumar A, Goyal D, *et al.*** Efficacy of splanchnic nerve neurolysis in the management of upper abdominal cancer pain: a systematic review and meta-analysis. Indian J Anaesth 2023; **67** (12): 1036–50. https://doi.org/10.4103/ija.ija_439_23.
2. **Yoon DM, Yoon KB, Baek IC, *et al.*** Predictors of analgesic efficacy of neurolytic celiac plexus block in patients with unresectable pancreatic cancer: the importance of timing. Support Care Cancer 2018; **26** (6): 2023–30. https://doi.org/10.1007/s00520-018-4043-2.
3. **Cornman-Homonoff J, Holzwanger D, Lee KS, *et al.*** Celiac plexus block and neurolysis in the management of chronic upper abdominal pain. Semin Intervent Radiol 2017; **34** (4): 376–86. https://doi.org/10.1055/s-0037-1608861.
4. **Yanaizumi R, Nagamine Y, Harada S, *et al.*** Long-term analgesic efficacy of neurolytic splanchnic nerve block via the transintervertebral disc approach to the retrocrural space: a multicenter retrospective study. Pain Ther 2023; **12** (3): 825–40. doi: https://doi.org/10.1007/s40122-023-00506-0.
5. Yale School of Medicine. Visual Analogue Scale (VAS) [Internet]. New Haven (CT): Yale University; [cited 2026 Feb 25]. Available from: https://assessment-module.yale.edu/im-palliative/visual-analogue-scale.

ХІМІЧНИЙ НЕВРОЛІЗ ЧЕРЕВНИХ НЕРВІВ У ПАЦІЄНТІВ ІЗ РАКОМ ПІДШЛУНКОВОЇ ЗАЛОЗИ: АНАЛЬГЕТИЧНА ЕФЕКТИВНІСТЬ ТА КЛІНІЧНІ СПОСТЕРЕЖЕННЯ

***Д.А. Вєремєй*[1,2], *А.Є. Крижанівська*[1], *С.М. Балака*[2]**

[1] Івано-Франківський національний медичний університет, Івано-Франківськ

[2] "Лікарня Святого Пантелеймона" Першого територіального медичного об'єднання Львова, Львів, Україна

Резюме. *Виражений біль є частим симптомом при раку підшлункової залози й залишається недостатньо контрольованим, незважаючи на опіоїдну терапію. Паліативним методом для зменшення вісцерального болю є хімічний невроліз черевних нервів.*

Мета: *оцінити ефективність і безпеку хімічного невролізу черевних нервів при болю, зумовленому раком підшлункової залози, а також визначити клінічні фактори, пов'язані з відповіддю на лікування.* ***Об'єкт і методи:*** *ретроспективний аналіз даних 46 пацієнтів (33 чоловіки, 13 жінок; вік від 34 до 79 років) із раком підшлункової залози III–IV стадії, яким було виконано хімічний невроліз черевних нервів 96% етанолом під контролем комп'ютерної томографії (КТ) у період із жовтня 2022 р по лютий 2025 р. Інтенсивність болю (за візуально-аналоговою шкалою, ВАШ) та добову дозу опіоїдів (у морфіновому еквіваленті) фіксували до процедури, а також через 1 день, 1 тиждень, 1, 3 та 6 міс. після неї. Оцінювали тривалість болю до процедури, ускладнення та смертність.* ***Результати:*** *середній вихідний показник ВАШ становив 8,7. Після невролізу показник ВАШ знизився до 1,9 на 1-й день та до 2,1 на 1-му тижні; залишався на рівні 2,1 через 1 міс., після чого зростав до 3,3 через 3 міс. та до 4,2 через 6 міс. Доза опіоїдів зменшилася у 72,7% пацієнтів, у тому числі із повним скасуванням препарату у 21,7%. У п'яти пацієнтів (10,9%) суттєвого знеболювального ефекту не спостерігали. Транзиторна артеріальна гіпотензія виникла у 22 пацієнтів (47,8%) і минула протягом 6 год.; транзиторна діарея спостерігалася у 14 пацієнтів (30,4%).* ***Висновки:*** *Хімічний невроліз черевних нервів забезпечує виражену анальгезію та знижує потребу в опіоїдах у більшості пацієнтів із раком підшлункової залози. Менша тривалість болю до процедури та нижча вихідна доза опіоїдів можуть сприяти кращій відповіді на лікування.*

Ключові слова: рак підшлункової залози; черевні нерви; невроліз; анальгезія; опіоїди; паліативна допомога.

Адреса для листування:

Вєрємєй Д.А.
76018, Івано-Франківськ, вул.Галицька, 2
Івано-Франківський національний медичний університет
E-mail: dr.veremey@gmail.com

Одержано: 01.06.2026
Рекомендовано до друку: 18.09.2026
Підписано до друку: 02.11.2026