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Celiac Plexus Neurolysis for Pain Management in Pancreatic and Hepatobiliary Malignancies: A Case Report and Literature Review

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ABSTRACT

Background: Chronic abdominal pain in advanced malignancies, particularly pancreatic and hepatobiliary cancers, is often refractory to conventional analgesics. Celiac plexus block (CPB) and neurolysis (CPN) are established interventional techniques that provide substantial pain relief, reduce opioid consumption, and improve patient quality of life.

Case Presentation: We report a 43-year-old male with stage IV pancreatic cancer and hepatic metastases presenting with severe upper abdominal pain unresponsive to high-dose opioids. Fluoroscopy-guided bilateral celiac plexus neurolysis using ethanol was performed. Post-procedure, pain scores decreased from NRS 6 to NRS 2–3, opioid requirements reduced, and sleep quality improved. The patient was discharged in stable condition two days later.

Discussion: CPN is a safe and effective intervention for upper abdominal cancer pain. Literature supports its opioid-sparing benefits, long-term efficacy, and favorable safety profile when performed under image guidance. Early intervention may optimize outcomes and reduce opioid-related side effects.

Conclusion: CPN should be considered early in the multimodal management of refractory abdominal pain in pancreatic and hepatobiliary malignancies.

Keywords: *Celiac plexus block, Celiac plexus neurolysis, Pancreatic cancer, Pain management, Interventional analgesia*

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1. INTRODUCTION

Chronic pain constitutes one of the most excruciating and burdensome manifestations in individuals enduring terminal abdominal neoplasms, most notably carcinoma of the pancreas, encumbering in excess of nine-tenths of sufferers in the penultimate phases [1]. Traditional palliation employing peroral anodyne regimens, most conspicuously opiate derivatives, is frequently circumscribed by untoward sequelae, such as emesis, obstipation, somnolence, and habituated tolerance, that deleteriously vitiate the patient's quotidian well-being [1].

The celiac plexus blockade (CPB) was initially delineated by Kappis in 1914 as a transcutaneous maneuver devised to obviate conduction within the splanchnic nerves and the celiac ganglionic plexiform [2], [3]. Over time, this procedure has evolved into celiac plexus neurolysis (CPN), which employs chemical agents such as ethanol or phenol for long-term pain control in malignancy [2], [4]. With advances in imaging techniques including fluoroscopy, CT, and ultrasound, the accuracy and safety of CPN have significantly improved [5], [6].

This manuscript presents a case of fluoroscopy-guided CPN for pain management in advanced pancreatic cancer with hepatic metastases and provides a comprehensive literature review on its role in clinical practice.

2. CASE STUDY:

A 43-year-old male, conjectured to harbor pancreatic carcinoma with hepatic disseminations (stage IV, T4N1M1), was hospitalized for intransigent right hypochondrial dolor irradiating dorsally, persisting for a trimester and intensifying throughout the preceding week. Pain intensity ranged from NRS 4–6, severely disrupting sleep and daily activities. He also reported nausea but no vomiting or jaundice-related symptoms.

Past Medical History: Type 2 diabetes mellitus (3 years, poorly controlled on insulin) and chronic hepatitis B.

Physical Examination: The patient appeared jaundiced with hepatomegaly; vital signs were stable (RR 18/min, SpO_2 99% on room air, HR 112 bpm, BP 132/91 mmHg, Temp 36.7°C).

Investigations:

Laboratory: Hb 11.8 g/dL, WBC 9,150/µL, Platelets 268,000/µL, SGOT 79 U/L, SGPT 118 U/L, Albumin 3.5 g/L, Bilirubin total 4.7 mg/dL, Direct 3.3 mg/dL, Random glucose 288 mg/dL, HbA1c 10.6%.

Tumor markers: AFP 7.4 ng/mL, CEA 293.3 ng/mL, CA 19-9 37,091 U/mL.

Imaging: CT scan revealed multiple hepatic nodules consistent with metastases, enlarged para-aortic lymph nodes, minimal ascites, and a malignant lesion at the pancreatic tail.

Preoperative Assessment: ASA III with comorbidities including uncontrolled diabetes, chronic hepatitis B, anemia, hypokalemia, and impaired liver function.

Analgesic History: Previous treatment with transdermal fentanyl (25 mcg/72h), oral morphine sulfate (10 mg q8h), paracetamol, dexamethasone, and amitriptyline provided insufficient pain relief.

Procedure: After informed consent, fluoroscopy-guided bilateral posterior para-aortic approach was performed under prone positioning. A 22-gauge, 15-centimetric stylet was navigated toward the celiac plexiform. Absence of sanguineous reflux upon aspiration corroborated precise localization, subsequent to which radiopaque contrast and 15 mL of absolute ethanol were instilled in a bilateral fashion. Vigilant hemodynamic surveillance was sustained throughout the maneuver.

Outcome: Post-procedure, the patient experienced significant pain relief (NRS reduced to 2–3), with only transient injection site discomfort resolving within 24 hours. He was discharged on postoperative day two in stable condition with reduced opioid requirements.

3. RESULTS AND DISCUSSIONS:

3.1. Pathophysiology of Pain in Pancreatic Malignancy

Pancreatic cancer is highly neurotropic with perineural invasion contributing to the high prevalence of severe abdominal pain (4). CPN targets visceral afferent fibers within the celiac plexus, thereby interrupting nociceptive transmission from upper abdominal organs.

3.2. Efficacy of CPN

Numerous studies demonstrate that CPN significantly reduces pain intensity, opioid consumption, and opioid-related side effects in advanced abdominal malignancy [4], [5], [7]. It has also been associated with improved quality of life and, in some reports, prolonged survival [4].

3.3. Technique and Imaging Guidance

Various approaches include posterior para-aortic, anterior, transaortic, trans-intervertebral disc, and endoscopic ultrasound-guided methods [5], [7]. Fluoroscopy remains widely available, while CT and EUS provide superior precision, particularly in anatomically complex cases [6],[8].

3.4. Safety and Complications

Common adverse effects include transient back pain, hypotension, and diarrhea [5]. Rare but serious complications include spinal cord ischemia, organ infarction, and retroperitoneal hematoma [9]. Careful patient selection, imaging guidance, and adherence to technique minimize risks [10].

3.5. Relevance of the Present Case

Our patient had refractory pain despite high-dose opioids, making him an ideal candidate for CPN. The procedure resulted in immediate and sustained analgesia, reduction of opioid dependence, and improvement in quality of life, consistent with published literature.

4. CONCLUSION AND RECOMMENDATION:

Celiac plexus neurolysis is a safe, effective, and minimally invasive technique for managing refractory abdominal pain in patients with advanced pancreatic and hepatobiliary malignancies. Incorporation of CPN into early multidisciplinary pain management strategies should be considered to optimize patient outcomes and reduce opioid-related adverse effects.

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