

Ultrasound-Guided Suprascapular Nerve Pulsed Radiofrequency with Perineural Ropivacaine–Triamcinolone Injection for Multisite Advanced Cancer Pain: Localized Analgesia Without Reduced Opioid Requirement - A Case Report

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Abstract

Background: Targeted pain interventions may relieve a specific pain generator, but their effect on total opioid requirements is uncertain when several painful sites remain active. **Case presentation:** A 30-year-old woman with advanced epithelioid hemangioendothelioma had severe bilateral shoulder pain together with thoracic, abdominal, and pelvic pain despite multimodal analgesia. Treatment was complicated by opioid-related adverse effects, dysphagia, renal dysfunction associated with selective cyclooxygenase-2 inhibitor therapy, thrombocytopenia, vertebral metastases, and progressive systemic illness. The overall Numerical Rating Scale (NRS; 0–10) score was approximately 8–10 with six to eight breakthrough episodes daily despite continuous intravenous fentanyl 600 µg/24 h with 25-µg nurse-administered rescue boluses (total daily fentanyl exposure 1,200 µg including rescue). Because the shoulders were the most severely painful and anatomically accessible sites, bilateral ultrasound-guided suprascapular diagnostic blocks were performed; shoulder pain decreased by more than 50% within 10 minutes of lidocaine injection. This was followed in the same session by bilateral suprascapular nerve pulsed radiofrequency at 42 °C for two 3-minute cycles per side and perineural injection of 2 mL 0.1875% ropivacaine with 5 mg triamcinolone per side. Shoulder pain decreased to near zero during the first 24 hours and remained controlled during the documented five-day follow-up. However, breakthrough pain at other sites persisted and the overall opioid requirement did not decrease; an attempted fentanyl taper was reversed on the following day. Follow-up ended when the patient was transferred to the intensive care unit on post-procedure day 5 because of massive gastrointestinal bleeding. **Conclusion:** Combined suprascapular nerve pulsed radiofrequency and perineural local anesthetic–steroid injection provided substantial localized analgesia without reducing systemic opioid requirements. Regional and global outcomes should be assessed separately when targeted interventions are used for multisite cancer pain; an unchanged opioid requirement does not invalidate a successful targeted regional intervention.

Keywords: cancer pain; interventional pain management; pulsed radiofrequency; suprascapular nerve; palliative care;

Abstrak

Latar belakang: Intervensi nyeri yang terarah dapat meredakan sumber nyeri spesifik, namun dampaknya terhadap kebutuhan total opioid masih belum pasti jika terdapat beberapa lokasi nyeri lain yang tetap aktif. **Presentasi kasus:** Seorang wanita berusia 30 tahun dengan epithelioid hemangioendothelioma stadium lanjut mengalami nyeri bahu bilateral yang parah, disertai nyeri di area toraks, abdomen, dan panggul, meskipun telah mendapatkan analgesia multimodal. Penatalaksanaan menjadi rumit akibat efek samping terkait opioid, disfungsi ginjal yang dikaitkan dengan terapi penghambat cyclooxygenase-2 selektif, trombositopenia, metastasis vertebral, dan penyakit sistemik yang terus berkembang. Skor Numerical Rating Scale (NRS; 0–10) secara keseluruhan berkisar antara 8–10, dengan enam hingga delapan episode breakthrough pain setiap harinya, meskipun pasien telah menerima infus intravena fentanyl secara berkelanjutan dengan dosis 600 µg/24

jam, ditambah bolus penyelamat rescue bolus sebesar 25 µg yang diberikan oleh perawat (total paparan fentanyl harian mencapai 1.200 µg, termasuk dosis penyelamat). Mengingat bahu merupakan lokasi dengan nyeri paling parah dan secara anatomis dapat diakses, dilakukan blok diagnostik saraf supraskapular bilateral dengan panduan ultrasonografi; nyeri bahu berkurang lebih dari 50% dalam waktu 10 menit setelah penyuntikan lidokain. Pada sesi yang sama, prosedur dilanjutkan dengan pulsed radiofrequency pada saraf supraskapular bilateral (suhu 42 °C, dua siklus selama 3 menit di setiap sisi) serta penyuntikan perineural yang terdiri dari 2 mL ropivakain 0,1875% dan 5 mg triamsinolon di setiap sisi. Nyeri bahu berkurang hingga hampir nol selama 24 jam pertama dan tetap terkendali selama periode pemantauan lima hari. Namun, nyeri tembus di lokasi lain tetap ada dan kebutuhan total opioid tidak berkurang; upaya untuk menurunkan dosis fentanyl pun dibatalkan pada hari berikutnya. Pemantauan berakhir ketika pasien dipindahkan ke unit perawatan intensif pada hari ke-5 pascaproedur akibat perdarahan gastrointestinal masif. **Kesimpulan:** Kombinasi pulsed radiofrequency pada saraf supraskapular dan penyuntikan perineural menggunakan anestesi lokal serta steroid terbukti memberikan analgesia lokal yang signifikan, namun tidak mengurangi kebutuhan opioid sistemik. Hasil klinis regional (lokal) dan global (sistemik) harus dinilai secara terpisah ketika intervensi terarah digunakan untuk menangani nyeri kanker di berbagai lokasi; kebutuhan opioid yang tidak berubah tidak berarti bahwa intervensi regional yang terarah tersebut gagal.

Kata kunci: nyeri kanker; manajemen nyeri intervensional; pulsed radiofrequency; saraf supraskapular; perawatan paliatif;

I. INTRODUCTION

Cancer-related pain may arise simultaneously from tumor infiltration, bone destruction, neural compression, treatment-related injury, and visceral involvement. In advanced disease, these mechanisms can produce several anatomically and physiologically distinct pain generators within the same patient.^{1,2}

Interventional pain management can target a selected pain pathway and may reduce pain in the treated region. Among oncologic shoulder pain syndromes, the suprascapular nerve is one of the key interventional targets, and ultrasound guidance is considered a safe alternative to blind techniques that increases procedural accuracy and reduces complications.³ Approaches reported in cancer populations include ablative radiofrequency lesioning of the nerve, which provided substantial pain relief in a series of malignancy-associated recalcitrant shoulder pain and peripheral nerve stimulation, which produced clinically significant pain relief with reduced oral analgesic intake in adults.^{4,5,6}

Pulsed radiofrequency is a non-destructive neuromodulatory intervention that has been used for chronic pain and selected refractory cancer-related pain syndromes; in chronic non-cancer shoulder pain, ultrasound-guided suprascapular PRF reduced pain intensity for at least six months with concurrent improvement in motor function and high patient satisfaction.⁷

However, relief of one regional pain component may not reduce overall pain or opioid use when other generators remain active. We describe localized relief of bilateral shoulder pain after combined suprascapular nerve PRF and perineural ropivacaine–triamcinolone injection in a patient with multisite pain from advanced epithelioid hemangioendothelioma, without a

corresponding decrease in systemic opioid requirements.

II. CASE

A. PATIENT INFORMATION

A 30-year-old woman had advanced epithelioid hemangioendothelioma, a rare vascular sarcoma, treated with chemotherapy and palliative radiotherapy. Positron emission tomography demonstrated metastatic lesions involving multiple vertebral bodies, both humeral heads, the pelvic bones, and intra-abdominal organs. A T2 vertebral body compression fracture was also identified.

Her condition was complicated by pancytopenia, urinary and respiratory infections, diarrhea, nausea and vomiting, dysphagia, spontaneous genital and gastrointestinal bleeding, progressive malnutrition, and declining renal function considered related to selective cyclooxygenase-2 inhibitor exposure. Depression, sadness, loss of appetite, and a cachectic appearance were documented.

B. CLINICAL FINDINGS

Pelvic and lower abdominal pain had been present for approximately 18 months. Upper back pain associated with the T2 compression fracture began approximately two weeks before the intervention. Bilateral shoulder pain had been present for about one month and had worsened over the preceding days. The shoulders were the most severely painful sites, with persistent stabbing or pressure-like pain and breakthrough episodes every one to two hours; the pain was attributed to metastatic lesions involving both humeral heads. Concurrent upper thoracic pain (moderate to severe, radiating to the anterior chest wall), abdominal pain (persistent mild to moderate pain with occasional severe episodes, associated with intra-abdominal metastatic disease,

distension, and meteorism), and hip and pelvic pain (long-standing mild to moderate dull or pressure-like pain from pelvic bone metastases) all remained clinically relevant.

Pain management during the preceding course included paracetamol, etoricoxib, tramadol, morphine, intravenous fentanyl, pregabalin, amitriptyline, ketamine, and epidural ropivacaine. Early opioid exposure caused severe dizziness, nausea, vomiting, hallucinations, and delirium. Tramadol and ketamine were discontinued because of adverse effects. Etoricoxib was stopped after dyspepsia and increased serum creatinine; re-exposure when pain worsened was followed by further deterioration in renal function. A transdermal fentanyl preparation

was unavailable, and oral morphine administration was sometimes limited by nausea, vomiting, and dysphagia.

Immediately before the intervention, the documented regimen included continuous intravenous fentanyl 600 µg/24 h with nurse-administered 25-µg rescue boluses, sustained-release oral morphine 30 mg twice daily, intravenous paracetamol 1 g four times daily, pregabalin 150 mg twice daily, and amitriptyline 25 mg nightly. The source record reported total daily intravenous fentanyl exposure of 1,200 µg, including rescue treatment. Despite this regimen, the overall NRS score was approximately 8–10 and breakthrough pain occurred six to eight times daily.

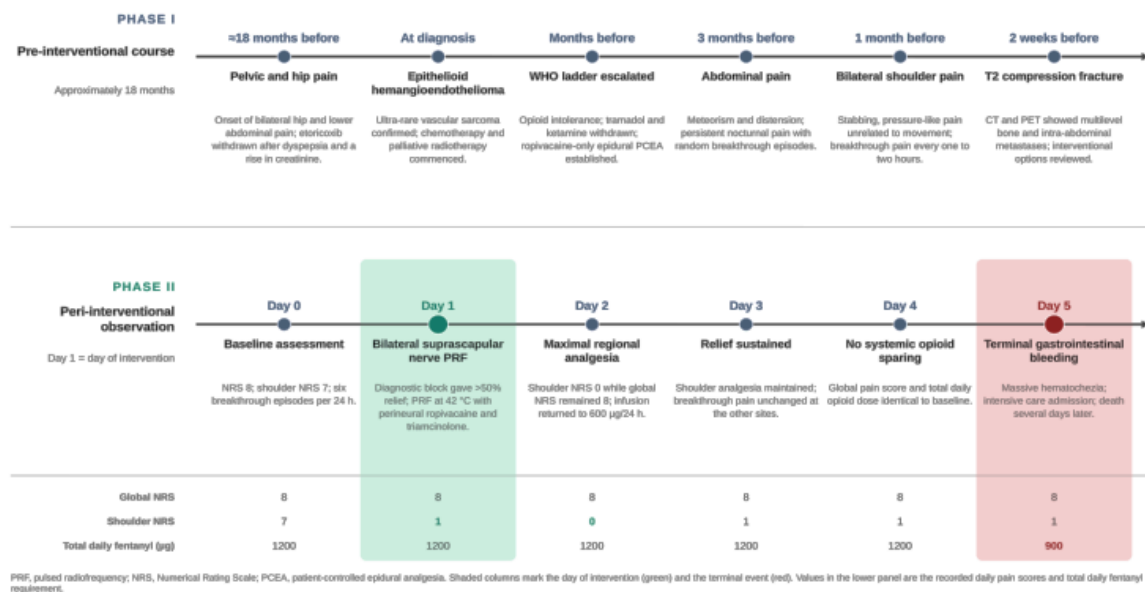


FIGURE 1. CLINICAL TIME LINE, SUMMARIZING PAIN SCORE AND OPIOID REQUIREMENT BEFORE AND AFTER INTERVENTIONAL PAIN MANAGEMENT

C. DIAGNOSTIC ASSESSMENT

Deeper neuraxial, sympathetic, and visceral interventions were considered but carried substantial risks in the setting of thrombocytopenia, infection, vertebral metastatic disease, abdominal distension, and general deterioration. Bilateral suprascapular nerve intervention was selected because the shoulder pain was the most severe

component and the target was relatively superficial. The patient and family participated in discussion of the proposed intervention with the treating specialists. A greater than 50% response to a diagnostic block is an established selection criterion before suprascapular PRF in the chronic shoulder pain literature.^{8,9} Pain intensity was assessed throughout with the NRS (0–10). Therapeutic intervention

With the patient seated, the suprascapular nerve was targeted bilaterally at the suprascapular notch under ultrasound guidance. The suprascapular artery was identified using color Doppler. Electrical stimulation produced infraspinatus muscle contraction, and concordance between the stimulated region and the patient's painful area was confirmed. A diagnostic perineural injection of 3 mL 1% lidocaine was administered on each side. After 10 minutes, the patient reported more than 50% reduction in shoulder pain.

The diagnostic block was followed in the same procedural session by PRF at 42 °C for two 3-minute cycles on each side, parameters comparable to published suprascapular PRF protocols (two 180-second cycles at ≤42 °C. A 2-mL perineural solution containing 0.1875% ropivacaine and 5 mg triamcinolone was then administered on each side.^{8,10}

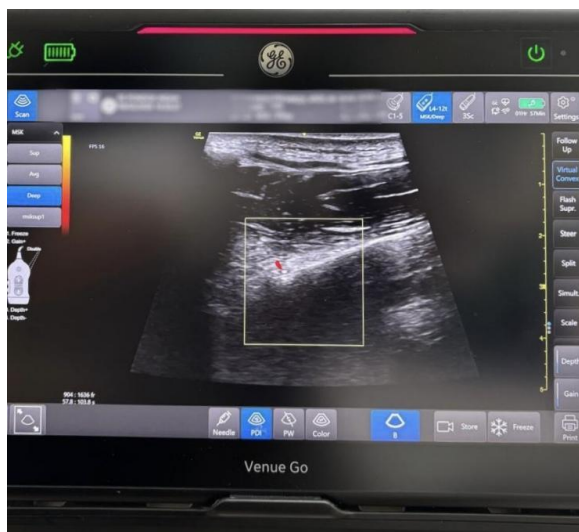


FIGURE 2. REAL-TIME ULTRASOUND IMAGE OF THE SUPRASCAPULAR NERVE AT THE SUPRASCAPULAR NOTCH (SHORT-AXIS VIEW) WITH COLOR DOPPLER IDENTIFICATION OF THE SUPRASCAPULAR ARTERY, SHOWING THE RADIOFREQUENCY CANNULA POSITION.

D. FOLLOW-UP AND OUTCOMES

During the first 24 hours after the combined intervention, pain in both shoulders decreased to near zero. An attempt was made

to taper the continuous fentanyl infusion. Although shoulder pain remained low, breakthrough pain at other sites continued and was accompanied by agitation, restlessness, and anxiety. The continuous fentanyl dose was therefore returned to 600 µg/24 h on the following day.

Shoulder pain remained controlled during the documented follow-up, but the frequency of breakthrough pain and overall opioid requirement remained similar to the pre-intervention period. On post-procedure day 5, the patient developed massive spontaneous lower gastrointestinal bleeding and was transferred to the intensive care unit. The case report documents the clinical course only until intensive care admission. The patient died several days later.

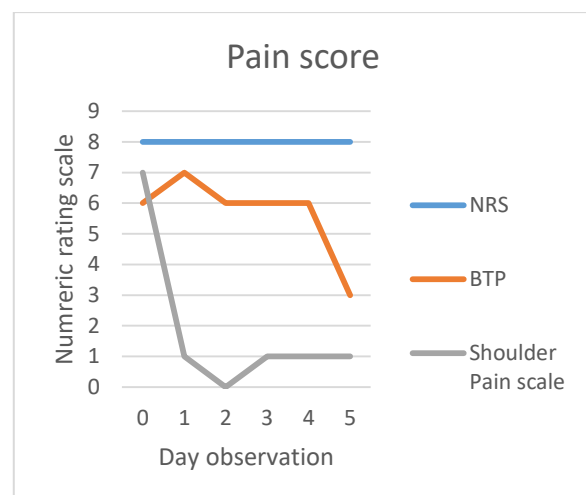


FIGURE 3. BILATERAL SHOULDER NRS TRAJECTORY (0–10) FROM BASELINE THROUGH POST-PROCEDURE DAY 5, PLOTTED AGAINST GLOBAL NRS AND DAILY BREAKTHROUGH EPISODES.

III. DISCUSSION

The clinically important observation in this case was the discordance between localized shoulder analgesia and the continued need for systemic opioids. A greater than 50% response to the diagnostic suprascapular block supported the suprascapular nerve as a relevant pathway for the shoulder pain and provided a rationale for proceeding with a targeted intervention, mirroring the

diagnostic-block selection criterion used in published suprascapular PRF series.⁸ Following combined PRF and perineural ropivacaine–triamcinolone injection, the shoulder-specific pain decreased to near zero and remained controlled during the short follow-up.

The present case extends the literature on suprascapular interventions for oncologic shoulder pain in two respects. First, most prior cancer reports used either ablative radiofrequency lesioning, whereas PRF is non-destructive and neuromodulatory — a relevant consideration in a thrombocytopenic, deteriorating patient in whom nerve injury from ablative techniques would be poorly tolerated.⁵ Second, in contrast to peripheral nerve stimulation series in which reduced analgesic intake accompanied pain relief, the systemic opioid requirement here remained unchanged; this contrast illustrates that regional response and global analgesic burden are dissociable outcomes. The rapid (first 24 hours) improvement is likely attributable substantially to the local anesthetic and steroid components, since the neuromodulatory effect of PRF in chronic shoulder pain typically emerges over days to weeks. This temporal profile deserves emphasis when interpreting early responses to combined interventions.^{5,6}

The localized response did not produce a parallel reduction in breakthrough pain or overall opioid requirements. The patient continued to have pain related to a T2 compression fracture, intra-abdominal disease with distension, and pelvic bone metastases. Advanced cancer pain commonly includes concurrent somatic, visceral, and neuropathic components, and treating the suprascapular pathway would not be expected to address these other anatomical sources. Consequently, unchanged total opioid consumption should not by itself be interpreted as failure of shoulder intervention. In patients with multisite cancer

pain, shoulder-specific pain and global analgesic requirements represent different clinical outcomes.

The case also illustrates the importance of defining the intended objective of an intervention. A procedure may be undertaken to reduce pain in a selected region, improve comfort, reduce systemic analgesic exposure, or achieve a combination of these goals. Here, regional analgesia was achieved, but opioid reduction was not. Reporting only total opioid consumption would have obscured the localized benefit, whereas reporting only the shoulder response would have overstated the intervention's effect on the patient's overall pain burden.

Several limitations restrict causal interpretation. PRF was followed immediately by perineural ropivacaine and triamcinolone; therefore, the effects of PRF, local anesthetic, and steroid cannot be separated. The marked improvement during the first 24 hours may have included an effect from ropivacaine. Follow-up was limited to five days because of terminal clinical deterioration. Site-specific numerical pain scores, daily rescue opioid consumption, standardized opioid-equivalent doses, functional outcomes, and quality-of-life measures were not documented in sufficient detail for analysis. The anatomical source of each breakthrough episode also could not be established from the available record.

Persistent opioid requirements may additionally have been influenced by progressive disease, opioid tolerance, psychological distress, or other systemic factors. These mechanisms were not formally evaluated and cannot be determined from this report. Accordingly, the case does not establish that earlier PRF would reduce opioid exposure or prevent pain progression. It supports a narrower conclusion: targeted suprascapular intervention can provide clinically apparent regional analgesia even

when the overall analgesic burden remains unchanged.

IV. CONCLUSION

Combined bilateral suprascapular nerve PRF and perineural ropivacaine–triamcinolone injection provided substantial localized relief of shoulder pain in a patient with advanced multisite cancer pain. Breakthrough pain at untreated sites and systemic opioid requirements persisted. Regional pain response and global opioid use should therefore be reported as separate outcomes after targeted interventional cancer pain procedures.

TAKE-AWAY LESSONS

- In multisite cancer pain, a successful targeted intervention can deliver meaningful regional analgesia without altering global opioid consumption; both outcomes should be measured and reported independently.
- A >50% response to an ultrasound-guided diagnostic suprascapular block is a pragmatic, evidence-aligned selection criterion for proceeding to PRF, even in palliative patients with contraindications to neuraxial or ablative techniques.
- When PRF is combined with perineural local anesthetic and steroid, early analgesia cannot be attributed to PRF alone; timing of effect should be interpreted accordingly.

PATIENT PERSPECTIVE

A patient perspective could not be obtained. The report was prepared from clinical information documented in the medical record.

DECLARATIONS

Informed consent: Written informed consent was obtained from the patient or next of kin for publication of this case report and accompanying clinical information and images.

Ethical approval: The case report was exempted from formal ethical review by Cipto Mangunkusumo Hospital in accordance with local policy for single-case reports.

Conflict of interest: The authors declare no conflict of interest.

Artificial Intelligence (AI) Use Declaration: The authors used AI (jenni ai) for grammar checking, language editing and paraphrasing to improve the clarity and readability of the manuscript. All content reviewed and verified by the authors.

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Data availability: The clinical data supporting this report are contained within the manuscript; further details are available from the corresponding author on reasonable request, subject to institutional policy.

Reporting guideline: This case report was prepared in accordance with the CARE guideline.

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ABBREVIATIONS

COX-2 = cyclooxygenase-2;
EHE = epithelioid hemangioendothelioma
GI = gastrointestinal
ICU = intensive care unit
IV = intravenous
NRS = Numerical Rating Scale
PET = positron emission tomography
PRF = pulsed radiofrequency
SR = sustained release
SSN = suprascapular nerve
US = ultrasound