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CASE REPORT

Lumbar Sympathetic Neurolysis for Intractable Ischemic Pain and Perfusion Gain in Foot Gangrene: A Case Report

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Abstract

Background: Chronic limb-threatening ischemia (CLTI) may present with ischemic rest pain, tissue loss and gangrene. Revascularization remains the preferred strategy when anatomically and clinically feasible; however, some patients have distal disease without suitable targets for intervention. Lumbar sympathetic neurolysis may provide analgesia and improve peripheral blood flow in selected patients.

Case Presentation: A 31-year-old male laborer and chronic smoker, without known comorbidities, presented with severe bilateral toe rest pain for two weeks and symmetrical blackish discoloration of the distal forefeet. Examination revealed sensory loss in the first and second toes bilaterally with absent distal pulses. CT angiography demonstrated multisegmental tibial arterial occlusion without suitable target vessels for revascularization. His baseline pain score was 7/10 despite tramadol/paracetamol and pregabalin.

Intervention and Outcome: A diagnostic bilateral lumbar sympathetic block at L5 produced approximately 80% pain reduction for 48 hours with warmth of both feet and subsequent demarcation and color change of the forefeet. Lumbar sympathetic neurolysis was then performed under fluoroscopic guidance using absolute alcohol. Following neurolysis, pain decreased to 2/10, with subjective warmth and improved capillary refill in the toes. At two-week follow-up, pain relief persisted, the gangrenous toes remained demarcated, and there was no progression to cellulitis.

Conclusion: Lumbar sympathetic neurolysis can be considered as an adjunctive palliative and limb-preservation strategy in carefully selected patients with ischemic pain and dry gangrene when revascularization is not feasible. It does not correct the underlying large-vessel occlusion, but may improve ischemic pain, peripheral perfusion and the ability to manage a demarcated distal gangrene conservatively.

Keywords

chronic limb-threatening ischemia, dry gangrene, lumbar sympathetic neurolysis, ischemic pain, peripheral arterial disease

Introduction

Critical lower limb ischemia represents an advanced manifestation of peripheral arterial disease and is associated with substantial pain, tissue loss, impaired function and risk of limb loss. Clinical manifestations include chronic ischemic rest pain, non-healing ulcers and gangrene. The burden is particularly high when ischemia is extensive or when distal arterial disease leaves no suitable target for revascularization. Current vascular management emphasizes restoration of arterial inflow whenever feasible, because correction of the underlying occlusive disease offers the best opportunity for durable limb salvage.[1,2]

Despite advances in endovascular and surgical techniques, a subset of patients remains unsuitable for revascularization because of diffuse distal disease, absence of an appropriate vascular target, or other clinical considerations. In these circumstances, treatment is directed toward symptom control, protection of viable tissue, prevention of infection and preservation of function. Lumbar sympathetic blockade and neurolysis have historically been used in ischemic limb conditions because sympathetic denervation can reduce vasoconstrictor tone, producing peripheral vasodilation and an increase in skin temperature and microcirculatory flow.[3,5] The potential benefit is therefore principally symptomatic and microcirculatory rather than correction of the primary arterial obstruction.

Lumbar sympathectomy has been described for patients with severe ischemic pain and toe gangrene, including patients with diabetes and those in whom reconstructive vascular surgery is not possible.[5,7] Although the contemporary role of chemical sympathectomy is more selective than in earlier eras of vascular surgery, it may still be useful when the clinical objective is relief of otherwise refractory ischemic pain and facilitation of conservative management. This case describes a young patient with dry gangrene, severe ischemic rest pain and multisegmental tibial occlusion who was considered unsuitable for revascularization and experienced sustained symptomatic benefit following lumbar sympathetic neurolysis.

Case Report

A 31-year-old male laborer and chronic smoker, with no known medical comorbidities, presented with severe rest pain involving the bilateral toes for two weeks. The pain was described as sharp and shooting and was associated with symmetrical blackish discoloration of the distal forefeet, clinically consistent with dry gangrene. On examination, there was sensory loss involving the first and second toes bilaterally, with absent distal pulses. There were no reported features of active infection, and the gangrenous areas were clinically dry.

CT angiography demonstrated multisegmental occlusion of the tibial arteries. The vascular anatomy was considered unsuitable for revascularization because there were no appropriate distal target vessels for intervention. The patient was therefore referred to the pain management unit for consideration of sympathetic blockade as a means of controlling his severe ischemic pain. His baseline Visual Analogue Scale (VAS) pain score was 7/10 despite treatment with tablet Ultracet twice daily and tablet pregabalin 150 mg at bedtime.

After informed consent, a diagnostic bilateral lumbar sympathetic block was performed under fluoroscopic guidance at the L5 level. Following confirmation of appropriate contrast spread, 5 mL of 1% lignocaine with 4 mg dexamethasone was administered on each side. The patient

experienced approximately 80% reduction in pain, lasting 48 hours. During this period, perceptible warmth of both feet was noted, accompanied by visible demarcation and color changes in the distal forefeet. The response to the diagnostic block supported a sympathetically mediated component to the ischemic pain and provided a clinical basis for proceeding to neurolysis.

Lumbar sympathetic neurolysis was subsequently planned. Under aseptic precautions and fluoroscopic guidance, a 22-gauge, 15-cm spinal needle was advanced to an anterolateral position adjacent to the L5 vertebral body. Correct needle placement was confirmed with contrast injection and negative aspiration was obtained before neurolytic injection. A total of 6 mL of absolute alcohol was injected slowly. The patient's vital signs were monitored throughout the procedure and during the immediate post-procedure period.

Following neurolysis, the patient reported marked improvement in pain, with the VAS decreasing from 7/10 at baseline to 2/10. He also reported warmth in the bilateral toes, and capillary refill appeared subjectively improved. Sleep quality improved substantially because the previously severe rest pain was relieved. He was discharged the following day on tablet pregabalin 75 mg at bedtime and tablet Ultracet twice daily. At two-week follow-up, the analgesic benefit persisted. The gangrenous toes remained demarcated without progression to cellulitis, supporting continued conservative management of the dry gangrene.

Discussion

The central challenge in CLTI is the coexistence of inadequate arterial perfusion, severe ischemic pain and progressive tissue injury. Revascularization remains the cornerstone of treatment because it directly addresses the vascular obstruction.[1,2] In the present case, however, CT angiography demonstrated multisegmental tibial occlusion without suitable target vessels, making conventional revascularization impractical. The clinical priority consequently shifted toward controlling the severe ischemic pain and maximizing the perfusion of potentially viable tissue while the dry gangrene was allowed to demarcate.

The rationale for lumbar sympathetic neurolysis is based on interruption of sympathetic vasoconstrictor activity. Sympathetic denervation can increase peripheral blood flow and skin temperature through vasodilation, and may improve microcirculatory perfusion in an ischemic limb.[5,6] This physiological effect is particularly relevant in patients whose large-vessel anatomy cannot be corrected. The marked warmth observed after the diagnostic block in this patient, followed by continued warmth after neurolysis, was clinically consistent with this mechanism. The initial diagnostic block also demonstrated a substantial, albeit temporary, reduction in pain, helping to establish that sympathetic blockade could produce meaningful symptomatic benefit before a longer-lasting neurolytic intervention was undertaken.

It is important to distinguish the effects of sympathetic neurolysis from those of revascularization. Neurolysis does not reopen an occluded tibial artery or restore normal macrocirculatory blood flow. Its potential benefits are instead related to reduction of sympathetic vasoconstriction, improvement in the peripheral microcirculatory environment and control of ischemic pain.[5,6] Therefore, it should not be considered a substitute for vascular assessment or revascularization when a suitable vascular option exists. In a patient with dry gangrene, the procedure should likewise be viewed as supportive management; definitive treatment of nonviable tissue remains dependent on demarcation, tissue viability, infection status and vascular surgical assessment.

The clinical course in this case illustrates several potential advantages of this approach. First, pain relief was rapid and substantial, with the VAS improving from 7/10 to 2/10. Second, the patient described improved warmth in both feet and subjective improvement in capillary refill. Third, sustained analgesia improved sleep and allowed discharge on lower-dose pregabalin. Finally, at two weeks there was no progression to cellulitis and the gangrenous toes remained demarcated, allowing continued conservative observation. These findings are clinically meaningful because severe ischemic pain can itself markedly impair sleep, mobility and quality of life, even when tissue loss is already established.

Previous reports have described a role for lumbar sympathectomy in selected patients with critical limb ischemia and toe gangrene. A prospective study in diabetic patients reported the use of lumbar sympathectomy in critical limb ischemia, while long-term follow-up data have described limb-salvage outcomes in patients with toe gangrene.[5,7] A report focusing on thromboangiitis-related ischemia has also described lumbar sympathetic block as a strategy for pain relief.[6] These observations support the concept that sympathetic interruption may have a role in carefully selected ischemic limbs, although the evidence base is limited and largely consists of observational or retrospective experience rather than contemporary randomized comparisons.

The present patient is notable for his young age and absence of known diabetes or other reported metabolic comorbidities. Chronic tobacco exposure was the principal identified risk factor and, in the clinical context of distal arterial disease, may have contributed to the severity of peripheral vascular compromise. However, the case does not establish a specific etiological diagnosis beyond the documented arterial occlusion and smoking history. The response to sympathetic blockade should therefore be interpreted primarily as a therapeutic observation rather than proof of a particular vascular disease mechanism.

Patient selection remains important. A complete vascular assessment is necessary before considering sympathetic neurolysis, with revascularization pursued whenever technically and clinically appropriate. The presence of dry rather than infected gangrene is also relevant to the conservative strategy described here. Neurolysis should not delay treatment of infection, wet gangrene or rapidly progressive tissue loss. Potential procedural complications, including bleeding, infection, hypotension, genitourinary or neurologic effects and inadvertent vascular or neural injury, must be considered and discussed during consent. In this case, the procedure was performed under fluoroscopic guidance with contrast confirmation and peri-procedural monitoring, and no immediate complication was reported.

The limitations of this report should also be recognized. It describes a single patient and therefore cannot establish the efficacy of lumbar sympathetic neurolysis for limb salvage. The observed improvement in warmth and pain cannot be separated completely from the natural course of dry gangrene or other concurrent management. Objective perfusion measurements were not reported, and follow-up was limited to two weeks. Consequently, the absence of progression to cellulitis and continued demarcation should not be interpreted as proof of long-term limb salvage. Longer follow-up and objective vascular or microcirculatory measurements would be needed to determine whether the intervention changes tissue outcomes beyond analgesia and short-term clinical stability.

Conclusion

Lumbar sympathetic neurolysis may provide meaningful relief of otherwise refractory ischemic pain and may improve peripheral warmth and microcirculatory perfusion in selected patients with chronic limb-threatening ischemia. In patients with dry gangrene who have no feasible

revascularization target, it can serve as an adjunctive strategy to facilitate conservative limb management and improve quality of life. It does not correct the underlying arterial occlusion and should be undertaken only after appropriate vascular evaluation and careful patient selection.

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Declarations

Ethics Approval

Not stated in the submitted manuscript.

Consent for Publication

Written informed consent was obtained from the patient for publication of this case report and the accompanying clinical information.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Author Contributions

Dr Jasmine Kaur contributed to the conception and preparation of the case report, clinical data collection, literature review and drafting of the manuscript. Dr Sujeet Kumar Singh Gautam contributed to clinical supervision and procedural management, critical review of the manuscript and final approval of the version to be submitted. Both authors approved the final manuscript and agree to be accountable for the work.