

## **Complete Pain Relief after Combining Radiofrequency and Phenol for Lumbar Sympathectomy**

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**Lumbar sympathectomy alleviates pain such as complex regional pain syndrome, phantom limb pain and other peripheral neuropathies. Different modalities have been used to manage complex syndromes including sympathectomy. Both radiofrequency (RF) and phenol injection are established methods of performing sympathectomy.**

**We present a case with possible diagnosis of chronic regional pain syndrome in a 56 year old lady who presented as an emergency with severe unbearable pain in her right leg. As a result of compromised circulation in the legs, the distal phalanx of second toe was amputated. Diagnostic lumbar sympathectomy with local anaesthetics provided short and temporary pain relief.**

**Lumbar sympathectomy by means of radiofrequency combined with phenol injection was used; the symptoms were alleviated within 12 hours. Follow-up at different intervals has shown remarkable subjective and objective recovery with improved circulation, discoloration and complete healing.**

**To the best of our knowledge this is the first case report of sympathectomy combining the two modes of RF and phenol injection in the same session.**

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Lumbar sympathectomy has been used to alleviate pain including sympathetically mediated lower limb pain such as phantom limb pain, complex regional pain syndrome (CRPS), and other peripheral neuropathies<sup>1,2</sup>. Lumbar sympathectomy is effective in pain secondary to vascular insufficiency<sup>3</sup>.

Chemical lumbar sympathectomy with phenol has been used for decades and has proved to have significant beneficial effects<sup>4,5</sup>. This mode of sympathectomy decreased the need for open surgery, but still has risks and complications, such as, post sympathectomy neuralgia and other complications<sup>6</sup>.

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Radiofrequency is used for sympathectomy with good results and some advantages over the chemical neurolytic techniques<sup>5,6</sup>. The development of precise neurolysis with radiofrequency significantly decreased the risks of sympathectomy neuralgia; the result is comparable to chemical and surgical neuroablation, though its longterm result is a debatable subject<sup>7</sup>.

The aim is to present a case of lumbar sympathectomy using combined radiofrequency and phenol injection for pain relief.

## **THE CASE**

A fifty-six year old female, with no previous medical problems, was the victim of an accident in which a heavy object fell on her right foot. She presented with severe pain and discoloration of her second toe. The severity of pain was 10/10 in verbal numerical/analogue scale. On examination, there was no distal pulse in the right dorsalis pedis artery. Angiography showed significantly reduced blood flow to the right distal leg. The patient developed gangrenous toe, which necessitated amputation of the distal phalanx of the right second toe.

The severe pain continued and the patient became extremely sensitive to touch and air flow. Sleep disturbance put her in further agony. Minimal pain relief was achieved through oral tramadol 100 mg eight hourly, paracetamol 1 gm 6 hourly and diclofenac IV 75 mg every 12 hours. Diagnostic lumbar sympathectomy with local anesthetic was done, which achieved temporary pain relief.

Her pain became intractable even at rest, and her amputation stump demonstrated poor healing. The patient became more irritable with depressed mood. Combined phenol and radiofrequency lumbar sympathectomy was performed.

The patient received 1 mg midazolam and 50 micrograms fentanyl. Fluoroscopy and radio-contrast material (Xenetix; Lobitridol 300 mg/ml) were used. NeuroTherm NT2000 lesion generator with radiofrequency cannula (150 mm long, 10 mm active tip) was used. This cannula was introduced 7 cm lateral to the spinous processes of the second, third and fourth vertebral bodies under the guidance of C-arm with an image intensifier, see figure 1. The location of the tip of the needle was then reconfirmed as appropriate by witnessing the spread of an injection of 0.5-1 ml of lobitridol, see figure 2. Aspiration of blood and cerebrospinal fluid was negative. Radiofrequency stimulation was done at 50Hz and 2Hz to identify the proximity to sensory or motor nerves respectively. One ml of 1% lignocaine at each site was injected. Pulsed radiofrequency was done for 120 seconds at a temperature of 42°C at each level (L2, L3, L4) followed by injection of 2 ml of 0.5% bupivacaine and phenol (5 ml of 5% phenol in oil).



**Figure 1: Lateral View Showing the Needles at L2, L3 & L4**



**Figure 2: Lateral View after Contrast Injection at L2, L3 & L4**

The pain improved immediately and the patient was almost pain free with a score of 3/10, 30 minutes after completion of the procedure. The pain restarted after 1.5 hour, for which she was given paracetamol 1 gm IV and pethidine 100 mg IM, but the pain did not improve much and it returned to its original level after two hours. The patient was pain free after less than 12 hours and slept normally.

Two, five and twelve weeks follow-ups, the patient was pain free, with no appearance of any abnormal sensation or other types of pain in the lower limb, see figure 3.



**Figure 3: Healing Stump 4 Weeks after the Block**

## **DISCUSSION**

Many studies have shown positive results after sympathectomy in patients suffering from rest pain, limited gangrene, causalgia and vasospastic phenomena<sup>8-10</sup>.

Phenol and radiofrequency lumbar sympathectomy are established techniques, each with different benefits and risks. Both of them can be repeated with minimum side effects but the radiofrequency has less distortion to the internal anatomy<sup>11</sup>.

Phenol lumbar sympathectomy is popular and has been used for a long time but it has some degree of morbidity. It was the method of choice, easily performed, effective and has good duration<sup>12</sup>. Post-sympathectomy neuralgia is a complication, which might arise due to the irritation of the genitofemoral nerve by phenol<sup>13</sup>.

On the other hand, radiofrequency lumbar sympathectomy, though it has been an established technique, but not enough studies to compare it with chemical sympathectomy<sup>14,15</sup>.

The position of the needle tip is specific and away from any nearby segmental nerve distribution whether sensory or motor. Therefore, the radiofrequency effect is limited and specific damage would be around the bare tip only<sup>16,17</sup>.

The practice of surgical and chemical sympathectomy for neuropathic pain and CRPS is based on poor quality evidence. Sympathectomy should be used cautiously in clinical practice, in carefully selected patients, and probably only after failure of other treatment options<sup>18</sup>.

## **CONCLUSION**

**A patient suffering from intractable pain was treated with radiofrequency and phenol sympathectomy. She had uneventful recovery.**

**Further research study about the type and technique for lumbar sympathectomy is proposed to verify the effectiveness of the combined procedure.**

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