

# A NOVEL TECHNIQUE TO DELIVER EPIDURAL PULSED RADIOFREQUENCY FOR THE MANAGEMENT OF PERSISTENT LUMBAR RADICULAR PAIN IN FAILED BACK SURGERY SYNDROME – A CASE REPORT.

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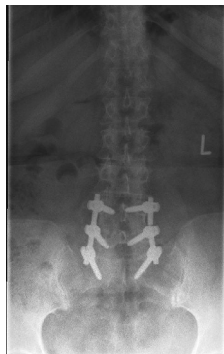
## Background:

Radicular pain has been successfully treated with pulsed RF to dorsal root ganglia [1]. A transforaminal approach is most commonly used, but may be unsuccessful in cases with abnormal anatomy or implanted metalwork. In these situations, an interlaminar approach may be required. A recent case report [2] identified the successful treatment of lumbar radicular pain in a cancer patient using a guidable radiofrequency injection electrode with a metallic coil active tip and embedded temperature sensor.

Here we describe a case report where we successfully treated lumbar radicular pain in a patient with failed back surgery syndrome (FBSS) using the same guidable radiofrequency injection electrode with a metallic coil active tip and embedded temperature sensor (RCE-E401519, Cosman Medical, Inc., USA).

## Case Report:

A 56 year old woman with a background of spinal fusion L4-S1 and persistent right-sided radicular leg pain had previously short lived analgesia from a caudal epidural with subsequent failed attempts at a DRG block due to difficult anatomy. A recent MRI of the Lumbar spine confirmed right L5 nerve root compression and excluded fibrosis or arachnoiditis.



Lumbar spine radiograph Jan 2014



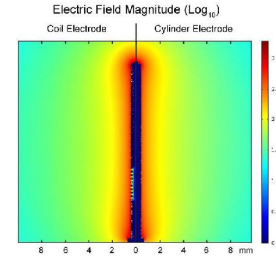
MRI Jan 2008

## References:

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- [3] Cosman ER Jr, Cosman ER Sr. Electric and thermal field effects in tissue around radiofrequency electrodes. *Pain Medicine* 2005;6(6):405-424.

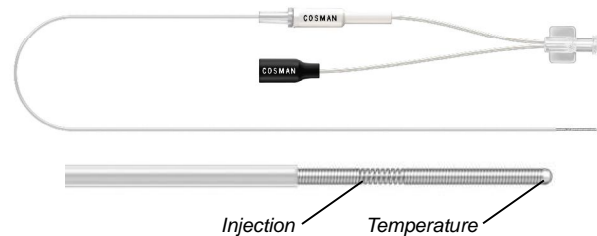
## Rationale:

Pulsed RF with temperature monitoring is preferred to conventional RF heat lesioning for application to the dorsal roots and DRGs because it avoids gross, destructive heating of mixed nerves and tissue near the spinal cord. Pulsed RF exposes neural tissue near the active tip of an electrode to high electric fields (E-fields) while average tissue temperatures remain at or below 42 C [1,3]. PRF E-fields are theorized to operate via sub-millimeter hot flashes, disruption of membrane and intracellular structures due to the electric field's strong ionic forces, and/or long-term depression of the first synapse in the dorsal horn [3]. Finite-element modeling demonstrates that the E-field produced by the RCE coil electrode with outflow gaps is equivalent to that produced by a solid cylindrical electrode of the same size.



## Intervention:

Under fluoroscopic guidance, a guidable RF injection electrode with 20ga/15mm active tip, embedded temperature sensor, and 19ga/40cm shaft (Cosman RCE-E401519) was introduced via the sacral hiatus using a straight 16ga/9cm epidural needle.



The active tip of the electrode was positioned at the level of L4-5 on the right side. Sensory stimulation at this level reproduced the patient's pain and pulsed RF was applied at this single location using an RF generator (Cosman G4) settings:

- Set Temperature: 42 C
- Set Time: 12 minutes
- Set Voltage: 45 Volts
- Pulse Rate: 2 Hz
- Pulse Width: 5 milliseconds
- E-dose: Vary Voltage .The generator maintained 45 V output throughout and the measured temperature did not exceed 42 C.

## Results:

The patient reported immediate excellent pain relief, which was maintained for 6 weeks (at time of writing). This was supported by the reported reduction of the analgesic medication usage, increased activity and improved sleep symptoms.

## Conclusion:

When PRF is technically difficult using the conventional transforaminal route, due to abnormal anatomy from previous spinal surgery, an interlaminar technique may provide an effective alternative.

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Conflict of interest: Dr. R Lifford and A Ghazi - Nil

Dr. E Cosman Jr – Scientific Director at Cosman Medical