

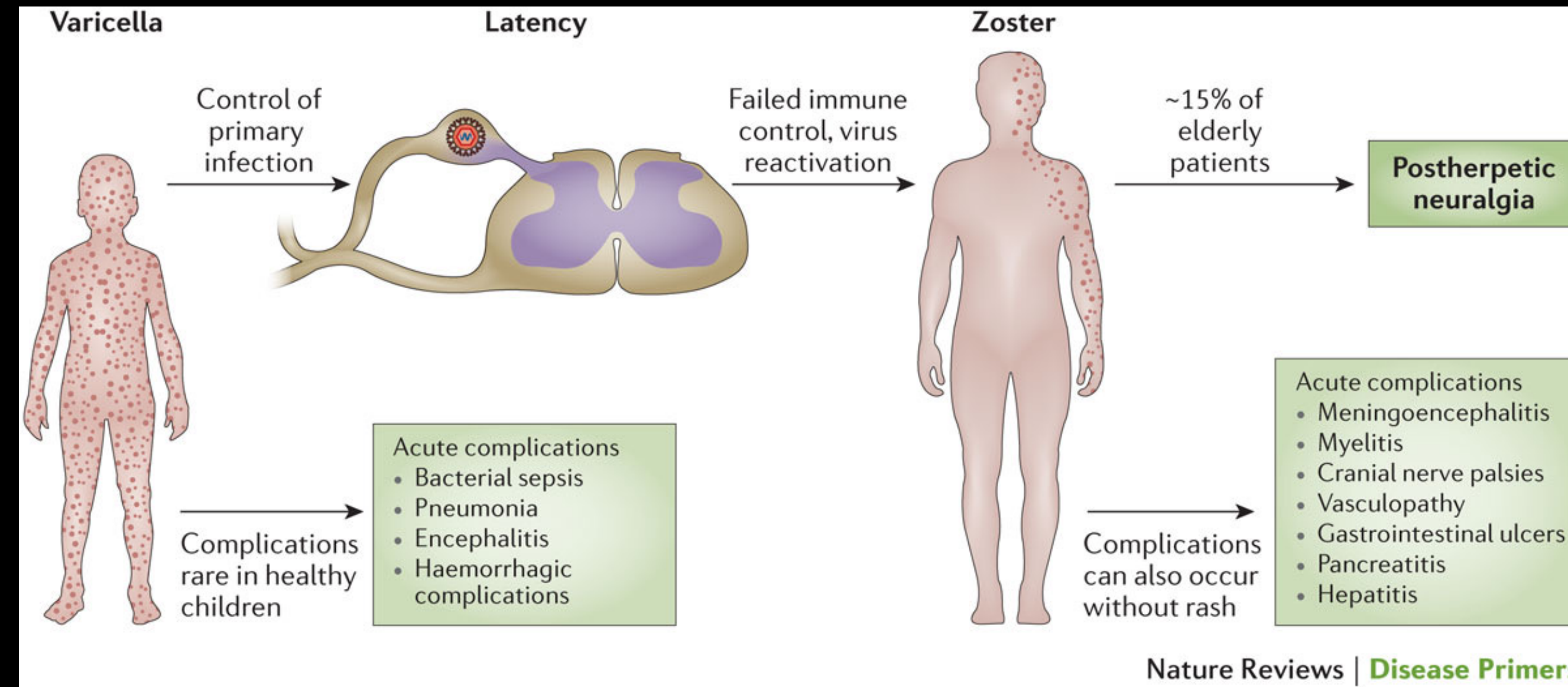
Peripheral Nerve Stimulation for a Refractory Case of Postherpetic Neuralgia in the Upper Limb: A Case Report

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Background

PHN is a chronic neuropathic pain syndrome that is a direct consequence of reactivation of VZV known as Herpes zoster (HZ), known as *shingles*.



Objective

The purpose of this case report is to present a patient with upper limb PHN who responded to peripheral nerve stimulation (PNS) after he failed to obtain sufficient pain relief with conservative management and how more invasive interventional techniques such as PNS can be used as pain relieving measures to improve the patient's quality of life.

Case Description

- 65-year-old Caucasian male
- Past medical history significant for Sjogren's syndrome, non-Hodgkin lymphoma, hypertension, and hypothyroidism
- Presented with PHN involving the left upper extremity (C5-C6 nerve root distribution).
 - Pain has persisted for 4 months and rated a 9/10 on a numerical rating scale
 - Associated symptoms reported fatigue, trouble sleeping, and weight gain as a result of the pain

Physical exam of left upper extremity:

- No signs of rash or inflammation
- Thenar atrophy
- Hypersensitivity on the dorsum of the thumb and the palmar aspect of the hand
- Active and passive motion of the thumb were limited due to pain.

November 2022

TampaPainMD, Tampa FL, USA

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Previously explored treatment modalities:

Conservative/Pharmacological management:

- Pregabalin 150 mg TID and methadone 5 mg BID
- Decrease the pain from 10/10 to 9/10

Invasive treatment modalities

- Cervical epidural corticosteroid injection → provided temporary pain relief
- Left stellate ganglion block → provided no pain relief

The patient reported the most significant improvement in symptoms from acupuncture

TIMELINE

2

February 2023

Presented to clinic after 4 months of therapy.

Diagnostic left median and left superficial radial nerve blocks were performed

- Each nerve was infiltrated with 7.5 mL of Ropivacaine 0.15% and 10 mg of dexamethasone

Patient reported >90% relief of pain for 2 days following the block before returning to baseline.

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March 2023

Trial of 8% capsaicin patch was applied over the forearm for 1 hour in the office providing 10% relief.

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June 2023

- The patient reported no significant pain relief from the capsaicin patch or the medications he was on at that time (pregabalin and methadone).
- Other therapeutic options like oral or IV Ketamine, IV lidocaine, spinal cord stimulation, and peripheral nerve stimulation were discussed.
- Patient opted for PNS.

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June 2023

- Placement of PNS device.
- The left median nerve was first targeted under direct ultrasonographic guidance (fig. 2). The patient reported a sensory stimulation at 30 Hz.
- The left superficial radial nerve was targeted next (fig. 3). The patient reported a sensory stimulation at 50 Hz.
- Once the stimulation was confirmed, the MicroLeads were implanted and secured with topical skin adhesive (fig. 4). Programming was done in the recovery room (fig. 5).

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July 2023

- Patient reported that his pain had reduced to 5/10 from 9/10
- Minimal improvement in his quality of life, sleep, and physical function.
- Advised to increase the stimulation when the thumb is hurting and to decrease it when he feels the stimulation is too strong.
- Patient discontinued methadone and pregabalin.

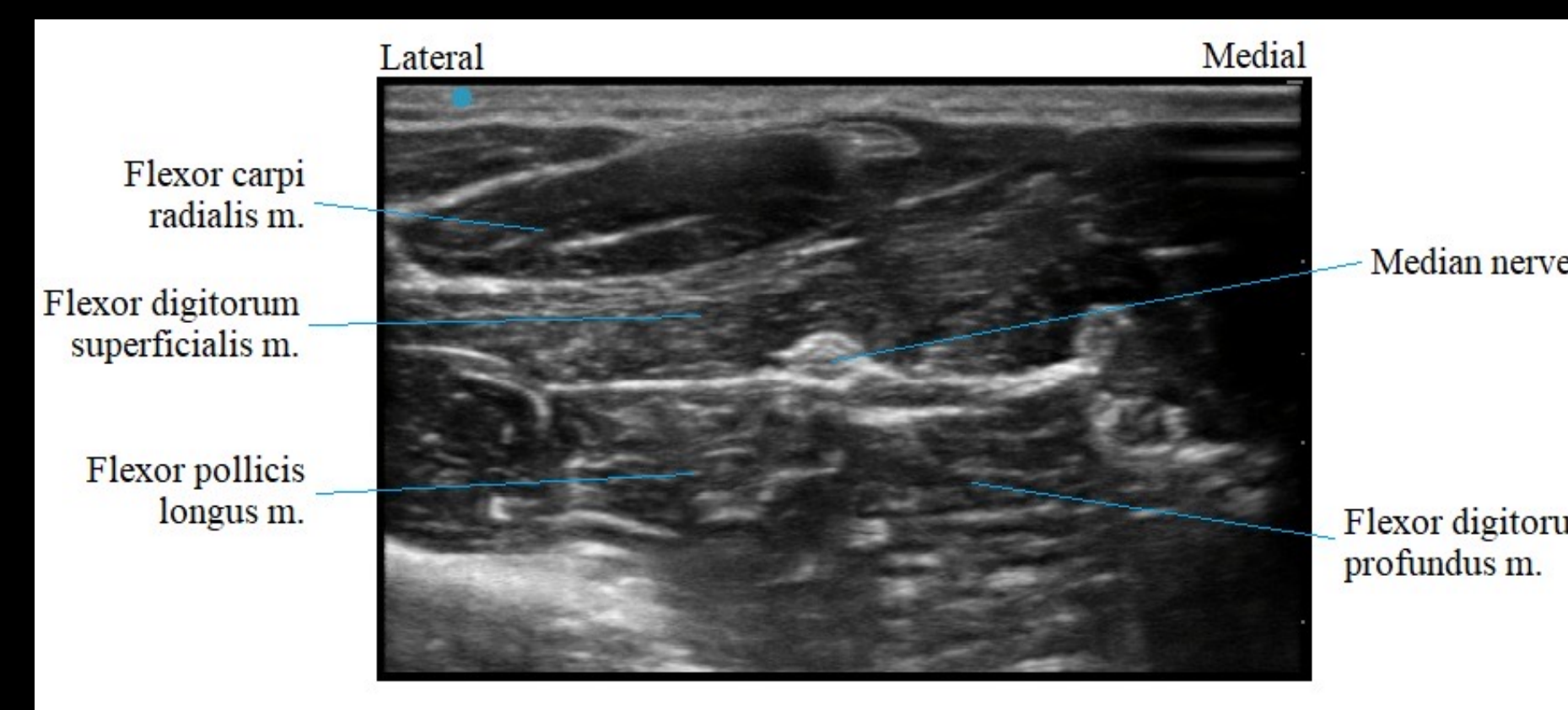


Figure 2. Ultrasonography of the median nerve

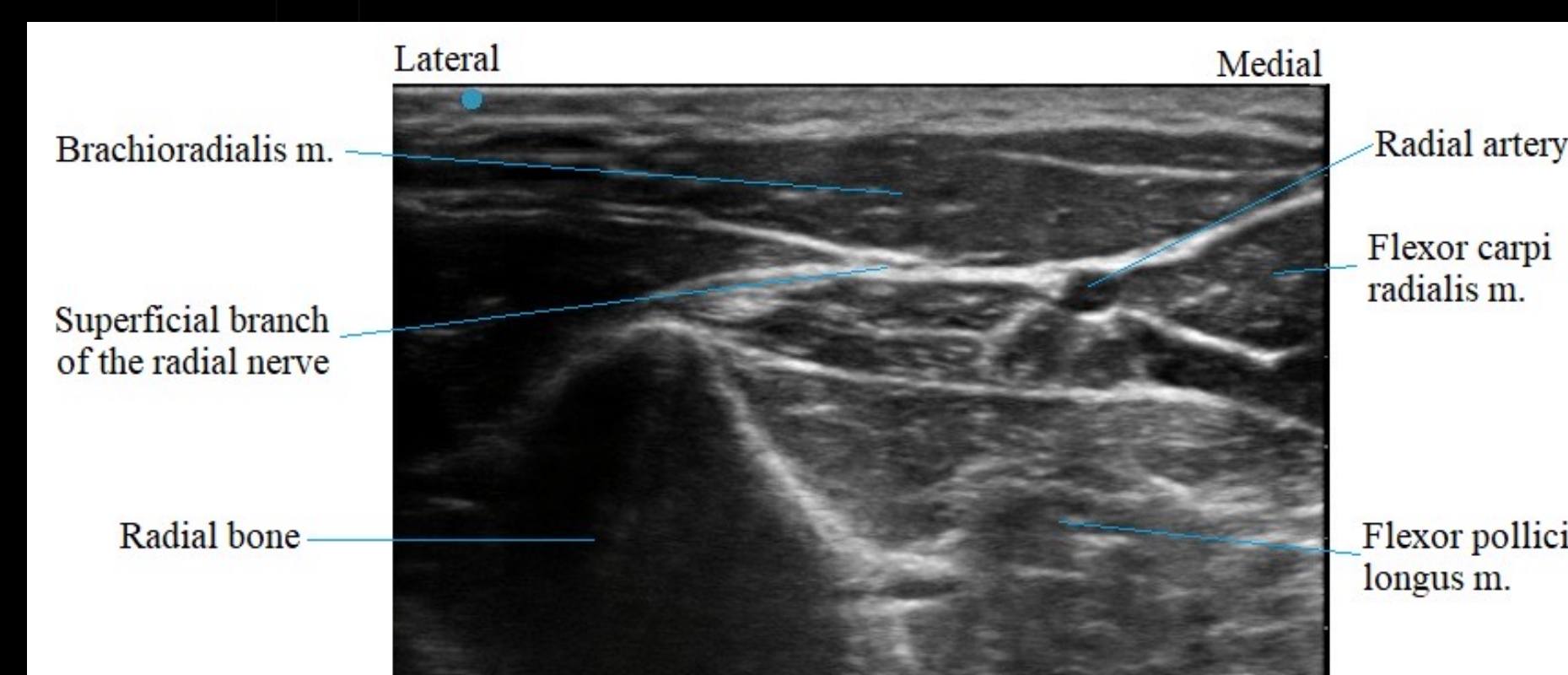


Figure 3. Ultrasonography of the superficial branch of the radial nerve



Figure 4. Electrodes at median and superficial radial nerve



Figure 5. PNS implant with external pulse generator

Discussion

- Based on current literature, tricyclic antidepressants (TCAs), gabapentin, pregabalin and topical lidocaine 5% patch as first line of therapy for PHN as monotherapy or combined therapy.
- Other modalities include invasive measures like intrathecal steroids, sympathetic blockade and implantable spinal cord stimulators.
- Spinal cord stimulation (SCS) and peripheral nerve stimulation are (PNS) both based on the postulated gate control theory proposed by Melzack and Wall in 1965 [2]. The spinal cord processing is acting as a neurologic gate, where networks of nociceptive signals are blocked by intense tactile stimulation from the same area as the pain signal.
 - PNS stimulates the peripheral nerves directly via a PNS device, thereby closing "the gate" and blocking the transition of painful stimuli at the level of the spinal cord.**
- SCS has been used for the treatment of chronic pain since 1976 and has been proven effective in the management of PHN but it more invasive than PNS due to placement of metal leads in the spinal dorsal epidural space.
- Existing studies on use of PNS and its outcome for chronic pain management show over 60% of patients had improvement in their symptoms and quality of life but studies are limited for upper extremities.
- Subcutaneous PNS can be an effective alternative for patients who are not good candidates for SCS or have failed SCS treatment.
- To our knowledge this is the first attempt at treating PHN of the upper extremity with PNS.
- It has provided a substantial improvement in our patient's symptoms and seems like an alternative to SCS in the management of refractory PHN.
- Future studies need to be conducted to assess and compare the safety profiles and efficacy of these two treatment modalities for refractory PHN.

References

- Gershon, A. A. et al. (2015) Varicella zoster virus infection. Nat. Rev. Dis. Primers doi:10.1038/nrdp.2015.16
- Melzack R, Wall PD. Pain mechanisms: a new theory. Science. 1965;150(3699):971-979. doi:10.1126/SCIENCE.150.3699.971