

Chronic Demyelinating Nerve Pain: A Unique Case Linked to Chernobyl Exposure

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Introduction

High radiation exposure from nuclear disasters is known to cause various health issues, including malignancies, cataracts, cardiovascular diseases, and demyelinating injuries [1].

Following the Chernobyl disaster in 1986, studies indicated increased risks of multiple sclerosis (MS) in contaminated areas, with elevated risk ratios of 2.4 to 6.8 compared to

less affected regions [2]. *Post-Chernobyl workers* also exhibited *axonal and demyelinating injuries* with symptoms like weakness, headaches and pain years

later [3]. This report describes a case of idiopathic, painful demyelinating sensory and motor neuropathy in a patient exposed to the Chernobyl fallout in Bavaria.

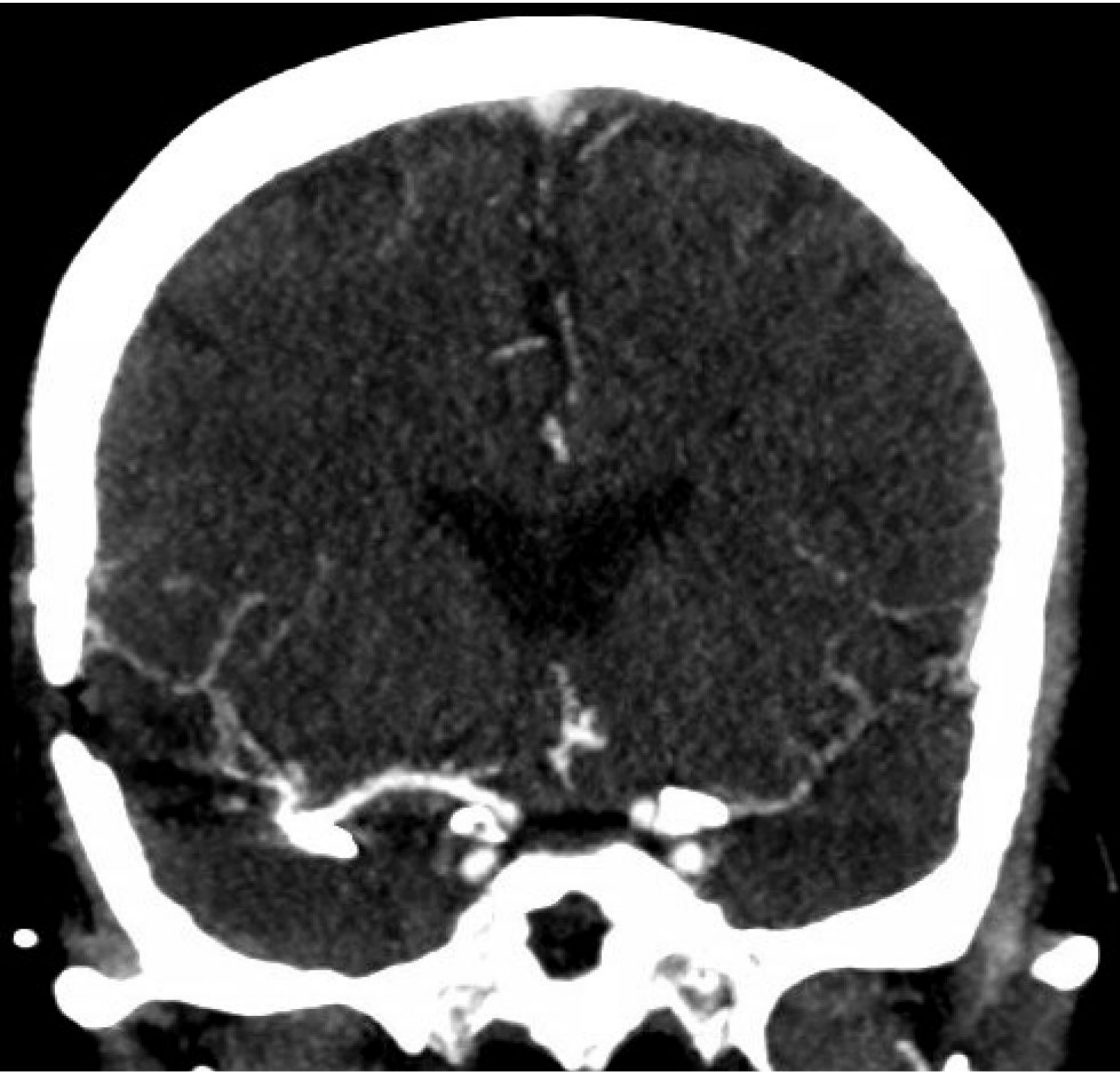


Image: Coronal head CTA showing MRI-incompatible aneurysm clip of R MCA bifurcation.

Case Report

A 51 year old female presented in clinic with a history of Hashimoto’s thyroiditis, and a cerebral aneurysm 14 years prior that was treated with an MRI-incompatible clip. Five years ago, she suffered insidious, progressive neuropathic pain in the upper and lower extremities with associated bilateral leg weakness that left her wheelchair-bound. She failed pharmacotherapy with gabapentinoids, central muscle relaxants and opioids. Notably, she revealed that she lived with her father on a U.S. Army base in Bavaria, where she was *exposed to a plume from the 1986 Chernobyl disaster*.

Extensive neurologic workup revealed CSF studies with elevated protein and myelin basic protein. Electromyography in March 2022 showed *mixed motor and sensory polyneuropathy*. Physical examination found thigh and leg atrophy, dullness to touch in all extremities, and diminished strength (3+/5) of knee and ankle movements. Severe allodynia was present in the bilateral feet and hands, and deep tendon reflexes of the quadriceps, hamstrings, and Achilles tendons were absent.

Discussion

This case report presents a patient with severe neuropathic pain and weakness of unknown etiology despite extensive workup. The findings align with a mixed sensory and motor demyelinating disease, but do not meet MS criteria. Her history of significant radioactivity exposure in Bavaria, and similar documented cases of Chernobyl-related demyelinating diseases, suggest a *possible link between Chernobyl and her painful demyelinating polyneuropathy*.

The presence of MRI-incompatible clips from a prior aneurysm significantly affects the management of this patient’s care, precluding the use of crucial diagnostic imaging. Given the patient’s lack of response to various analgesic and conservative treatments, we initiated a trial of low-dose naltrexone and tizanidine to target potential central pain mechanisms. She failed this trial and we are now pursuing a spinal cord stimulator for her lower extremity pain.

Methods

Informed consent was obtained from the patient for submission of this case report. As the report is devoid of patient-identifiable information, it is exempt from IRB requirements as per UTHSCSA policy. The patient presented to our chronic and interventional pain clinic as a new patient. Patient history was gathered by chart review and corroborated by patient interview. Relevant labs and studies were obtained by electronic health record review. Physical exam findings were obtained during her clinic visit.

References

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3. Troshina OV. Osobennosti patologii perifericheskogo neiromotornogo apparata v otdalennyi period u likvidatorov posledstviï avarii na Chernobyl'skoï AES [Characteristics of the peripheral neuromotor pathology in Chernobyl accident clean-up personnel late after the accident]. Patol Fiziol Eksp Ter. 2004 Jan-Mar;(1):18-20. Russian. PMID: 15052872.