



## BRIEF REPORT

# Complex Regional Pain Syndrome after Cryosurgery of Viral Warts

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Dear Editor:

A 22-year-old male presented with a pain on the plantar area of his right foot. He had received six sessions of cryosurgery to treat viral warts localized in his right foot two years ago. He was healthy and had no illnesses other than viral warts. After three months from the last cryotherapy, the patient entered military training and suffered severe pain in the right sole when he was wearing military shoes. As a result, he was unable to continue his military service and discharged three times in total for two years. There was no other trauma or infection history during the military service. Physical examination revealed that the right foot was slightly more reddened than the left (Fig. 1). We received the patient's consent form about publishing all photographs.

The initial clinical suspicion was complex regional pain syndrome (CRPS) and a three-phase bone scan was performed. Blood flow and pool images showed increased blood flow and pool in the right foot (Fig. 2A). Osseous phase showed delayed uptake in the right foot (Fig. 2B). The diagnosis was confirmed as CRPS type II.

Cryotherapy (cryosurgery) is widely used in various diseases including viral warts, pressure corns, prurigo nodularis, and actinic keratosis. Cutaneous cryotherapy some-



**Fig. 1.** Clinical photograph of the patient: The right foot was slightly more reddened than left.

times result in such as skin ulcers, bullae formation, scar formation, secondary infection, and even full-thickness skin necrosis and prolonged and repeated application can damage the nerves<sup>1-4</sup>.

CRPS is a rare neuropathic pain disorder that usually oc-

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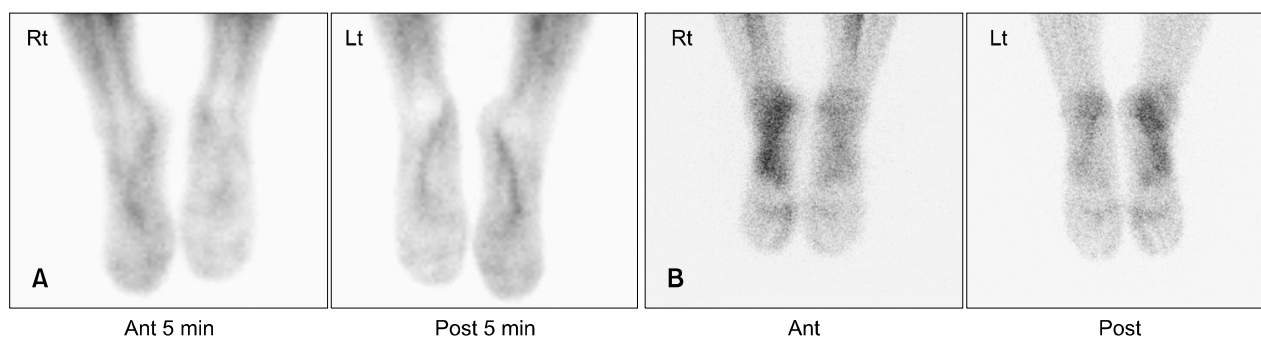
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**Fig. 2.** Results of the three-phase bone scan. (A) Anterior (ant) and posterior (post) pool phase images show increased pool activity after injection of 20mCi  $^{99m}\text{Tc}$ -methylene diphosphonate in the right foot. (B) Delayed phase images show diffusely increased uptake in the right foot. Rt: right, Lt: left.

curs secondary to traumatic injury or lesions of the peripheral or central nervous system<sup>5</sup>. It generally develops up to 6 months after the event. Characteristics of CRPS are sensory (pain, hyperalgesia, allodynia), autonomic (disturbances of skin temperature, color change, abnormal sweating), and motor (paresis, tremor, dystonia) symptoms. The diagnosis is primarily according to clinical symptoms, and neurological tests including three-phase bone scan can be helpful. In typical cases, increase of blood flow in the pooling phase of the affected limb and increase of bone resorption of radioisotope in the delayed phase can be observed in the early stages. In the very early stages, blood flow increases in the perfusion phase in the affected limb, but there is no evidence of increased bone resorption in the radioisotope in the delayed phase. In the long term after the occurrence, there can be no increase or even a decrease of blood flow in the perfusion phase or pooling phase of the affected extremities. The treatment goal for CRPS is to alleviate and control pain, and achieve remission. The management must be multidisciplinary approach, including pharmacologic physical, psychological, and interventional therapies. And there are evidences that supplemental vitamin C can lower the risk of developing CRPS<sup>5</sup>.

Although cryotherapy can lead to the complication of neural injury, as far as the authors know, this is the first case of CRPS after wart treatment. We report this case as being educational because it is a common technique widely practiced in the dermatology field, and suggest that dermatologists be aware of CRPS as a very rare complication of cryotherapy.

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## CONFLICTS OF INTEREST

The authors have nothing to disclose.

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