

Squamous Cell Carcinoma in a Case of Chronic Arsenicosis: A Case Report

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Abstract: *We describe here a case report of a patient who underwent multiple surgeries to treat skin malignancy arising from documented Arsenicosis. Arsenicosis most commonly arises from the use of contaminated groundwater. It presents itself with myriad health issues ranging from growth retardation, respiratory disorders to bladder and skin cancers. Skin malignancy from arsenicosis is usually treated with wide local excision. In case of extensive disease involving limbs, whenever feasible, every attempt should be made to salvage the limb to prevent deterioration of quality of life. Patients who undergo amputations should be offered appropriate functional rehabilitation. Careful follow-up of treated patients is necessary for early detections of recurrences and new lesions.*

Keywords: Arsenicosis, squamous cell carcinoma, upper limb amputation

1. Introduction

Contamination of ground water by arsenic is the most common source of chronic arsenic toxicity.¹ Other sources include traditional methods which incorporate the use of arsenic as medication to treat diseases such as asthma and psoriasis. Arsenic toxicity affects several organs of the human body of which skin carcinogenicity² is most common.

2. Case Presentation

A 71 year old lady from West Bengal initially presented with a history of an ulcero-proliferative lesion over left thenar area for two years (Figure 1). She had multiple macular spots and hypopigmented lesions all over her body. Ten years prior to her initial visit she had undergone excision of a thigh lesion at a nursing home, details of which could not be obtained and had even undergone radiotherapy following the procedure. Since birth, she had been residing in an area which had a documented history of prevalence of arsenicosis. This had been proven by a government survey which had examined the residents' hair, nails and drinking water. Her left-hand lesion was biopsied in a local hospital and came as moderately differentiated SCC (squamous cell carcinoma). The disease extended to the underlying muscles, palmar spaces and bones (Figure 2, Figure 3) requiring her to undergo a hip disarticulation in April of 2023.

Four months following the procedure she developed recurrence at the amputation stump (Figure 4). There was also a new lesion in the right palm which was determined to be a squamous cell carcinoma following a biopsy (Figure 4, Figure 5). The right palm lesion was superficial involving only the dermis of the volar skin (Figure 6) and hence it was excised and skin grafting was done to resurface the resultant raw area. The recurrence at the stump was treated with a revision amputation at the level of mid forearm.

Recently, she developed an ulcerative lesion over her right temporal scalp hair-bearing area which was excised and covered with superficial temporal artery based local hatchet and perforator plus flap. The lesion came out to be SCC in situ on histopathology.

She is being regularly reviewed every three months. At present, she complains of difficulty in fully extending her right wrist which is due to post-grafting contracture (Figure 7). Active and passive massaging and physiotherapy have been advised. She is being considered for rehabilitation through use of a prosthesis.

3. Discussion

Major sources of inorganic arsenic in diet is ground-water and rice. WHO limit of arsenic in drinking water is 10 mcg/L.³ One of the greatest sources of geographic groundwater arsenic was discovered in 1993 in Bengal delta with subsequent hotspots found in Argentina, Cambodia, China, India, Mexico, Pakistan, the United States and Vietnam.³ Arsenic leads to concentration in ectodermal tissues including skin, hair and nail.³

In a clinico-epidemiological study conducted across Basirhar and Baduria blocks of North 24 Parganas district of West Bengal, 56% showed skin pigmentation and keratosis, 2% showed skin cancer and 42% did not show any symptom.⁴

In nine districts of West Bengal, namely Nadia, Murshidabad, Burdwan, Howrah, Hooghly and Kolkata, level of arsenic in groundwater exceeds the limit of 50 mcg/L.⁵

The effects of arsenicosis include growth retardation, skin disorders (like melanosis, leucomelanosis, keratosis, hyperkeratosis, skin cancer), non-pitting edema, hypertension, cancer of bladder, lung, kidney and liver, peripheral vascular disease, ischaemic heart disease,

restrictive pulmonary disease, non-cirrhotic portal fibrosis, respiratory problems, hypertension and diabetes mellitus.⁶ Mechanism of carcinogenicity in arsenic poisoning include oxidative DNA damage, chromosomal aberration and interference in cellular signalling pathway.⁶

For malignant skin disorders, literature suggests that presence of clear margins following excision is associated with 95% local control and 99% disease specific survival. However, in cases of macroscopic perineural invasion this local control drops down to 50-55%.⁷

Amputation is an acceptable option only after all options are exhausted for treating a limb malignancy given that limb amputation has a deleterious effect on the amputee's quality of life. Post-amputation rehabilitation is a difficult task and the rate of prosthesis abandonment is high in the upper extremity.⁸ Myoelectric prostheses, flexible insulated sensors, capacitive biopotential sensors and waterproofing technologies have shown enhanced dexterity, patient comfort and flexibility and increased degrees of freedom of movements.⁹

Surgical advances such as targeted muscle reinnervation, regenerative peripheral nerve interfaces, agonist-antagonist myoneural interfaces, and targeted sensory reinnervation; development of technology designed to restore sensation, such as implanted sensors and haptic devices; and evolution of Osseo integrated (bone-anchored) prostheses show great promise.⁹

4. Conclusion

SCC arising in limbs following arsenicosis leads to significant loss of DALY (Disability-Adjusted Life Year). If amputation is warranted, the emphasis should always be on preserving as much length of the remaining limb as possible. However, Conservation should be attempted only after making sure there is no deeper tissue involvement. In patients showing recurrence, postoperative radiotherapy is advised. Amputees should be offered appropriate functional rehabilitation through use of prosthesis. A high degree of suspicion in people presenting with typical lesions and hailing from known arsenic belts may be crucial in early detection of malignancy with minimal intervention. Similarly, careful follow-up of treated patients is necessary for swift identification of recurrences and new lesions.



Figure 1

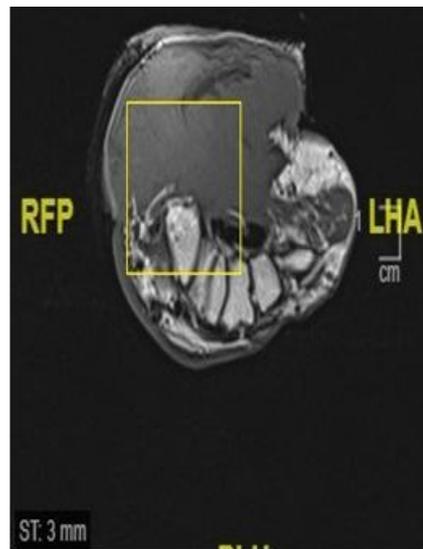


Figure 2

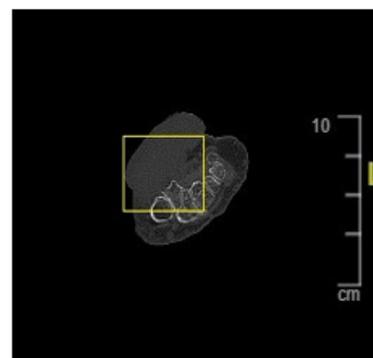


Figure 4



Figure 4



Figure 5

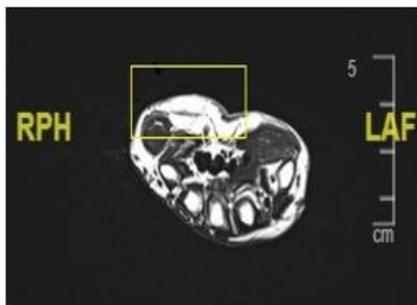


Figure 6



Figure 7

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Figure Legends

- Figure 1: Ulcero-proliferative lesion over left thenar area
- Figure 2: MRI showing extension of the SCC on the left hand into the muscles and palmar space
- Figure 3: CT scan showing extension of the SCC of the left hand into the underlying bones
- Figure 4: SCC recurrence on the left upper limb amputation stump along with new onset lesion on the right palm
- Figure 5: New onset lesion on the right palm (Preoperative view)
- Figure 6: MRI showing superficial extent of the right palm SCC involving only the dermis
- Figure 7: Contracture of the skin graft over the right palm

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