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Case Report

Dermatology Section

Non-healing Scalp Ulcer Accompanying Chronic Arsenicosis: A Case Report

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ABSTRACT

Arsenic, an environmental toxin, significantly contributes to the development of several health problems. Epidemiological studies done across the globe have reported that a prolonged arsenic exposure has been associated with characteristic skin lesions, neuropathy and an increased risk of skin, lung, liver (angiosarcoma), bladder, kidney and colon cancers. In present study, we are reporting a case of a 60-year-old male, who presented with a large (5cm x 4cm) painless ulcer in fronto-parietal area of scalp, with occasional oozing of blood. X-ray of skull (AP and lateral view) revealed granular well-outlined osteolytic lesions in right fronto-parietal skull vault, which raised a suspicion of malignancy. An incisional biopsy was taken and histopathology revealed no evidence of malignancy. A benign, non-healing skin ulcer is rarely seen in a setting of chronic arsenicosis. His skin examination showed characteristic fine freckles of spotted pigmentary changes i.e. classic rain-drop pigmentations which were present all over the body, particularly on trunk, palms and soles. Arsenic levels seen in hair and nail of the patient were 1.23 micrograms/gram and 3.26 micrograms/gram respectively, which were in accordance with WHO suggested diagnostic criteria of chronic arsenicosis.

Keywords: Rain-drop pigmentation, Arsenicosis

CASE REPORT

A 60- year-old male, a farmer, presented with a large painless ulcer in fronto-parietal area of scalp, with occasional oozing of blood, along with hyperpigmented lesions all over the body. The ulcer had started as a small nodule about 3 years back, which had gradually increased in size and a rapid growth had occurred in past two months. He denied having any history of trauma. He had multiple, patchy, hyperkeratotic lesions all over his body since past 30 years. The lesions were non-itchy and they were mostly prevalent on his palms and soles [Table/Fig-1]. He was a resident of Purbasthali block of Burdwan district of West Bengal, India. He revealed that his source of drinking water had been a tube-well for about 50 years and that similar types of skin lesions were seen among his neighbours.

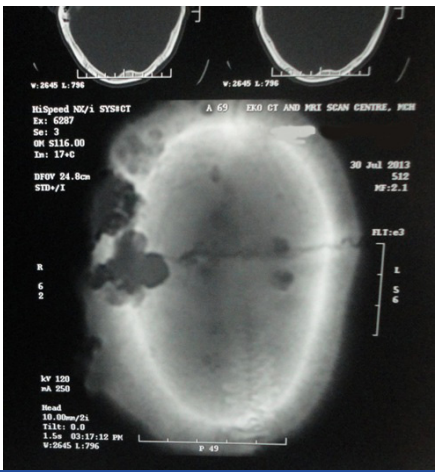
On examination, a 5cm x 4cm, oval shaped ulcer with irregular margins and rolled-out edges, was seen in fronto-parietal region of scalp [Table/Fig-2]. The floor of the ulcer was oedematous and it was covered with red granulation tissue; palpation revealed moderate indurations of the base and the edge. There was no neck lymphadenopathy. X-ray of skull (AP and lateral view) revealed granular well-outlined lytic lesions in right fronto-parietal skull vault, which raised a suspicion of a neoplastic involvement. However, an incisional biopsy showed histology of skin-covered tissue, with evidence of a dense chronic inflammatory cell infiltrate in the dermis, particularly around the hair follicles. No malignancy was seen. The biopsy was repeated at two separate diagnostic centres, both of which revealed no evidence of malignancy. CT scan of brain revealed a diffuse brain parenchymal shrinkage with an irregular lucent defect over vault [Table/Fig-3].

Skin examination showed characteristic fine freckles of spotted pigmentary changes i.e. rain-drop pigmentations which were present all over the body, particularly on trunk, palms and soles. Macular areas of depigmentation on normal skin or a hyperpigmented background i.e. leucomelanosis, were also present in some areas.

Investgations revealed

Haemoglobin level - 5g/dl (which after 4 units of blood transfusion, increased to about 10g/dl).

Albumin level - 2.6g/dl.



[Table/Fig-1]: "Raindrop" pattern of pigmentation or depigmentation
[Table/Fig-2]: Oval shaped ulcer with irregular margin and rolled-out edge in fronto-parietal region of scalp
[Table/Fig-3]: Diffuse brain parenchymal shrinkage with irregular lucent defect over vault on CT scan of brain

Other haematological and biochemical parameters - within normal limits.

Chest X-ray – No abnormality detected.

USG of abdomen – Mild splenomegaly with minimal ascitis.

Serology report was negative for HBV, HCV and HIV.

Arsenic estimation - Arsenic levels in hair and nail were 1.23 micrograms/gram and 3.26 micrograms/gram respectively.

He was prescribed neosporine ointment and betamethasone valerate lotion to apply locally on scalp; tablet doxycycline (100 mg), injection ceftriaxone and vitamin B-complex tablets. Besides this, two units of packed RBCs were transfused for correction of anaemia. A plastic surgeon's opinion was also sought for scalp skin-grafting.

In the present setting, the differential diagnoses included diabetic ulcers, basal cell / squamuous cell carcinoma, ulcers of non-tuberculous mycobacterial (NTM) origin, ulcers caused by actinomycosis infections, chromoblastomycosis and ulcers which accompanied chronic arsenicosis.

Based on history, clinical examinations and laboratory investigations, the patient was provisionally diagnosed with a non-healing scalp ulcer which accompanied chronic arsenicosis.

DISCUSSION

Arsenic is an element which occurs naturally in earth's crust and in small quantities in rock, soil, water and air. Chronic arsenicosis has been defined by the WHO working group as a "chronic health condition which arises from prolonged ingestion (not less than 6 months) of arsenic, above a safe dose, which is usually manifested by characteristic skin lesions, with or without involvement of internal organs" [1]. In West Bengal, India a large population is exposed to arsenic contamination which is acquired from drinking water, which results in consequent escalation in number of chronic arsenicosis cases. The source of the arsenic contamination is suggested to be geological; arsenic level in groundwater has been found to be above 50 micrograms/L (which is the current drinking water standard in much of the world) in seven districts of West Bengal [2]. In 1996, a groundwater quality survey was conducted in the Purbasthali block of the Burdwan district of West Bengal. The researchers reported high levels of arsenic pollution in this area, where arsenic was detected in 19 out of 20 tube wells which were sampled, at a concentration level of 0.5 to 135.9 micrograms/L [3].

Chronic arsenicosis plays a contributory role in the development of several health problems. Epidemiological studies done across the globe have reported that prolonged arsenic exposure has been associated with characteristic skin lesions, neuropathy and an increased risk of skin, lung, liver (angiosarcoma), bladder, kidney and colon cancers [4]. The WHO cut-off value for arsenic in drinking water was provisionally reduced in 1993 from 0.05 mg/L to 0.01 mg/L [5]. Drinking arsenic-rich water over a long period results in various health effects. Here, we have presented a case of a large, non-healing ulcer of scalp in chronic arsenicosis, which is very rare in presentation. The arsenic levels were greater than 1 microgram/gram and 1.08 micrograms/gram in hair and nail respectively, which was one of diagnostic criteria of chronic arsenicosis. This suggested that the patient had been suffering from chronic arsenicosis.

Skin lesions have long been known to be hallmark signs of chronic arsenic exposure. Hyperpigmentation and keratotic lesions were the most common health effects found in populations exposed to arsenic-contaminated drinking water in many countries [6]. The hyperpigmentation is usually marked by raindrop-shaped discoloured spots, diffuse dark brown spots, or diffuse darkening of the skin on the limbs and trunk [7]. In the present case, we observed similar skin changes in our patient [Table/Fig-1]. Thus, the diagnosis of chronic arsenicosis was based on relevant clinic findings, together with a history of chronic exposure to arsenic, as well as increased arsenic levels in hair and nail samples of the patient.

There was a large, non-healing, benign ulcer in our patient who had chronic arsenicosis, which is a rare finding, because, although ulcers have been reported in chronic arsenicosis, histologies of a majority of them suggest malignancies. We also excluded other causes of non-healing ulcers like diabetes mellitus and hypothyroidism in our patient. Based on history of aresenic exposure, clinical features of the ulcer, hispathological findings (no neoplastic changes were elucidated) and laboratory test results (particularly, arsenic levels in hair and nail), chronic arsenicosis could have been the only possible offender in this case. However, it may be argued that such an ulcer can transform into a malignant one in course of time. Keeping this viewpoint, we counselled the patient to attend dermatology OPD of the institute regularly, so that an early appropriate intervention could be undertaken, as deemed necessary.

AUTHORS' CONTRIBUTION

Authors have equally contributed in conception, acquisition of data, analysis and interpretation of data and have drafted the article critically for important intellectual content.

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