

# Chronic Arsenic Poisoning: A Problem of Contaminated Drinking Water

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**Received** : March 22, 2024

**Published** : April 19, 2024

## ABSTRACT

Arsenic poisoning is a major public health issue that affects millions of people worldwide, contaminated water being the main source. We present a case of Chronic arsenic poisoning with classical cutaneous presentation and one lesion progressing to Bowen's disease. Strong suspicion of malignancy in atypical presentation is highlighted.

## CASE

A 53-year-old male presented with 2-year history of asymptomatic, progressive increasing papules and plaques over trunk and extremities. He also complained of impaired spatial memory and generalized weakness and was admitted for acute pain abdomen one month back. He was otherwise systemically well.

Clinical examination revealed multiple keratotic scaly plaques varying in size from 1-3cm on extremities. There were multiple hypopigmented macules on background of diffuse hyperpigmentation suggestive of raindrop pigmentation on back, multiple keratotic papules and plaques were noted on palms with fissuring of soles (Figure 1).

Routine blood investigations were within normal limits. Histopathology from plaques showed acanthotic epidermis, full-thickness dysplasia with loss of polarity and nuclear pleomorphism and mitoses suggestive of Bowen's disease (Figure 2). Magnetic resonance imaging revealed chronic small vessel ischemic changes with diffuse cerebral atrophy and computed tomography of abdomen showed small collection around appendix with perforation of the tip, probably sequelae of acute appendicitis.

A neurology consultation was taken, patient was diagnosed to have Alzheimer's and started on Memantine (5mg/day), Donepezil (5 mg/day) and Methylcobalamin (1,500 mcg/day). With all above findings a diagnosis of chronic

arsenic poisoning with secondary Bowen's disease was made.

## DISCUSSION

Arsenic poisoning is a major public health issue that affects millions of people worldwide. Contaminated water is the main source of arsenic poisoning and chronic use of indigenous medication is an emerging cause of chronic arsenic poisoning. The recommended limit of arsenic in drinking water is 10 µg/L. Prolonged consumption of arsenic-contaminated water leads to arsenic poisoning and almost all systems are affected. Two of world's most severely afflicted regions are Bangladesh and West Bengal, India, our index patient was from Bengal. Arsenic toxicity's clinical signs differ between individuals, demographic groups, and geographical locations and have a wide range of presentations. Cutaneous presentation is commonest which includes diffuse pigmentation, raindrop hypopigmentation, guttate hypopigmentation on normal or hyperpigmented skin, mucosal pigmentation, Mee's lines, palmar and plantar keratotic papules and nodules, neoplasia (Bowen's disease, Squamous cell carcinoma and Basal cell carcinoma) [1,2].

The cutaneous malignancy is seen in around 3% and premalignant Bowens's disease is seen in up to 21% of the patients. The average duration from first arsenic

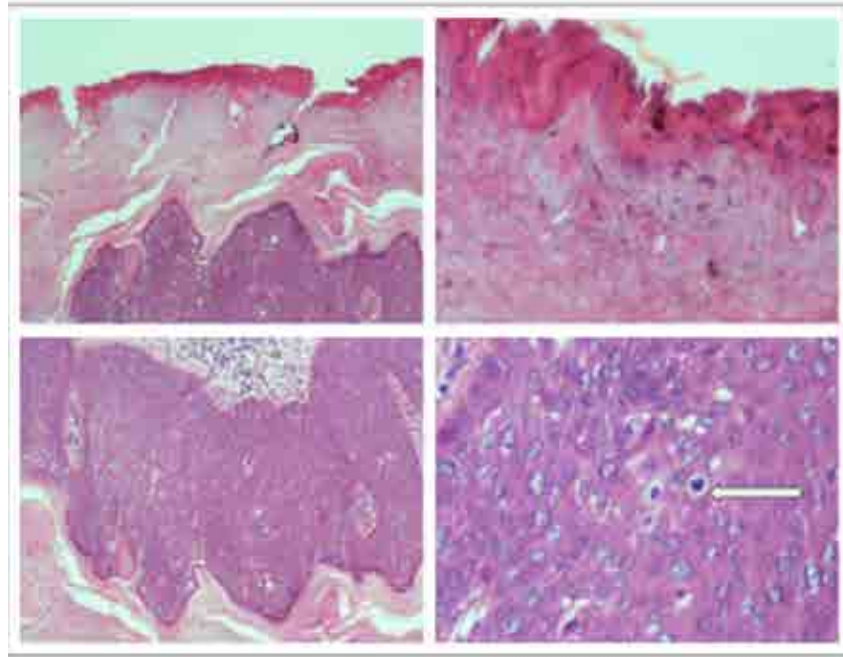
exposure to onset of cutaneous neoplasm is around 17 years [3]. To confirm the diagnosis, an elevated concentration of arsenic in drinking water is essential. In situations where drinking water is not available, arsenic levels can be tested from hair (> 1mg/kg of dry hair), nails (> 1.5 mg/Kg) or urine (> 50µg/L). Estimation of blood arsenic level is not useful due to short half-life of arsenic in blood [2]. Cessation of exposure to arsenic-contaminated water is of paramount importance. Safe water sources are deep wells, traditional dug wells, and rainwater harvesting.

There is no effective therapy for arsenic poisoning and supportive therapy is extremely important. Palmoplantar keratoderma can be treated with salicylic acid and urea-based ointment, cutaneous malignancies require excision. Oral Retinoids can be considered for chemoprevention of arsenic-related cancers. Chelating agents like DMSA (dimercaptosuccinic acid), DMPS (dimercaptopropane succinate) [5], d-Penicillamine are often considered in the management of chronic arsenic toxicity, but efficacy is doubtful [3,4].

This report exemplifies awareness of these presentations that help in early diagnosis and better management of the patients. For those residing in places where arsenic still causes a problem usage of alternative sources of water and arsenic removal devices is the need of the hour.



**Figure 1:** Clinical features showing hyperkeratotic palms and soles, hypopigmented macules over back (raindrop pigmentation), mucosal dyspigmentation and Bowen's disease over thigh.



**Figure 2:** H&E section of keratotic plaques suggestive of Bowen's disease.

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