Chronic Arsenic Poisoning with Skin Cancer

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ABSTRACT

Chronic arsenic poisoning is an alarming environmental health problem in Bangladesh. The toxicity of arsenic compounds depends on the amount, chemical and physical form of arsenic and the duration of exposure to arsenic. Skin manifestations are the prime and common manifestations of Arsenicosis. Patients are presenting with various complications relating to chronic arsenicosis, out of them we are reporting 2 cases of squamous cell carcinoma of skin. All were female, married, age ranging from 40-60 years, hailed from endemic zone of arsenicosis and the disease which were confirmed by histopathologically.

Key Words: Skin manifestation, Arsenicosis, Squamous cell carcinoma, Histopathologically

Introduction

Chronic arsenic exposure has deleterious effects on health including skin lesions, cancers of the liver, lung, bladder and skin with adverse outcomes on reproductive, neurological & cognitive functions. Consumption of drinking water containing inorganic arsenic is an important risk factor for SCC. Additional risk factor’s ultraviolet radiation, sunburn etc. In 1983 the first cases of arsenic induced skin lesions were identified by K.C. Saha then at the department of dermatology, school of Tropical Medicine in Calcutta, India. The first patients seen were from West Bengal, but by 1987 several had already been identified who came from neighboring Bangladesh. Recent findings show that about 20 million people in Bangladesh are using tube-wells contaminated with arsenic over the permissible level. In 2008, a study by UNICEF revealed that there were approximately 55% of tube-wells have been tested arsenic contaminated.

Case- 1

Mrs. Jannatul Ferdous, 40 year-old woman hailing from Chatkhali, Noakhali, diabetic for 1 year, with the complaints of a blackish pigmentation of the whole body for 12 years, a blood-stained non-healing ulcer on the right leg for 10 years and ulcers on the right post-auricular, left pre-auricular and right temple regions for 1 year. She gives no history of trauma, drug use, fever or significant sexual history. On general examination, she is anxious, pulse 78/min, BP 100/60 mmHg, hyperkeratotic lesions on both hands, general blackish pigmentation and ulcers on the above mentioned sites. On local examination, the ulcers have irregular outline, raised and erythematous margins and a hard base with dirty & necrotic material and is blood-stained.

Fig: Lateral aspect of below ankle joint (rt.) showing deep ulceration with bleeding point due to chronic arsenicosis.
All routine and relevant pathological investigations were done which include Montox test (MT), X-ray chest, Liver function test, USG of whole abdomen, Fenestrate needle aspiration cytology (FNAC) and histopathological examination of the local skin tissue revealed the diagnosis of squamous cell carcinoma of skin. Patient was treated with antibiotics, vitamins, regular dressing, chemotherapy and radiation.

Case- 2
Mrs. Ayesha Khatun, 60 years-old woman hailing from Chadpur, diabetic for 5 year, with the complaints of a blackish pigmentation of the whole body for 15 years, recurrent ulcer over index finger of hand and 2nd toe of right foot for 7 years. She gives no history of trauma, drug use, fever or significant sexual history. She went to several local doctors many times and took medications, but about 2 years back ulcer was increasing in size. Then she took surgical management. Excision of ulcer and skin grafting was done. About 1 month back recurrence of ulcer occur again which was irregular outline, raised and erythematous margins and a hard base with dirty & necrotic material and is blood-stained and she undergone excision biopsy which reveals carcinoma. After that she undergone amputation of both left index finger and right 2nd toe of foot.

Fig: After amputation of both left index finger and right 2nd toe of foot due to SCC.

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Discussion
Arsenic is a chemical element. It is a semi-metal that comes in three different allotrophic forms: yellow, black and gray. The pure arsenic is not poisonous, but all its compounds that are used as pesticides, herbicides and insecticides. In fact, arsenic is a very harmful environmental contaminant, and in human this element is known to cause skin cancer as well as cancer of lung, bladder, liver and kidney. As is a slow poisoning and so is considered the ideal homicidal poison. Its effects on the body long lasting and its contamination or poisoning can be detected long after death from hair or bones. The primary drinking water sources for the patients were tube-wells, which drew water from underground aquifers. Tube-wells have been used in Bangladesh since the 1940. In Bangladesh, arsenic contamination of water in tube-wells was confirmed in 1993 in the Nawabganj district. A study in 2008 showed that about 42 district out of 64 had arsenic contaminated water. Arsenic level in drinking water is clearly in excess of the maximum level recommended by WHO of 10 µg/l and greater than the maximum level of 50 µg/l permitted in Bangladesh. Chronic dermatological toxicity may presents with arsenical melanosis, palmo-planter keratoses, leukonychia, Aldrich-mess line and Bowens disease. Arsenical keratoses and Bowens disease may gradually extend forming a large erosion or ulceration. The occasional invasive squamous cell carcinoma that arises in arsenical keratoses may rapidly grow and ulcerate. The basic treatment is to supply the patient with drinking water that is free from arsenic. Raising awareness is a necessary step to prevent further prevalences. Awareness should also include labeling of all tube-wells either red or green depending on contamination and restriction of drinking from red labeled tube-wells. Chelation is possible using Dimercaprel, DMSA and Calcium sodium edetate. Potassium supplements have also shown to be
effective in preventing arrhythmia in arsenicosis. Squamous cell carcinoma, basal cell carcinoma, Bowens disease are the common malignancies found in patients with long term exposure to arsenic. Merkel cell carcinoma is uncommon but highly aggressive cutaneous neoplasm. Most common arsenic induced malignancy is SCC, though frequent rate is very high but it is highly curable with proper surgical, chemotherapy and radiation, as the malignant lesion are sensetive to chemotherapy and radiation.

Conclusion

Arsenic contamination in drinking water is a burning issue in Bangladesh. Its adverse health effects are enormous and the incidence is increasing day by day. Among the hazards of arsenicosis, cancer is the most dangerous one, of which SCC of skin is most common, Which Is not restricted to any age group or sex. Therefore, careful and aggressive measures against arsenicosis has become quite mandatory.

References

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