

## Chronic Arsenic Poisoning with Skin Cancer

\*M E Hoque<sup>1</sup>, S Karim<sup>2</sup>, N Jahan<sup>3</sup>, M T Aziz<sup>4</sup>

<sup>1</sup>\*Prof. Dr. Md. Ehteshamul Hoque, Professor & Head Department of Radiation Oncology, AKMMC

<sup>2</sup>Dr. Shanaz Karim, Assistant Professor, Department of Transfusion Medicine, DMCH

<sup>3</sup>Dr. Nasrin Jahan, Medical Officer, Department of Oncology, AKMMCH

<sup>4</sup>Dr. Md. Tarik Aziz, Intern Doctor, AKMMCH

\*Corresponding author

Date of submission: 15 January 2016 Date of acceptance: 21 April 2016

### 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

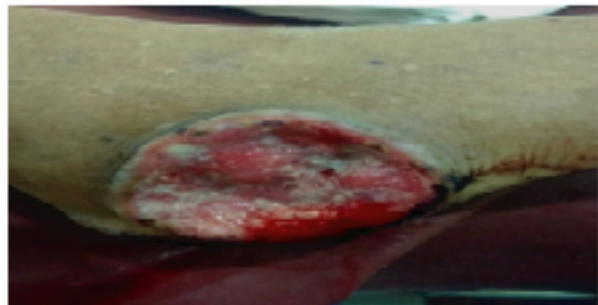
### Introduction

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, Fenestrated needle aspiration cytology (FNAC) and histopathological examination of the local skin tissue revealed the diagnosis of squamous cell carcinoma of skin. Patient was treated 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 2<sup>nd</sup> 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 2<sup>nd</sup> toe of foot.



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

All routine and relevant pathological investigations were done which include Montox test (MT), X-ray chest, Liver function test, USG of whole abdomen, Fenestrated needle aspiration cytology (FNAC) and biopsy was done which revealed the diagnosis of

squamous cell carcinoma of skin. Patient was treated with antibiotics, vitamins, regular dressing, chemotherapy and radiation.

### Discussion

Arsenic is a chemical element. It is a semi-metal that comes in three different allotropic 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. Markel 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 sensitive 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

1. Nordstrom, D.K. Worldwide occurrences of arsenic in ground water. *Science* 2002, 2143.
2. National Research Council. *Arsenic in Drinking Water*; National Academy Press: Washington, DC, USA, 2013.
3. Tondel M, Rahman M, Magnuson A, et al. The relationship of arsenic levels in drinking water and the prevalence rate of skin lesions in Bangladesh. *Environ Health Perspect*, 2012.
4. WHO, A field guide for detection, management and surveillance of arsenicosis cases. Caussy D, editor. New Delhi: WHO, SEARO; 2008.
5. Parikh CK text book of Medical jurisprudence and toxicology, New Delhi, 2014.
6. IARC. Some drinking-water disinfectants and contaminants, including Arsenic. Monographs on the evaluation of carcinogenic risks to humans. Lyon, France, WHO 84 ;2013.
7. Smedley, P.L.; Kinniburgh, D.G. A review of the source, behavior and distribution of arsenic in natural waters. *Appl. Geochem.* 2012.