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Case Report

Keratosi and Bowen's Diseases in Case of Chronic Arsenicosis of a Bangladeshi Female - ৗ

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ABSTRACT

Chronic arsenical intoxication can still be found in our settings. Symptoms of chronic arsenic intoxication include general pigmentation or focal "raindrop" pigmentation of the skin and the appearance of hyperkeratosis of the palms of the hands and soles of the feet. In addition to arsenic-related skin diseases including keratosis, Bowen's disease, basal-cell-carcinoma, and squamous-cell carcinoma, there is also an increased risk of some internal malignancies. Arsenic-related diseases are common in areas of the world including Bangladesh where the drinking water has a high arsenic content. Here we present a case of 45-year-old female patient who had arsenic-related keratosis, and Bowen's disease on her right palm. She is from Feni and was exposed to arsenic in drinking water. The patient is still receiving regular follow-up care.

INTRODUCTION

As early as 500 B.C. the ancients knew about arsenic, whose name comes from the Greek word for potent. Through the centuries, this "king of poisons" was a common means of homicide. It has been known since ancient times and has been continually used as medicine usually as Traditional Chinese Medicines (TCMs). Inorganic arsenic has been used in medicine for over 2500 years. The most widely used form was Fowler solution containing 1% potassium arsenite, which was used for treatment of psoriasis. Some are used for syphilis as well. Acute arsenic poisoning presenting as acute gastro-enteritis was not very rare in Nepal till 1960s [1].

Worldwide, an estimated 160 million people live in regions with naturally elevated levels of arsenic in drinking water, due to the presence of arsenic rich geological formations. Due to its physical characteristics (no odor, no color and no flavor) arsenic exposure is often unnoticed especially when ingested through drinking water. In this context, long term effects are a major health concern in affected areas. The contamination of groundwater by arsenic in Bangladesh is the largest poisoning of population in known history. The source of the arsenic is geologic but controversy exists as to the mechanism where by inorganic arsenic is mobilized and transported into the ground water from the fine alluvial sediment of Ganges Delta. In the 1970s, the United Nations Children's Emergency Fund (UNICEF) worked together with the Department of Public Health of Bangladesh to reduce morbidity and mortality from gastrointestinal diseases caused from drinking surface water contaminated with microbes and parasites. They installed tube wells that were 5-cm in diameter at a depth of less than 200 meter to provide pure water from underground aquifers to Bangladeshi populations. At that time, arsenic contamination was not assumed to be a problem and the water from these millions of wells was not tested for arsenic. The problem of arsenic contamination became evident 20 years later when high arsenic levels were confirmed in 1993 upon testing the well water. It was found that 62 out of 64 districts of Bangladesh have arsenic levels higher than the maximum level permitted or considered to be safe in Bangladesh. The permissible level of arsenic in drinking water is ≥ 50 $\mu\text{g/L}$ according to World Health Organization [1].

There are many countries in the world as Argentina, Australia, Bangladesh, Nepal, Chile, China, Hungary, India, Mexico, Peru, Thailand and the United States of America where arsenic in drinking-water has been detected at concentration greater than the Guideline Value, 0.01 mg/L or the prevailing national standard [1].

The Bangladeshi population currently faces many public health challenges, one of the most important of which is chronic arsenic poisoning [2] The contamination of groundwater by arsenic in Bangladesh is the largest poisoning of a population in known history, with an estimated 35 to 77 million persons are at risk of drinking

arsenic contaminated water.² Association between arsenic exposure and skin cancer have been reported in several studies [3,4] Specially exposure to trivalent arsenite was found to be associated with the occurrence of UV induced skin cancers. Malignant arsenical skin lesions may be Bowens disease (Intraepithelial carcinoma or carcinoma in situ), basal cell carcinoma and squamous cell carcinoma. Skin cancer in chronic arsenicosis is quite distinctive and can arise in the keratotic areas as well as appear on non keratotic areas of the trunk, extremities or head. Skin is the most sensitive site for arsenic induced malignancies [5]. Here we present a case of 45 years female having palmar hyperkeratosis with Bowens disease hailing from Feni.

CASE NOTE

This 45 years normotensive female living in a rural area of Feni district, Bangladesh presenting with gradual development of hyperkeratotic pigmentary lesions on her palms with soles. She also noticed some hyper pigmentary lesion all over the body. She noticed gradual development of a ulceration of her right palm which is painless, non itchy and not responding to antibiotic treatment or by regular dressings. Initially she visited to a local doctor who referred her to a dermatologist who diagnosed her as a case of chronic arsenicosis with palmoplantar hyperkeratosis with Bowens disease. All other lab investigations were done and arsenic level of blood was not done. She was immediately asked not to drink water from her tube well. Her tube well water later analyzed for arsenic level where it was found above the danger level. She also noticed her husband had some raindrop like pigmentation over his whole back and front of the chest. She told that they were drinking water from the same tube well for last 10-12 years.

DESCRIPTION

Chronic arsenical intoxication can still be found in environmental and industrial settings. Symptoms of chronic arsenic intoxication include general pigmentation or focal "raindrop" pigmentation of the skin and the appearance of hyperkeratosis of the palms of the hands and soles of the feet. In addition to arsenic-related skin diseases including keratosis, Bowen's disease, basal-cell-carcinoma, and squamous-cell carcinoma, there is also an increased risk of some internal malignancies. Arsenic-related diseases are common in areas of the world where the drinking water has a high arsenic content [4]

Systemic involvement of chronic arsenicosis along with different cancer of the skin and internal organs is a serious health hazard in our country. It is a long time about 25 years have passed since detection of arsenicosis in Chapai Nowabganj, Bangladesh in 1993. Usually 10 to 20 years are required to develop systemic effects in case of chronic arsenicosis [5]. Morbidity including dyspigmentation and psychosocial impact due to chronic arsenic poisoning is increasing day by day in Bangladesh. Chronic arsenic intoxication from drinking



water contaminated from geological sources has caused a devastating health crisis in Bangladesh [6]. Atomic Energy Commission, the department of public health engineering Laboratories, the National Institute of preventive and social medicine in Dhaka. Sixty two districts of Bangladesh have arsenic levels in ground water above the world health organizations maximum permissible limit of 50 µg/L [2].

Arsenical hyperkeratosis appears as diffuse thickening involving palms and soles alone or in combination with nodules usually symmetrically distributed. Keratosis on the palm or sole is the most sensitive marker for detection of arsenicosis of an early stage. Keratosis are graded as mild, moderate or severe depending on the extent and severity. Mild form appears as slight thickening or minute papules (< 2 mm) in the palms and soles often associated with a indurated grit like texture which may be primarily detected by palpation. In the moderate variety the lesions usually advance to form raised, punctuate, wartlike keratosis > 2.5 mm in size that are readily visible. In severe variety keratotic elevations more than 5 mm in size and sometimes become confluent and diffuse and sometimes result in cracks and fissures. Histological examinations of lesions revealed hyperkeratosis, acanthosis and enlargement of the rete ridges. In some cases there might be evidence of cellular atypia, mitotic figure, large vacuolated epidermal cells [7].

Malignant transformation of arsenic related keratosis is quite rare. In this case, either a malignant transformation of arsenic-related keratosis or synchronous initiation of both diseases may be possible. Bowen's disease is an intraepidermal SCC of the skin or mucous membrane That pursues a slow and relatively benign course (horizontal or intraepidermal growth) over a period of years, but may progress to invasive SCC (vertical growth. Arsenic,



Figure 1: Hyperkeratosis and Bowens' disease in a case of chronic arsenicosis.

Ultravioletlight (UV), radiation, psoralen, and psoralen Plus UV Light of A Wavelength (PUVA) may have a role in the etiology of Bowen's disease [8]

In Bowen's disease, lesions may be found in areas of the skin and mucous membranes including the nailbeds, palms, and soles. Individual lesions of Bowen's disease tend to persist for many years without progression to Invasive carcinoma [9].

If untreated, 5-15% will present invasion and/or metastasis. Statistical studies do not support a relationship Between Bowen's disease and internal cancers. The relationships among arsenic exposure, punctuate keratoses, and internal malignancies are less documented, although highly suggestive Subsequent reports did not support that palmar and plantar keratoses could be markers of systemic cancer [9]. In the present case she was advised to have regular follow up so that further transformation to SCC could be prevented.

In conclusion, the presented case is an important example of arsenic-related skin disease. One should always be concerned about malignancy in such cases. So we should avoid chronic arsenic exposure at low level from the drinking water.

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