Mild-type Chronic Arsenic Poisoning in Champasak, Lao and Baraich, India

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Abstract

We identified many cases with mild-type chronic arsenic poisoning (CAP) in Champasak, Lao in 2011 and in Baraichi, India in 2012. Arsenic concentration of the groundwater in Baraich was not so high. Arsenic contaminated level of their hair samples were not so high and not correlated to their symptoms. In the mild –type CAP, we can not find typical skin symptoms such as leukomelanosis, palmoplantar keratosis and skin cancers. As they have only melanossis on the oral mucosa and very mild keratosis on the palms and/or soles, the determination of this type have to be made by an expert for the skin manifestations. Therapy of mild –type CAP is stopping to drink the contaminated groundwater and can be cured. This is the most important reason why we have to make a diagnosis of mild-type CAP.

Keywords: mild-type chronic arsenic poisoning,, skin manifestation, melanosis, oral mucosa

INTRODUCTION

Since 1982 Dr Hotta and I had visited many arsenic contaminated areas in the world and examined many cases suffered from CAP. In Mindanao,Phillippine, Buyat,Indonesia and Mekong River Delta,Dong Thap,Vietnam we confirmed mass outbreaks of mild cases with melanosis on mucousmembrane of oral cavity and lips[2]. In 2010 we described about these cases and proposed to call "mild-type chronic arsenic poisoning" [3]. On this time, we had the opportunity to examine the mucocutaneous manifestations of the residents in the arsenic contaminated areas in Champasak province, Lao in 2011 and in two villages, Baraich district, India in 2012. As their arsenic cocentration of the groundwater is not so high, we guessed that mild-type CAP cases were observed. The diagnosis of ordinary-type CAP is not difficult but mild-type is not easy. In India we gave the lecture how to diagnose CAP, especialy mild-type CAP to the local doctors and medical staffs.

MATERIALS AND METHODS

In 2011, at Kietongong village, Pathoumphone district, Champasak province, in Lao, 23 residents who the chief of the village selected were examined the skin of whole body and oral cavity by one Japanese dermatologist. The findings were recorded on the skin map sheet. They are 13 males, age 18 to 67 year old and 10 females, age 3 to 68 year old (Table1) and are drinking the over 0.05ppm arsenic contaminated groundwater. Their hair was sampled for analysis of Arsenic[1].

In 2012, in Baraich district, Uttar Pradesh province, in India, same Japanese dermatologist gave the lecture to the local doctors for detection of mild-type CAP. In two villages (Chetra and Newada) in Baraich, 35 residents who BAMP staffs had checked and doubted CAP were examined. In Chetra village, we have to see their skin at the outdoor, so only 4 residents were checked by the dermatologist. In Newada village, five local doctors were devided into two groups and examined 31 residents with the Japanese dermatologist. These 35 residents in both villages are drinking the over

0.05ppm arsenic contaminated groundwater. They are 21 males, age 15 to 90 year old and 14 females, age 4-75 year old (Table1). Hair was sampled from 13 out of 35 participants and analyzed in Miyazaki university in Japan.

RESULTS

In Kietongong village, Lao, arsenical mucocutaneous hyperpigmentation (melanosis), leukomelanosis and keratosis on the palm(s) and/or sole(s) were observed among 18 out of 23 participants (78%). Three cases had typical arsenical mucocutaneous lesions (ordinary-type CAP, 17%) and 15 cases were mild-type CAP (83%). All cases with ordinary-type were male and their symptoms were not severe (Table1). Many cases with mild-type CAP had multiple spotty melanosis on the gingiva and/or palate (78%) and on the palms and soles (78-83%). Very mild punctate or pitting keratosis on the palms and/or soles were also found in many cases (61-94%). One Bowen's disease and two solar keratosis were suspected in three cases (Table2) [1].

In Chetra and Newada village, India, arsenical mucocutaneous manifestations were observed among 31 out of 35 participants (88.6%). Among 31 cases, 11cases were ordinary-type CAP (35.5%) and 20 cases were mild-type CAP (64.5%) (Table1). Most cases with ordinary-type CAP were not serious. But one 65 years old female with ordinary-type CAP had very serious spotty hyperpigmentation in her mouth, on the lips, gingiva, buccal mucosa and tongue. Skin manifestations of mild-type cases were similar result to in Kietongong. Multiple spotty melanosis on the gingiva, palate and buccal mucosa (94%) and on the palms and soles (71%) and very mild punctate or pitting keratosis on the palms and/or soles (71-97%) were also found. Bowen's disease was suspected in three cases with ordinary-type CAP (Table2).

The arsenic concentration of the 36 hair samples were 0.1> to 0.5 ppm in Kietongong and 0.1> to 0.9 ppm in Baraich.

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COMMENT

On the present examination, we have confirmed many mild-type CAP due to drinking arsenic contaminated water in Champasak, Lao and in Baraich, India. Their symptoms were mild in general such as hyperpigmentation on the oral mucosa and small punctate keratosis on the palms and soles. For the prevention and therapy of these cases, not to drink arsenic contaminated water is most important and priority. All residents in these villages have to stop to drink the polluted groundwater. We suspected 4cases with Bowen's disease and 2 cases with solar keratosis. We recommend the excisional biopsy of these lesions for the convinced diagnosis and healing.

18 cases in Champasak and 31cases in Baraich diagnosed CAP should be taken a periodical medical examination for the early detection of malignant change. And also we recommend a skin examination for all residents in these villages.

We analyzed the arsenic concentration of hair samples from 36 participants. It was not so high (0.1> to 0.9 ppm, mean 0.2ppm). Dose response relationship between type of CAP and arsenic concentration was not defined.

We confirmed the existence of mass breaks of mild-type CAP through our surveys in three endemic areas in Mindanao, Buyat and Mekong River Delta. Their symptoms are non specific skin lesions, mild hyperpigmentation of the oral mucosa and lips, and very mild keratosis. These cases of mild-type CRP that we identified in these areas had not previously been counted as cases of CAP due to the differensis of the criteria for the diagnosis.

This underlines the need to keep in mind the existance of mild-type CAP cases among the residents who have no definite melanosis, rain drop-leukoderma or palmoplantar keratosis. These two appearance of CRP are actually only the manifestations of different severities of the same disease.

The confirmative diagnosis of CAP is easily made by palmoplantar keratosis, and this was difficult in mild cases. However, hyperpigmentation on the lips. Gingiva, tongue, palate and buccal mucosa is easy to be recognized by careful inspection. In some children, it may be the only symptome of CAP. Therefore, we should check in the mouth.

Sometime, small Bowen's disease may already have developed even in milder patient. This lesion may be difficult to diagnose if the observer is not a dermatologist.

The therapy and the prevention of mild-type CAP are different from ordinay-type CAP. Hyperpigmentation is gradually getting better then be cured after stopping to drink the arsenic contaminated water

Awareness of mild-type CAP among local doctors, health workers and residents is imperative. Provincial and district doctors and health staffs should be taken to train for the identification of early symptoms by dermatologists and experts.

Table1 Clinical diagnosis and Sex and Age of Residents

	Kietongong			Baraich		
	Total	Male	Female	Total	Male	Female
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Participants	23	13	10	35	21	14
Cases with CAP	18 (100)	12 (67)	6 (33)	31 (100)	18 (58)	13 (42)
Ordinary-tipe	3 (17)	3	0	11 (35.5)	7	4
Mild-type	15 (83)	9	6	20 (64.5)	11	9
Age	y. (Average)	y. (Average)	y. (Average)	y. (Average)	y. (Average)	y. (Average)
Participants	3-68	18-67	3-68	4-90	15-90	4-75
	(46.8)	(53.3)	(38.4)	(46.5)	(49.3)	(42.3)
Cases with CAP	16-65	45-65	16-68	4-90	22-90	4-75
	(50.9)	(50.7)	(51.5)	(47.7)	(51.7)	(42.0)
Ordinary-type	45-65	45-65	0	45-90	50-90	45-75
	(54.7)	(54.7)		(65.1)	(69.1)	(58.0)
Mild-type	16-68	53-65	16-68	4-70	22-70	4-60
	(50.2)	(49.3)	(51.5)	(38.1)	(40.6)	(35.0)

Table2 Skin manifestations of CAP

	Kietongong (n=18)		Baraich (n=31)	
	N	%	N	%
Hyprerpigmentation				
Oral mucosa	14	(78)	29	(94)
Palm(s)	15	(83)	22	(71)
Sole(s)	14	(78)	22	(71)
Nail(s)	1	(6)	4	(13)
Others	5	(28)	14	(45)
Leukomelanosis	2	(11)	13	(42)
Hyperkeratosis				
Palm(s)	17	(94)	22	(71)
Sole(s)	11	(61)	30	(97)
Malignant neoplasms				
Bowen's disease susp.	1	(6)	3	(10)
Solar keratosis susp.	2	(11)	0	

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