Session II : Leading-edge of Studies and Information on Environmental Problems in Asia : Hot Reports on Actual Condition and Countermeasures against Arsenic Related Health Hazards : Medical Study / Toxicity : S2-5

The incidence of water contamination of arsenic in Miyazaki

Yoshiki kuroda[1], Takenori Yamauchi[1], Kenichi Ito[2]
1)Faculty of Medicine, University of Miyazaki, Japan
2)Global Support Office, Center for International Relations

Abstract

Arsenic pollution is a severe problem in the world. In Japan the quality of tap water is controlled strictly under the standard of water supply (Arsenic:<0.01mg/L). But some private tube wells are not controlled so strictly. Many people seems to be using tube well water now. Last year, we experienced the arsenic contamination episode of tube well in Miyazaki prefecture Japan. We evaluate the exposure degree by measuring the hair arsenic concentration of the residents who drank and didn't drink polluted water.

Keywords: Arsenic, Tube well, Arsenic, Contamination, Pollution

Introduction

The arsenic contamination in water supply from a tube well was occurred in a municipality of Miyazaki prefecture Japan. The arsenic concentration of water was little higher than the standard of Japan (0.015mg/L). The acceptable arsenic concentration of tap water in Japan is 0.01mg/L. Since some students(elementary and junior high school), their parents and teachers drank this contaminated water, exposed people was worried about their health. The municipality planed to survey their degree of exposure of arsenic. And the municipality asked us (the department of public health the faculty of medicine Miyazaki University) to evaluate their exposure degree. The evaluation included to analyze the hair arsenic concentration and estimate the volume of arsenic intake from water consumption and marine products.

Materials and methods

We analyzed the arsenic concentration of the hair with energy dispersive X-ray spectrometry (EDX). Detection limit was 0.1mg/kg. The cases (who drank polluted water)was 47(exposure group), and controls were 52(non exposure group). And we asked them (exposure group and non exposure group) how long they drank the polluted water, and how much they ate sea vegetable by using a questioner

Result

Table1 indicates the hair arsenic concentrations of the exposure group and the non exposure group. There is no difference between two groups.

Table1

	Exposure	Non exposure	P
Mean±SD mg/kg(Range)	0.15±0.01 (0.1-0.57)	0.21±0.05 (0.1-2.06)	0.24

Table2

	Male(mg/kg)	Female(mg/kg)	P
Exposure	0.12±0.01	0.18±0.03	0.04
Non exposure	0.15±0.02	0.26±0.09	0.23

Table2 indicates the hair arsenic concentration distributed by sex in both groups. In exposure group, the concentration of female was significantly higher than male.

Figure1 indicate the relation between the arsenic concentration and exposure time. There is no relation

Contact: Yoshiki Kuroda
Faculty of Medicine, University of Miyazaki Japan
5200 Kihara Kiyotake Miyazaki Japan 889-1692
e-mail:ykuroda@med.miyazaki-u.ac.jp

between two factors

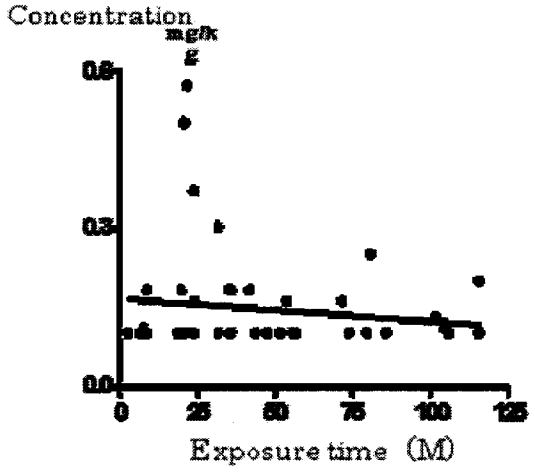

Fig1: The relationship between the concentration of arsenic and exposure time

Discussion

We evaluated the effect of people who drank polluted water in Miyazaki prefecture by analyzing their hair arsenic concentration. There is no difference between two groups. Since the arsenic concentration of polluted water was not so high, the hair arsenic concentration could be low. And we thought the health effect with this contamination could be low because of this low concentration.

The average arsenic concentrations of both groups in this study are higher than a Japanese report[1]. We thought that the arsenic concentration of the residents in the this municipality may be higher than other place in Japan. But our concentrations are the same with the report at non polluted area in India [2].

In the exposure group, the concentration of female was significantly higher than male. We couldn't find out the reason about this result. We need to study more to answer this question.

Conclusion

We concluded that there is no difference between the exposure group and the non exposure group. But in the exposure group, the concentration of female was significantly higher than male. We don't know the reason of this results.

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