HEALTH STATUS AND SOME THYROID BIO-INDEXES OF LONG-TERM EXPOSED POPULATION TO DIOXIN

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Introduction

Dioxin affected many systems of enzymes and hormones. The one of this effects is thyroid hormon function. Some experimental studies show the results of reduction of total T_4, reduction of free T_4, the increase of TSH hormone the increase of enzyms, like Cytochrom P450, glutathion-S-transferase. The effects produce the decline of thyroxin hormone..., may leading to resistant hypertrophy of thyroid cell, resulting to high risk of thyroid cancer [2,6,7]. There are few studies on the effects of Agent Orange/Dioxin exposed human have been done, indicated the prelimanary effects on thyroidal function [3,5].

10-80 Division (Division of Mitigation of the consequences on Human health of the Chemicals used during the war) in the rank of colloboration with the Japan Medical Exchange Center conducted the study on populations, living in the sprayed areas of the South and the Central of Vietnam, compared with the populations living in the North, non-sprayed area. The target is evaluate the health status and thyroid bio-indexes of the populations exposed to war dioxin for a long term.

Materials and methods

Exposed populations are the residents of the South villages: An Đien of Binh Duong province, Tan Thuan of Ca Mau province, the Central villages Ninh Phuoc of Khanh Hoa province, Que Minh of Quang Nam province. Controls are the residents of the North nonspraed villages: Bac Hong of Ha Noi, and Nghia Lo of Hai Phong.

Method: cross-sectional

Sample size of 1723 personnels, among them 582 of the South, 581 of the Central, and 560 the North. Criteria for selection is the individuals born after the war time begining 1962, the biochemical tests for the subjects aged at 15-60, except the emigrants after 1975.

Health examination by local physicians to determine the health status, reproductive health disorders. Blood samples taking for paraclinical analysis, blood formula, thyroid hormones such as free tetrathyroxine FT_4, and thyroid stimulating hormone TSH. The biochemical tests have been done in Lab of Hannanchuo Hospital of Osaka, Japan.

Results and discussion:

The health status

The results of stuty (Table 1) continues to confirm the previous research into the long-term effects of war chemical exposure on the population, still living in sprayed areas [1,4]. Although, among the populations living in contaminated area after 30 years as operation ending, disease structure is beeng changed, pathology frequences are reduced, the disorder of health outcomes has been hold by influence of socio-economic circumstances.

In general, the rates of digestive illness and cancer among populations, exposed to war AO/dioxin are higher than of unexposed populations. Diabetes II type, chronic hepatitis, liver cancer are significantly high. Relative frequencies of the illness of musculoskeletal, respiratory and nervous are highest. Relative frequencies of circulatory, genitourinary are more lower. Cancer rate is 3,3 folder higher in exposed population, compared to unexposed one, the difference is statistically significant with $p<0,05$.

Concerning the reproductive health, the relative frequencies of birth defects of exposed populations are significantly higher, with relative risk RR of 3,47 and $p<0,01$. The highest rate of birth defects are the defects of the nervous system, with the advantage of mental retardation in range from mild to heavy level, that count for 4 fold higher in comparision to unexposed population. The defects of movement system like club hand, club foot, polydactily... are also significantly higher in sprayed arears. By the period of time, it has observed the rate of birth defects began

increased from 1965, as the chemical war has strengthened, the rate of birth defects has reached the pick during the period of 1975 to 1980, keep the wave to years of 1985-1990, and has decreased since 1995 period, but still higher the level of years of 1960, the time before chemical war.

The results of biochemical analysis

The heamosystem in general is not changed a lot (Table 2), there is observed the image of light anaemia, showed in slight erythrocyte reducing, slight leukocyte increasing. Cholesterol increased, neutrophyle significantly raised, monocyte significantly decreased. Although the heath structure is not testimonied this heamotology status, but the situation suggest the adaptation process of living in the contaminated environment.

The date of bio-indexes of thyroid function showed the picture of chronic thyroid insufficiency with thyrointoxication (Table 3). FT_4 significantly reduced in comparision to exposed data and standard data of the normal vietnamese. TSH significantly increased in comparision with standard data of normal vietnamese.

Exploring test of the thyroid peripheral function indicates, that the total protein is not different between exposed and unexposed, although higher than standard bio-indexes of normal vietnamese. Cholesterol is still in normal range, but higher in comparision to unexposed population.

Observed the dose-response relationship between sprayed level and bio-indexes of thyroid hormones (Table4). TSH concentration increased, while concentration of FT_4 decresed significantly in trend from the North to Central and the South.

TSH in the North-nonexposed populations is in normal range of standard, while TSH increased gradually in exposed population of the Central and the South.

FT_4 also have the trend, the downtrend, FT_4 in the North-nonexposed populations is in normal range of standard, while FT_4 decreased gradually in exposed population of the Central and the South.

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Table 1: Relative frequences of some pathologies

Pathologies	Exposed		Unexposed		RR	p
	Freq.	Rel. freq.	Freq.	Rel. freq.		
Diabetics	81	6,96	21	3,75	1,86	0,03
Chronic hepatitis	76	6,53	23	4,11	1,59	0,03
Liver cancer	21	1,81	3	0,54	3,27	0,02
Birth defects						
Mental retardation	25	0,43	3	0,11	4,01	0,01
Cerebral palsy	55	0,94	6	0,22	4,41	0,00
Clepf lip, palate	6	0,1	2	0,07		
Club foot	28	0,48	4	0,16	2,7	0,03
Total of defects	202	3,47	29	1,04	3,35	0,01

Table 2: Blood formula of females, aged 18-59

Indexes	Exposed Mean ± SD	Unexposed Mean ± SD	Standards μ ± δ	Z test	p
Erythrocytes (T/l)	4,14 ± 0,48	4,75 ± 0,44	4,66 ± 0,36		>0,05
Leukocytes (G/l)	8,4 ± 2,2	8,2 ± 1,95	8,1 ± 2,0		>0,05
Neutrocytes (%)	*52,3 ± 10,0*	*57,8 ± 10,0*	*57,4 ± 8,1*	*5,87*	*0,01*
Monocytes (%)	5,9 ± 1,9	5,08 ± 4,15	3,8 ± 0,5	2,89	>0,05
Lymphocytes (%)	*31,9 ± 7,9*	*34,2 ± 10,3*	*35,6 ± 6,4*	*3,63*	*0,03*

Table 3: Thyroid function tests

Indexes	Exposed Mean ± SD	Unexposed Mean ± SD	Standards μ ± δ
$FT_{4\ (pmol/l)}$	11,56 ± 2,98	16,53 ± 2,94	16,31 ± 3,82
p	0,0075		0,0006
TSH (mU/l)	2,69 ± 6,78	2,17 ± 0,79	2,12 ± 0,89
p	>0,05		0,04
Protein TP (g/l)	7,56 ± 5,02	7,53 ± 3,06	7,31± 6,06
p	>0,05		>0,05
Cholesterol (mg/dl)	164,8 ± 36,1	143,3 ± 28,7	163,6 ± 27,2
p	0,0009		0,08

Table 4: Thyroid hormones concentration by exposed levels

Indexes	Standards μ ± δ	North Mean ± SD	Central Mean ± SD	South Mean ± SD
$FT_{4\ (pmol/l)}$	16,31 ± 3,82	16,53 ± 2,94	13,17 ± 2,83	9,98 ± 3,12
p			0,001	
TSH (mU/l)	2,12 ± 0,89	2,17 ± 0,79	2,63 ± 6,58	2,75 ± 6,97
p			0,01	