Spina bifida occulta among the adult's children of the people living in herbicides contaminated areas during wartime was revealed by lumbar vertebra X-rays

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Introduction

Spina bifida is the most common of the three types of neural tube defects (NTD)[1]. Every child with this serious defect (e.g acranius monstre) has been stillborn. Potential mechanisms could underline a paternal relationship to spina bifida in the offspring as follows: from paternal exposure (mutagen), maternal health and chance or unproven association (Diagram1)[2].

The environmental pollution is a serious problem and has been examined by many scientists. The results from many studies have shown that defects of the neural tube may be caused by many factors following: heavy metals (Sever, 1995)[3], social stress, folic acid (Czeizel & Dudas, 1992; Berry et al., 1999)[4], multivitamin use (Wasserman et al.1998)[5] and specifically-Polycholorinated Aromatic Compounds POPs (Erickon,1984; CDC Vietnam Experience Study, 1988)[6]. These, factors caused neural tube defects of acranius monster at the rate of 1/1000 in USA. Another study (Australia, IOM) on Spina bifida showed that this kind of defects may be related to Dioxin (2,3,7,8-tetrachloro dibenzo-p-dioxin) which was used by U.S forces during the Vietnam war (Ranch Hand 1961-1971). In 1998 Spina bifida was considered a suggestive evidence of an association between exposure to herbicides and the health outcomes (IOM, Veterans and Agent Orange).[7]

In fact, there are not many studies regarding Spina bifida occulta among parents of children. Most Spina bifida occulta are revealed by X-ray the lumbar vertebra. We conducted the retrospective cohort study on people living in the herbicides sprayed areas during the wartime in Southern Vietnam (1961-1971). This study was implemented by X-ray the lumbar vertebra of adult's children and their parents on 64 families living in herbicides sprayed areas and 47 families living in unsprayed areas (control's group).

Method and Material

Retrospective cohort study of children over age 16 in 64 families whose parents lived between 1961-71 in a sprayed area of Quang Tri Province in southern Vietnam compared with a control group of children in 47 families living in unsprayed areas of northern Ha Tinh Province during the same period.

Lumbar vertebrae X-rays were taken of all children over 16 and their parents, in order to assess genetic as well as environmental risk status.

Realization

1- The subjective study included two groups:

· Exposed: 64 families living in herbicides contaminated areas during the wartime (Quang Tri province of the Southern Vietnam) and

· Unexposed: 47 families living in unsprayed areas during the wartime (Ha Tinh province of the Northern Vietnam) as well.

2- Photograph (X-ray) the lumbar vertebra from the lumbar vertebra to the sacral - coccyges, at right and oblique directions for studied subjects included adult's children (over 16 years-old) and their parents.

Results study

Table 1: Descriptive data of spina bifida (SB) for children of two groups investigated

No	Criteria	Exposed	Unexposed
1	Number families X-rayed	64	47
2	Total children of families	292	232
3	Number of children X-rayed (above 16 years old)	156	104
4	Number of children have been SB	74	29
5	Total pregnancies of the families X-rayed	334	252
6	Rate of SB's children to children X-rayed (%)	47.44	27.88
	RR=1.7; 95 % CI. (1.22 = 9.9		
7	Rate of SB's children to total children (%)	25.34	12.5
	RR=2.03; 95 % CI. (1.372 = 13.4		
8	Rate of SB's children to total pregnancies (%)	22.16	11.51
	RR = 1.93; 95% CI (1.29 2 = 11.22		

Summary of findings from Table 1 found a statistically significant difference between the rates of spina bifida for the groups exposed and unexposed through some comparisons as follows:

- Rate of spina bifida children to children X-rayed was 47.44% exposed and 27.88% unexposed (with p = 0.001).
- Rate of spina bifida children to total children was 25.34% exposed and 12,5% unexposed (with p = 0.0002).
- Rate of spina bifida children to total pregnancies was 22.16% exposed and 11.51% unexposed (with p = 0.0008).

Table 2: Descriptive data of two groups which father has not been ***SB.***

No	Criteria	**Father without SB**	
		Mother with SB	Mother without SB
1	Number of families investigated	(1)	(2)
		12	67
2	Number of alive children	49	309
3	Number adult's children X-rayed	25	158
4	Number of children have been Spina bifida	10	46
5	Rate of SB's children to alive children	20%	14.8%
	RR=1.37; (0.742 =0.97		
6	Rate of SB's children to children X-rayed	40%	29%
	RR=1.37; (0.802 =1.2		

Table 2: In 79 investigated families which the fathers have not been SB, there are 12 families with SB's mother and 67 families without SB's mother. The statistics shows that in the 25 children X-rayed there are 10 children with SB for the families have mother with SB. In the 158 children X-rayed there are 46 children with SB for families have mother without SB.

Rate of SB's children to children alive of two groups was 20% and 14.8% (with p=0.3). Rate of SB's children to children X-rayed of two groups was 40% and 29% (with p=0.27).

From findings of Table 2, indicate a statistically significant difference between two groups which mothers have been SB and mothers have not been SB on rates of SB's children was not found.

Table 3: Descriptive data of two groups which mother has not been SB

No	Criteria	**Mother without SB**	
		Father with SB	Father without SB
		(1)	(2)
1	Number families investigated	25	67
2	Number of alive children	124	309
3	Children X-rayed	60	158
4	Children have been SB	33	46
5	Rate of SB children to alive children	26.6	14.8
	RR=1.79; (1.202 = 8.14		
6	Rate of SB children to children X-rayed	55%	29%
	RR=1.89; (1.352 =12.55		

From Table 3: Both groups have 92 families which mothers did not have SB. The father with SB, in 25 families there are 33 children with SB. Families with father without SB; in the 158 children X-rayed of the 67 families there are 46 children with SB.

The rate of SB children to live children in the group which their fathers with SB was higher than those of fathers without SB (26, 6% and 14.8% with p=0.004).

However, in comparison with children X-rayed, that of those was 55% and 29% (with p=0.0003). From statistics in Table 3, we found a statistically significant difference on rate SB's children between two groups where their father had SB and did not have SB**.**

Table 4: Descriptive data of two exposed and unexposed groups which their parents have not been SB.

No	Criteria	**Parents without SB**	
		Exposed	Unexposed
1	Number families investigated	36	33
2	Total pregnancies of the families	185	179
3	SB's children	34	17
4	Rate of SB's children to total pregnancies (%)	18.38	9.5
	RR = 1.94; 95% CI (1.122 = 5.94		

The result statistical of Table 4 on 36 exposed families and 33 unexposed which their parents have not been SB showed that the rate of SB's children to total pregnancies in the exposed group was two fold higher than those in unexposed group again (18, 38% and 9.5% with p=0.01).

Discussion

The rate of spina bifida occulta in the exposed group of children whose parents lived in areas sprayed by herbicides during wartime was approximately two-fold higher than the rates of SB in the unexposed group.This research revealed the possible relationship between herbicides exposed and the occurrence of Spina bifina on adult's children of families living in sprayed areas. We do not deny that other reasons many exist for spina bifida, but this research suggested that AO/Dioxin can be the main cause for the increase in the rate of spina bifida of children. The genetic paternal factor on Spina bifida was also found in this study but the genetic maternal factor was not found.

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References

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