

When reading the article of the Mainichi Daily News, dealing with health problems after the nuclear accident of Fukushima, one may ask the question: which institution could advice the authorities for ta-king the best decisions to protect the population and reduce the suffering of the victims?

The responsibility of the direction of the factory starts with the errors in the planning and building of the power plant, the absence of information about the real damage which started with the earthquake, more than one hour before the rest of the wave of the tsunami making thousands of victims 100km from there. * The later errors lead to the delay to reduce and stop the contamination of the air, of the soils and water.

- WHO subordinated to IAEA -

According to its constitution (1946) the World Health Organization (WHO) has to provide an adequate technical assistance in the field of medicine. Intervention in case of urgency, if required by governments, or just after acceptance of such interventions should furnish the best information, give pieces of advice and assistance concerning health. It has to form a well documented public opinion regarding health. None of these obligations were respected.

For historical reasons this did not happen. The WHO signed in 1959 with the newly created (1957) International Agency for Atomic Energy (IAEA) an Agreement (WHA 12.40) which ended the independence of the WHO to act in the field of nuclear industry. * More recent decisions confirm the take away of the activities of the WHO in the field of ionizing radiation. * It explains why the IAEA could intervene in Chernobyl and Fukushima, not the WHO.

The population ignore the statutes of the IAEA, which gives directives or contributes to make decisions after an atomic catastrophe such as Fukushima or Chernobyl. The IAEA before all, has to owe the wording of its statutes. The following lines of this IAEA document, is quoted in IAEA publications, for instance in the Proceedings of the International Conference on Chernobyl in Vienna, 8-12 April 1996. It says that the Agency has as principal objective "to accelerate and enlarge the contribution of atomic industry to peace, health and prosperity throughout the world".

In other words, this U.N. agency has before all to promote nuclear industries, and support such commercial projects. The IAEA has the highest position compared with other agencies in the hierarchy of the United Nations (UN), including the WHO, FAO, UNICEF and others being controlled by ECOSOP. Furthermore, the WHO from a legal point of view, is not independent or even absent in the field of health and ionizing radiations. The IAEA having to impose its goal, will not admit that severe diseases are due to radiation; this would slow down the spreading and the growth of the nuclear facilities in the world. The guidelines from this agency represent the defense of these commercial structures, but not a protection the population nor a help for victims.

For the national health authorities, the IAEA will be the wrong councilor in case of a nuclear

catastrophe. Priority will be given to economical considerations, therefore the attempt to minimize or refute pathologies associated or provoked by artificial radiations will be denied. Wrong estimations may delay the evacuation of heavily irradiated communities.

- Radiation effects by gender -

Shocking and even less understandable in Fukushima, has been the absence of distribution of stable iodine to the whole population, and before all to children, who are more at risk. This prophylactic intervention is not expensive. It would have been efficient and, as shown in Poland by Keith Baverstock, such a campaign is very well tolerated, even if millions of children, who have the greatest need for such a protection, are included. One tablet has to be swallowed, if possible before the wind transporting radioactive iodine, mainly I-131, crosses over the region.

The Journal does not indicate that the first victims of the accident of Fukushima are and will be the children. This starts when the rapidly dividing cells of the embryo make this stage of development 1000 times more susceptible than adults. Embryos may die, this would correspond to an early subclinical abortion. At birth, up to 5% of the girl babies have been missing the years after the explosion of Chernobyl, compared with the statistics of the years prior to 1986. The highest sex odds, with more than 5% of the female children missing were registered in Belarus and Russia, the countries with the highest radioactive fall-out. Missing girls at birth were also noticed in eastern Europe and Balkans after Chernobyl. Even in Germany there was still a significant deficit in girls at birth. However in France and Spain, with very little or localized radioactive fall-out, no changes of the historical sex odds were found. It shows that the deterioration of the sex odds is proportional to ionizing radiation.

The normal sex ratio, which is a sex odd, corresponds to about 1045 new-born males for 1000 newborn females. This ratio is more or less constant all over the world. There are other examples where the aggravation of the sex odds are increased, connected with increased radioactivity. For instance in the valley of Kerala with a back-ground radioactivity due to monazite, a thorium rich sand, with a six-time increased background activity, leads to a significant increase of congenital new dominant mutations, and Down's syndrome, as well as an aggravation of the sex odds, compared with the neighboring valley with a normal background radiation. (Padmanabham).

In Chernobyl still-birth and perinatal mortality, as well as congenital defects were noticed. Cardiac defects are often detected much later. Irradiation of fetuses in utero may lead to a significant increase of leukaemia and cancers (brain tumors) as shown in the 50th by Alice Stewart.

- Radiation and immune dysfunction -

In Chernobyl, the incidence of type 1 diabetes mellitus increased in children and especially in small children and infants, where the disease becomes evident due to the coma at entry. This is caused by defects of the immune system or a new mutation. *Usually, hereditary factors may be found in such cases; parents or grand-parents suffered from similar diseases. * In Chernobyl, type 1 diabetes mellitus is missing in the family. The Chernobyl diabetes mellitus of infants or small children appears to be a new disease.

In Belarus, it has been shown that the immune system was heavily affected after the accident. Therefore, both the white blood cells and the gamma globulins must be studied with a prolonged follow-up in the population of Fukushima (See papers of Pr. Titov). The results should be compared with those of similar research performed in children populations far away from the radioactive fall-out. E.g.: a comparable region around Kobe or Kyoto).

When studying the immune system of irradiated children, attention should be paid to auto-antibodies, against beta cells of Langerhans islets in the pancreas, and against thyroid cells. Hashimoto's thyroiditis has the same etiology as type 1 diabetes mellitus. *Other endocrine glands, such as sex hormones producing cells, may be responsible for functional problems especially during puberty: delayed menstruations or even epidemics of male sterility as described in Ukraine. Allergic diseases may also increase in frequency among irradiated children populations. *Again, comparison with communities free of radioactive fall-out will be necessary.

The hypersensitivity of cells (lymphocyte cultures) of irradiated children, after a short X-ray irradiation of the cell culture, should also be studied in Fukushima, as it was done in Chernobyl children by Pr. Pelevina. The alteration of the immune system surely contributes to the increase of infectious diseases in infants and children of Chernobyl, even after years, if children still receive radio-contaminated food. The infections will have a more severe course, with complications and a tendency to become chronic, when compared with children of not radio-contaminated regions.

Ionizing radiation induces a genome instability, which is directly transmissible from generation to generation. This has to be studied and followed-up for generations, starting with the grand-parents now.

- Radiation and cancer -

The incidence of thyroid cancer extremely rare in small children, may increase even before the fifth year of age; an age where normally only one case in one million small children suffers from this malignant disease. If irradiated in utero or soon after birth, the latency period for this cancer may be very short, and a rapidly invasive papillary cancer of the thyroid can develop in very young children. Chernobyl provoked several other thyroid diseases, such as goiter, thyroiditis and functional disorders. The other cancers have a longer latency period, up to 35 years. Cronberg in Sweden and Okeanov in Belarus found a clear trend for the increase of different cancers 10 years after Chernobyl, and a statistically highly significant increases of all common cancers after 20 years.

Irradiation of young adults leads to premature aging; the early occurrence of cancers being part of this phenomenon. *The increase of cancer was much more pronounced in younger, than in older liquidators of Chernobyl, with the same exposition to radiation. Okeanov showed further more that among liquidators, the duration of the exposition to radiation was a more important risk factor than the dose. (See Proceeding of an intentional conference, IAEA, Vienna, p. 279, 8-12 April 1996.). When studying problems of cancers, never chose the mortality as parameter, the mortality is declining year after year, but the incidence is growing, especially among irradiated subjects, and the mean age of occurrence may start 20 years too early. There, statistically significant differences may be found in ten to twenty years.

Blindness is also more frequent among young than among older liquidators. It is a degenerative disease of the retina, with microcirculatory disturbance, reaching after a few years the macula.

In Chernobyl the first cause of death due to radiation is not cancer, but cardiovascular diseases, hypertension, with cerebral and cardiac complications. Physicians may protect patients from these complications.

Years after Chernobyl, children with a high burden of Cs-137 in the organism are ill in 80% of the cases, and have often cardiac problems. Prior to Chernobyl and in regions of Belarus with minimal radioactive fallout, only 20% of the children can be considered as non healthy, as it was the case in Belarus before the catastrophe.

Hashimoto's thyroiditis, and type 1 diabetes mellitus occur in infants at always younger ages. Other endocrine diseases, such as conditions due to anomalies of sex hormones may be responsible for functional problems especially in females during puberty, with delayed menstruations and sterility in male subject.

It is important that similar studies are undertaken in Fukushima, with always a possibly to compare the findings, with a group for comparison, in a similar environment, but no radioactive fall-out. The age, the sex distribution, the professions and standard of living and the density of population should be the same. Radiologically clean regions for comparison, could be selected around Kyoto or Kobe.

- Avoid internal exposure -

Measures to be taken to protect children are before all to prevent the uptake of radionuclides with drinks and food. Clean food and drinks must be given to all children, at home and in school canteens. Holidays in radiologically clean areas are also helpful.

Pectin reduces the uptake of radionuclides, Sr-90. Cs-137 and uranium derivatives. It also accelerates the elimination of radionuclides both with feces and urine. This food additive is considered by the experts of the Research Laboratory of the European Commission in Ispra, Italy, as safe and efficient for this indication (Nesterenko V.I. & al. SMV 134: 24-27. 2004).

Contaminated children can also be protected with vitamin E and A, as well as carotenes,

which act as antioxidants. Mothers should provide carrots, beet roots and red fruits, containing such antioxidants to their children.

The external radiation dose is much less source of pathologies than internal dose due to incorporated radionuclides, which are chronically accumulated in given organs, Thymus, endocrine glands, spleen, surface of bones and heart. Bandazhevsky demonstrated after Chernobyl (SMW 2003; 133:p488-490) that nearly a two times higher concentrations of Cs-137 is measured at autopsy in organs from children, when compared with the concentration in the organs of adults from the same region. The highest concentrations were measured in the pancreas and the thymus of new-born babies and infants.

Dosimeters distributed to children should be replaced by whole body spectrometers periodically transported in schools for controls. This gives a measure of the Cs-137 load. If the values are above 20 Bq/kg bodyweight, medical courses may be necessary, and the contaminated food must be replaced by absolutely clean food and clean drinks.

These reflections follow the article of the Mainich Daily News. It confirms that among adults no death related radiation occurred so far. The epidemiological and medical problems are to be studied and treated from birth to puberty by pediatricians, geneticists and immunologists, in irradiated communities. They will compare the present situation in Fukushima with that observed in not radio-contaminated comparable regions. *The cancers epidemic in adults has to be studied in 5 to 25 years from now.

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