Chronic Lymphocytic Leukemia in so-called controls of Hiroshima and Nagasaki

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The „Extended LSS“ sample contains a large subgroup which should also be considered in this context. 26500 persons are registered in the „Not in city“ cohort (NIC) which was formerly used as a control. These persons entered the cities soon or several days after the bomb explosion and were affected by residual radioactivity (gamma exposure produced by neutron activation of materials and radioactive fallout). The NIC persons were not evaluated any more in the later RERF studies and not used for comparisons. The residual radioactivity is assumed to be neglectable in the regarded A-bomb survivors.

Until 1971, 28 cases of CLL in a total of 691 leukemia cases were observed in the NIC cohort having reached 484300 person years at that time (Ichimaru et al., 1977). The incidence of 5.8 $10^{-5}y^{-1}$ lies considerably higher than the expected value for all leukemias of 3.8 $10^{-5}y^{-1}$ derivable by cancer registries of two Japanese districts which were conducted at that period, in 1962-64 and 1966 (Doll et al. 1970). The NIC data were obtained from a Leukemia registry operated by the departments of hematology of the Hiroshima and Nagasaki universities. In 1972, the total number of confirmed leukamia cases was 1559 including 422 cases of A-bomb survivors. No case of CLL hab been found in persons born after the A-bomb explosions (total leukemia cases 446).

Revised estimates by the RERF in 1987 by physical considerations lead to accumulated doses for the NIC by residual radiation up to about 200-500 mSv in both cities (Okayima et al., 1987). This corresponds to own estimates based on chromosome aberration data and comparisons of late effects (Schmitz-Feuerhake & Carbonell, 1983; Schmitz-Feuerhake, 1983)

Interestingly, no case of CLL was found in the survivor subgroups exposed by direct bomb irradiation ≥10 mSv (total leukemias 226 and 862600 person years), while the lowest dose group (<10 mSv) showed 6 cases of CLL and an incidence of 1.4 $10^{-5}y^{-1}$. This incidence is also higher than the expected value which can considered to be about ?? The dose cohort <10 mSv consists of 29977 survivors who were located in distances ≥ 10 km off the hypocenter at time of the bombing and were formerly also used as a control. Okayima et al., however, found that the fallout dose in the low dose groups is not neglectable. Own estimates of the mean dose by fallout in this subgroup resulted in a range 50 and 300 m Sv which is much higher than the „official“ dose by direct bomb irradiation.

It can therefore be assumed that nearly all of the observed CLL cases in the RERF sample until 1972 were originated by chronical low dose exposure, and this kind of exposure might be prominent in radiation-induced CLL.

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