COGNITIVE IMPAIRMENT FOLLOWING CHILDHOOD EXPOSURE TO MODERATE DOSES OF IONIZING RADIATION

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Background and Aims: Exposure to high doses of ionizing radiation results in a spectrum of cognitive deficits but the impact of lower doses is much less clear. The aim of this study was to investigate the effect of childhood exposure of the head to a mean dose of 1.5 Gy on reported memory problems and attention deficit after about 50 years.
Methods: The study population included a subsample of individuals derived from the tinea capitis cohort, of which 253 irradiated and 162 non-irradiated subjects were interviewed (compliance rate 79.1% and 48.2% respectively, among those who could be located). Subjects completed a questionnaire covering socio-demographic and health topics. A section concerning memory problems and attention deficit (including details on symptoms, severity, and treatments) was incorporated using closed and free-text fields. To assess the effect of radiation on cognitive problems, multivariate Poisson regression models were performed.
Results: About half of the study population was females and most individuals (73%) were aged between 55-64 years at interview. The mean age at irradiation was 7.4 years (range 1-15) and the average follow-up period was 52 years (range 44-63). More irradiated subjects than non-irradiated subjects reported memory problems (55.7% vs 35.8%, p<.001) and attention deficit (33.2% vs. 14.8%, p<.001). Controlling for age, gender, and SES level, irradiated subjects had a higher risk of having moderate-high severe memory problems (RR=2.00, 95%CI: 1.19-3.26) and moderate-high severe attention deficit (RR=3.48, 95%CI: 1.77-6.85) compared to the non-irradiated. Female gender and low SES level were found to be independent risk factors for memory problems.
Conclusions: This study suggests that cognitive impairment may be a health outcome of exposure to moderate ionizing radiation in childhood. The long term effects of this exposure continue to be a public health concern considering the growing use of diagnostic modalities involving this exposure (primarily CT).