

OCCUPATIONAL DISEASES AND RADIATION PROTECTION OF EXPOSED WORKERS

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INTRODUCTION

Health Consequences

- Most clinical manifestations of chronic changes occur between 6 months and 5 years after radiation contamination from environment.
- Cumulative effects doses from 100mSv up to 1Sv (100mSv>1000Sv), for long-term, at least 3 years.
- Depending Chronic Radiation Syndrome
- Relatively risk for carcinogenesis is 0,8% /100mSv (8 per 1000 persons who has received 100mSv per year for long-time, in average).

Types of malignancies

- Multiple myeloma
- Leukemia
- Lymphatic Cancer
- Skin Cancer
- Lungs Cancer
- Breast Cancer
- Thyroid Cancer

PURPOSE AND METHODS

- To assess the radiation risk of cancer genesis in individuals professionally exposed to low-level ionizing irradiation in a longitudinal cohort study. The main objective was to establish etiologic diagnosis for occupationally diseases.
- The epidemiological method of the retrospective cohort study was used for comparison of morbidity and mortality data due to occupational diseases (malignant tumors; cataract of lens) among the health care professionals working in the ionizing irradiation zone. The cohort comprised 1.560 health care workers in ionizing irradiation zone who had been subjected to regular check-ups in the period 1992-2002.

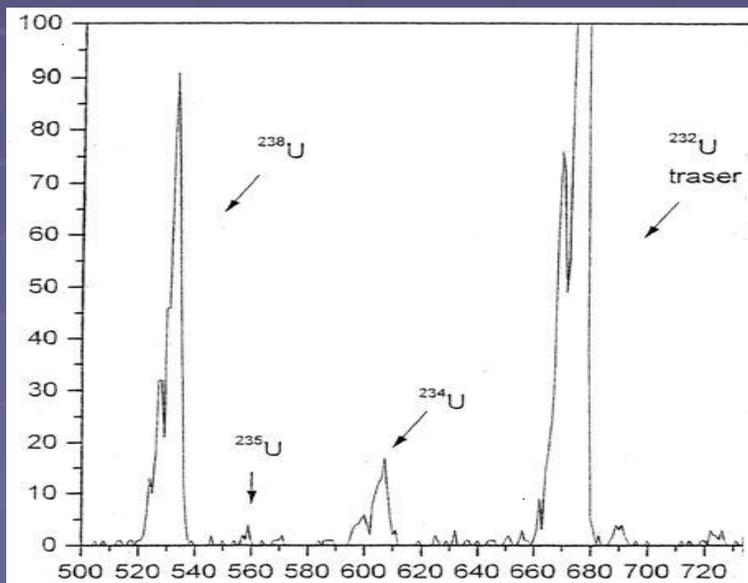
METHODS - Measuring and Monitoring



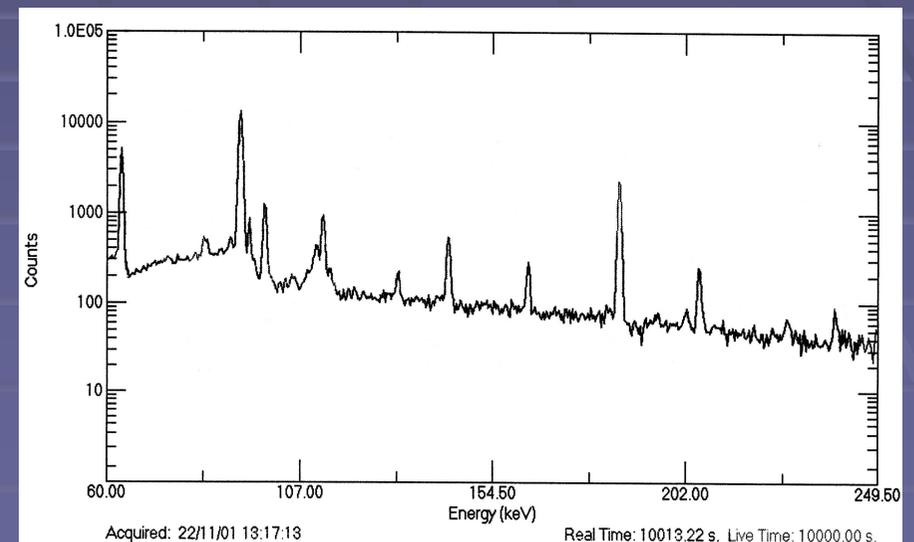
Detector



TLD



α -Spectrometric of urine



γ -Spectrometric of urine

RESULTS

Doses were presented as annual or 5-year equivalent to absorbed dose, expressed in mSv. A total of 1560 workers were employed in the zone and 1680 out of ionizing radiation zone, which were of different occupations, age and sex. Percentage of smokers was approximately the same in both groups (31% vs. 33%).

More significant incidence of cataract was found in exposed group. Radiation risk was higher in health workers in radiation zone than in others, relative risk – RR is 5.

Malignant tumors of the respiratory system are the first most common tumors in male population, both exposed and unexposed. The contribution of smoking is high, present in 2/3 of the cohort subjects. It has been generally known that in addition to the skin cancer, acute and chronic leukemia are the most common consequences of the ionizing radiation. Systemic forms of the cancer (leukemia and lymphomas) develop only in women, while solitary tumors affecting airways, cervical organs and female reproductive organs are present in the majority of patients. Solitary tumors affecting less radiosensitive organs are predominant.

Professionally Diseases

Radio dermatitis

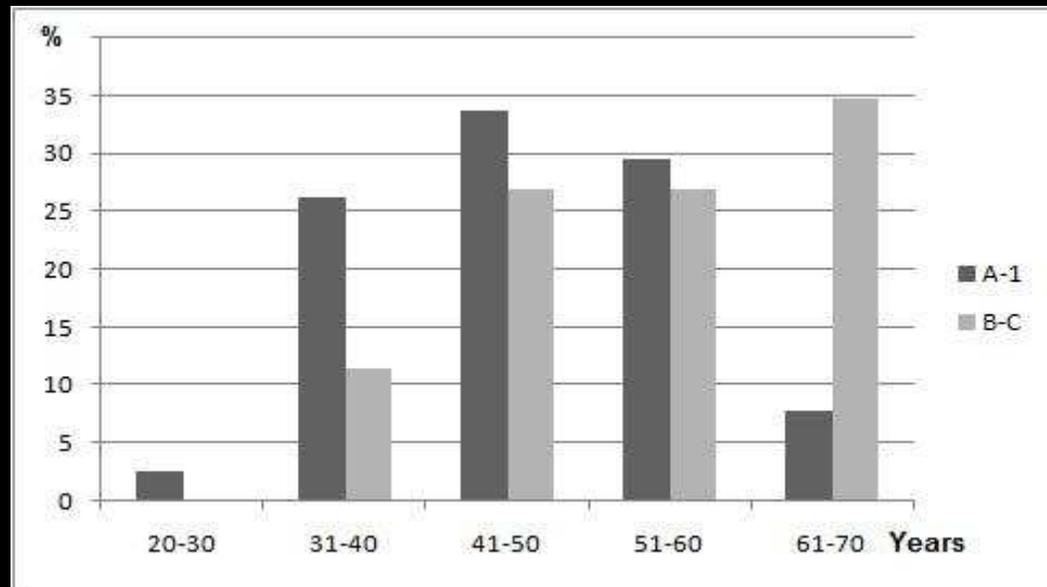


Cataract

Depends on age and duration of occupational exposition - DOE

A-1 exposed workers

B-C control



Malignant neoplasm's' frequency according to occupation

<i>Occupation</i>	<i>Malignant neoplasm</i>	
	<i>n</i>	<i>%</i>
Roentgen technicians	15	41.40
Senior Roentgen technicians	7	19.50
Radiologists	7	19.50
Medical technicians	3	8.40
Laboratory technicians	1	2.80
Dentists	1	2.80
Pneumonologists / T.B. specialists	1	2.80
Other workers in zone	1	2.80
Total	36	100.00

Average annual incidence of malignant neoplasm according to localization, ranged on frequency

<i>Locali zation</i>	<i>Average annual incidence per 100,000 Mail</i>	<i>RR</i>
Lung	89	0.91
Skin	30	0.65
Pharynx	15	5.00
Larynx	15	0.75
Colon	15	0.68

<i>Locali zation</i>	<i>Average annual incidence per 100,000 Femail</i>	<i>RR</i>
Breast	101	1.1
Womb	45	1.3
Skin	23	0.8
Ovary	23	1.2
Bone morrow	11	5,5

CONCLUSION

The absolute radiation risk due to the occupational exposure of health care professionals to ionizing irradiation has not been documented. The increased relative radiation risk (RR) was detected on certain localizations after prolonged latency.

Solitary tumors affecting less radiosensitive organs are predominant. The morbidity is higher among females while the mortality is higher among males. X-ray technicians are more frequently affected than other individuals in the irradiation zone.

Control of the exposure and radiological protection of the occupationally exposed individuals have reduced the risk of the malignant diseases. Chronic exposure is one of the co-factors leading to development of cancer due to the cumulative radiobiological effect.