

SOME EXPERIENCES ON EFFECT OF EXTERNAL DECONTAMINATION IN THE PREVENTION OF IRRADIATION

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Investigations are included experimental materials in the frame of decontamination of normal and damaged skin contaminated with radioiodine or radio-caesium and acquired experiences in human practice as external decontamination of persons contaminated with different radionuclides working at RA Vinča reactor and in laboratories which produce and use radionuclides, as well as after Chernobyl accident. In experimental conditions the efficiency of decontamination based on evaluation of the total body burden of radionuclides and residual radioactivity in the decontaminated region. In human praxis the decontamination treatment presents the most effective medico-prophylactic procedure in the prevention of local and total irradiation.

METHODS

Methodology include the experiments and the evaluation of data taken from human praxis.

Experimental

The experiments were performed on the white rats. The skin made "fat-free" using soap before contamination. On the shaved skin of the extremity was made perforating wound by dental drill. The radioactivity of the applied amount of solution NaI^{131} and $^{137}\text{CsCl}$ was 1,85 MBq. Decontamination of the skin:five treatments were performed in duration of one minute each.Treatment of radiomixte based on rinsing action by use of vacuum system with choosen solution for decontamination. Means for decontamination: soap,saline,1% Cetavlon,2,5% Sterigal,0,5% iodine tincture, 5% Na-HMF,0,25% DBS-TR,PAM-03.

Human examination

A-Decontamination of persons at an operating nuclear plant

- Period of observation: over 25 years.
- Number of cases accidentally contamination employed on the Reactor RA in Vinča: 34.
- The efficiency of decontamination in dependence of physiological, radiological, physiological and chemical characteristics have been analysed, including: state skin and visible mucous membrane; anatomical locality (the head-frontal bump, superciliary arch, eye, cheek, nose, mouth, chin, hair, hand, fingers, finger-nail etc.); duration of contact radionuclide with barriere (usually a few minutes, seldom 30 minutes); levels initial activity, chemical form of contaminant; state aggregation (dust, gas, liquid); time of duration of treatment at different cases (about 20 minutes);
- Radiocontaminants: ^{60}Co , ^3H , ^{24}Na , ^{27}Al , ^{109}Ag , ^{131}I . Mixture of fission products. Unknown composition (especially when contaminant is in form dust). Contamination with dust was in 35% cases.
- Localization: hand/feet (16 cases-47%), face (9 cases-26%) etc.

B-Decontamination of persons contaminated in laboratories of Institute "Boris Kidrič"

-Vinča

- Place of performance: Block for human decontamination-Vinča.
- Period of observation: over 20 years.
- Number of persons: 42
- Anatomical locality and number of cases: fingers of hand/feet (20), hand/feet (10), forehead (4) by three (hair forehead, nose, neck) by twice (face, lips) and by once (temple, ears, foot, fingers of foot).
- Radiocontaminants: ^{131}I (16 contamination-38,1%), ^{198}Au (6 contamination-14,3%), ^{239}Pu (4 contamination-9,5%), by twice contamination with ^{32}P and ^{137}Cs (4,8%), by once contamination with ^{60}Co , ^{27}Al and ^{111}Ag . Registered also 4 contamina-

nation with mixture fission products and 5 unidentifiable contamination.

C-Decontamination of Yugoslav workers in Soviet Union

This materials concerning effect of decontamination of workers building plant Komgrap on building site Micord-Žlobin (Soviet Union) contained due to the Chernobyl are analysed.

Common procedures and means for decontamination from human praxis

Treatment: Decontamination of the skin contaminated with different radionuclides contained usually 4-5 procedures by use of cotton-wool and alternately by water rinsing or by cleaning with solution of means for decontamination. Means for decontamination: 5% detergent, toilet, medical and liquid soap, 3% citric acid, 2% tannic acid, saline, permanganate, 2% boric acid, emery; Detergent mixture, Hypex-detergent emulsion, 3% Versen, Lotion MO 8.385; Combination 5% Detergent and 2% Versen; Protective creams-Lanolin, Vaseline, Jecoderm, "Lek 48".

R E S U L T S A N D D I S C U S S I O N

Experimental data enable following confirmation:

- The efficiency of decontamination of the skin conditioned more by radioactivity decontaminated region but at perforating wound is greater influence of body burden of the penetrated radionuclides.
- Decontamination efficiency of the skin contaminated by radioiodine and radio-caesium was 90-99% when treated 30 minutes after contamination.
- Soap and saline used as a decontamination means shows the greater efficiency in the comparison with other used means.

Human data - it remains only for a summary of these findings to be made here:

- In majority of cases at personnel operating nuclear plant contaminants were ^{60}Co and ^3H but at contamination in laboratory conditions contaminant was ^{131}I .

- Application surface active substance (detergent,soap) as decontamination means show the greatest efficiency (that reach to 100%).
- At 468 Yugoslav workers building plant Komgrap on construction site Micord-Žlobin that is 90% supervised persons established the contamination of clothing.
- Maximal number of contamination was registered on the hands (20%).
- The contamination of hair was evident at about 10%.
- Signs of contamination of the body established at 6 controlled persons.
- Low level of contamination under 10 i/s registered at 38 cases, middle at 86 cases and higher level (over 100 i/s) evident at 16 cases (by use instrument KOMO-TN).

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