Nursing of Radiation Casualties

By **Mrs. Vanamala Gurmurthy**

ACUTE Radiation Syndrome is caused due to exposure to excess of X-Rays, Ultra-Violet, Alfa, Beta and Gamma rays. This may also be caused by accidental ingestion of contaminated food, water etc., due to radio-active fall-out. Exposure to radiation is always dangerous and often fatal. The degree of seriousness depends upon the intensity of radiation. The dose of radiation received is expressed in physical units, r e m s and determined by a Physicist.

Table—1

Living Being	L. D_{50} Dose in r e m s.
Small mammals	400—800
Man	400
Gold fish	700
Newt	3,000
E. Coli	10,000
Amoeba	100,000
Viruses	1,000,000

(L. D_{50}=dose required to kill 50% of exposed population).

It is obvious from the above figures that man is the most sensitive of all living creatures who receives the above dose, develops the acute radiation syndrome.

The dose of radiation received will be determined by instruments called dosimeter and Geiger Muller counter. The syndrome develops in three stages.

I. Prodromal Phase : This develops in hours and lasts for a day or two. The patient suffers from nausea and vomitting, malaise etc.

II. Latent period : Duration of this condition is 1 to 3 weeks. The patient appears normal, but severe upset in blood occurs. This can be seen in the laboratory findings.

III. Manifest illness : Changes in the skin, tenderness, epilation, pancytopenia, repression of blood forming organs, diarrhea etc. will follow. Fifty per cent of the patients die. If the patients receive a dose over 1,400 r e m s, vomitting, diarrhea, shock and CNS impairment occurs and death will follow.

In such situations nurses working in the decontamination centres have a great responsibility. The following are the techniques used to take care of the sick and to protect the staff from radiation hazards.

The contamination may be caused by the fall out of radio-active material from broken vessel containing the isotopes or by bomb explosion. This may be in the form of gas, liquid or dust. In such cases avoid inhaling directly, close nostrils with a cloth and keep the vessels containing food, milk water etc. covered to prevent internal contamination. If already exposed the patient should be taken to a decontamination centre.

The staff should wear special suit made of plastic or rubber with oxygen supply. This covers the body completely and breathing is facilitated by the oxygen mask.

When the patient arrives at the Centre he is lead to the health physics room where the dose is determined and then transferred to the decontamination room. His contaminated clothing is removed and discharged into plastic waste baskets. The patient is inspected carefully for any open wounds. Special care is to be taken in case of nose, eyes, and mouth and "Hot Spots" (heavily contaminated areas) be determined. The decontamination process should start from the periphery to the centre.

The radio-active material rests on the oily film of the outer skin and then penetrates into the skin. The skin is to be cleaned with soap and water, if it fails, 1% cetrimide solution should be tried after which saturated solution of potassium permanganate should be employed. Care must be taken not to have undissolved crystals as they would cause blisters. The brown discoloration caused by $KMnO_4$ is removed by 10% solution of Sodium metabisulphte. The abrasive method such as scraping the skin is rarely required.

The solution is to be protected from external contamination by using an automatic drink-dispenser. The hair is to be shampooed with ether-soap. The washings should not come in contact with eyes, nose etc. "Back wash" device of the hairdressing trade can be of great help. Mouth is decontaminated with 20 vol. Hydrogen Peroxide, using a soft toothbrush. Eyes and nose are irrigated with water and saline.

The wounds and abrasions are most difficult to decontaminate. They are excised sometimes as per doctor's advise. Otherwise they are cleaned with a continuous water jet from a 10 ml. syringe nozzle.

Finally the patient is examined naked with health physicist, with his instruments to see the degree of decontamination and the process is repeated, until satisfactory improvement is achieved.

The patient is kept in absolute sterile conditions. The patients of radiation sickness are extremely susceptible to infections as the body's defensive mechanisms come to a halt practically.

Staff entering the centre should wear the special dress. On completion of their duty they must see their dosimeter and decontaminate themselves before putting on their dress. All these precautions are to be taken carefully.

If the patients are having internal contaminations, E.D.T.A. or any chelating agent should be administered intraveneously on the advise of the doctor BLOOD TRANSFUSION is given when advised.