

AN UNUSUAL CASE OF HOMICIDE BY RADIOACTIVE MATERIAL

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Abstract

November 23 2006, opened a new chapter in toxicology. For the first time, in the history of poisoning it got documented that radioactive substance being used for homicide.

The death of ex-Russian KGB Spy, 43 yrs old, Col Alexander Litvikenko, by radioactive substance, in London's University College Hospital, on November 23, was an eye opener, and created a storm in medical fraternity. Radioactive substance is normally used in nuclear medicine for diagnosis and treatment like radioactive iodine used for thyroid diseases or radioactive thallium used as tracer during heart scan. BA substance is also used as a weapon of mass destruction; however it 'as never used earlier for homicide. The case is discussed in detail.

Key Words: homicide by Radio Active material, spy death.

Case Report

On November 01, Ex-KGB Spy, who was given political asylum in Britain, met some one, identity withheld, at the *Iitsu Sushi* restaurant of London. It is believed he was poisoned there, which eventually killed him on November 23. [1]

History & Findings

On November 19 BBC News flashed a footage showing a very thin built, grossly emaciated person. He seemed aged. There was no hair in his head. For routine activities he was taking help of others and needed support for standing. He was breathing independently with no oxygen mask. No per-enteral fluid was administered to him. He was found talking to a lady attendant, supposed to be his wife. As per report his condition was "serious but stable".

As per history given by Alexander Litvikenko, 43 years, several hours after having food at *Iitsu Sushi* restaurant at London he felt sick. In two weeks time he was seriously ill and had to be admitted in hospital when he began to vomit violently. [2]

Doctors treating him, based on clinical findings thought he was poisoned by radioactive thallium salt. Radioactive thallium is commonly used in hospitals, as a tracer during heart scans. Radioactive thallium is a tasteless, odourless, colourless

and deadly. It can be slipped into food to kill a human in short time, in a very small dose. It causes internal haemorrhage and gastroenteritis. Eminent toxicologist who visited Alexander Litvikenko in hospital suspected radioactive substance was used. However the level of thallium detected in patient was not to the level of toxicity. Ultimately tests have detected Polonium-210 in Alexander Litvikenko body.

Mode of Action by radioactive Substance on human Body

Radioactive material emits three major types of radiations in form of Alpha particles, Beta particles and Gamma particles in addition to hundreds of other radiations. Alpha particles are least penetrating; Beta particles can penetrate a depth of few centimetres, whereas gamma has highest penetrating power and very deadly. [3] The damage to human body is essentially caused by damaging the cells and causing their death. Radioactive materials are found in powder or liquid forms. [4]

Acute Radiation Syndrome

Exposure to nuclear radiation is followed by symptoms of nausea, vomiting and fatigue, which last for 2-3 days. This is followed by latent period of variable duration [up to 3 weeks] when there will be no major

symptoms. After this, symptoms of haemorrhage and secondary bacterial infections like fever, abscess formation and red spots over the body appear. In case of mild exposure, the recovery commences after about 3 months. In case of severe exposure, death ensues within 24 to 48 hours. [5]

Findings on Post-mortem examination

Probable PM Examination would have shown the following features, absence of hair over the body including scalp. Gross emaciation, signs of infection over the body due to absence of immunity. Internal findings would have been gross necrosis of almost all viscera bleeding into various organs. Small haemorrhage under the skin and intestine.

Discussion

Though radiation injury is common finding in a nuclear disaster, like seen when atom bomb was hurled on Hiroshima on 06th Aug 1945 and 09th Aug 1945 in Nagasaki which had killed almost a population of 5 lakh and similar number injured. In the Chernobyl accident in USSR, on 26th April 1986, 46 million Curies of Radioiodine was released accidentally, which took many lives. [6]

The effects of nuclear radiation are as follows:

- a. Immediate cause of death – The death from radiation sickness is slow and painful. The initial symptoms include nausea, vomiting, diarrhoea, loss of appetite and malaise. After 2-3 weeks of radiation exposure there will be an increased tendency of bleeding in various organs. Small haemorrhages

appear under the skin. Spontaneous bleeding from mouth and intestine is common. Loss of hair manifests after 2 weeks. Eventually the radiation kills white cells of blood leading to reduction in body resistance. It gives a picture of an AIDS patient. Ultimately overwhelming infection develops leading to the death. [7]

- b. Long term effects to the survivors are leukaemia, thyroid cancer, breast and lung cancer, stomach and colon cancer and multiple myeloma. 'This is because of genetic mutation.

It is unlikely that radioactive substance will be used routinely for homicidal purpose because it is very difficult to procure. A radioactive reactor is required to manufacture radioactive substance. However, whenever there is a motive to use this substance, it becomes available either the state helps like the above case alternatively; it can be obtained through unfair means like stealing. Thankfully the world is still in safe hands as far as radioactive material is concerned since strict norms are maintained in cases of radioactive substances

References

1. The Times of India, New Delhi [Chandigarh] 04 Dec 2006: p1.
2. The Times of India, New Delhi [Chandigarh] 21 Nov 2006: p11.
3. Radiation Disaster Management. INMAS. Aug 2003: p17.
4. Nuclear Warfare. Oct 2003: p264
5. Nuclear Warfare. Oct 2003: p265
6. Radiation Disaster Management. INMAS. Aug 2003: p3.
7. Radiation Disaster Management. INMAS. Aug 2003: p79.

