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**VIVA : RADIATION PROTECTION**

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**ATTEMPT ALL QUESTIONS:**

**Q:1)** Describe the role of radiation protection officer in radiology department.

Ans:) **Role of radiation protection officer :**

* Radiation protection/safety officers (RSO) are responsible for ensuring the safe use of ionizing radiation producing equipment at registered facilities .
* RSO Training is required,per registrants are responsible for x-ray equipment that is under their administrative control,and must ensure that the radiation safety/quality assurance program, staff and use of x-ray equipment .
* The RSO must be identified within the radiation safety/quality assurance program.
* The RSO must receive RSO specific training and has additional responsibilities beyond

Their day to day job duties.

* The RSO must be provided sufficient time and commitment from the registrant to stop operations that he/she considers unsafe,ensure x ray equipment is used safely,and compliance with MDH x ray rules.
* These responsibilities,time and commitment must be delegated in writing from registrant to the RSO.
* When the registrant is also the RSO,an RSO completed.

Q:2) Elaborate the radiation protection measures in a safe radiology department?

Ans:) 1) **Minimize exposure:**

Remember to minimize your exposure at all possible times.

2) **Measure your radiation dose-dosimeter:**

* Use to measure the occupational dose equivalent from x-ray,gamma,and high energy beta emmiters.
* Always practice ALARA (As low as reasonably achievable)
* Some people dna is more resistant or susceptible to damage,and some people have an increased risk of cancer after exposure to ionizing radiation.

3)  **Three effective stratigies:**

* Minimize the time and you will minimize the dose.
* Pre-plan the procedure to minimize exposure time.

4) Th**ree effective stratigies distance:**

* Doubling the distance from the source can reduce your exposure intensity by 25 percent.
* Inverse square law know the radiation work, and move to lower dose areas during work delays.

5) **Three effective stratigies –shielding:**

* Position shielding between yourself and the source of radiation at all permissible times.Take advantage of permanent shielding.(i.e equipment or existing structures).
* Select appropriate shielding material during the planning stages of the procedure.

**Recommendation (Summary):**

* Shield thyroid and gonads, always wear lead aprons and use dosimeter to monitor the exposure.
* CT scans should be more justified.
* Patient education is important.
* There should be a universal x-ray bank where patient x-ray can be accessible anywhere from any hospital.

Q:3) What are radiation hazards that one should be beware off.

* Ans:) radiation refers to tiny,invisible or high speed particles or high energy electromagnetic wave energy that passes from one location to another and can have many manifestations,
* Radiation decomposition i.e splitting of water into H+ and OH- and also splitting of other solvents of the body.
* Kinetic energy of the incident photons heats up the molecules of the living tissues.
* Incident radiation when travelling through the body tissues knock out the bound electrons free from their parent atoms or molecules.These free electrons are highly unstable and interact with other atoms and molecules within the irradiated system.
* Ionization is another process where the radiations interact with matter to form ions.
* High energy electromagnetic radiation and particle radiation are capable of producing ions in their passage through matter.
* Types of ionizing radiation include alpha and beta particles,x ray ,gamma rays,etc.X ray machines and radio-isotopes are the two important and potential sources of ionizing radiation.

**Indirect effects:**

* Since 80 percent of the biological tissue is water.
* Most of the incident radiation energy is absorbed by the water molecules and these are broken into very unstable and reactive components.These react with body molecules and cause the cell damage.
* Due to the generation of H and OH radicals, subsequent to many series of reactions hydrogen peroxide is formed which is highly reactive oxidizing compound and break chemical bonds in macro molecules of the body such as proteins,lipids and other nucleic acids etc causing cellular damage,cell death and mutations.
* The biological effects are enhanced by the presence of oxygen which is always present in the cells.

**Q:2)** How a radiation technologist can protect himself/herself from radiation,what is annual occupational dose.

Ans:) Radiation is part of our life.Radiation help background radiation that is always in the environment.The majority of background radiation occurs naturally and a small fraction comes from man made elements,coming primarily from natural minerals,is around us all the time.Fortunately ,there are very few situations where an average person is exposed to uncontrolled sources of radiation above background.Nevertheless.it is wise to be prepared and know what to do if such a situation arises.

One of the best ways to be prepared is to understand the radiation protection principles of time,distance and shielding.

During a radiological emergency (a large release of radioactive material into the environment),we can use these principles to help protect ourselves and our families.

**Time,distance and shielding:**

Time,distance and shielding minimize your exposure to radiation in much the same way as they would to protect you against over-exposure to the sun.

**Protecting yourself:**

**Time** :for people who are exposed to radiation help radiation energy given off as their particles or rays.In addition to natural background

Radiation,limiting or minimizing the exposure time reduces the dose from the radiation source,

**Distance:** Just as the heat from a fire reduces as youmove further away,the dose of radiation decreases dramatically as you increase your distance from the source.

**Shielding:**

Barriers of lead,concrete,or water provide protection from penetrating gamma rays a form of ionizing radiation that is made up of weightless packets of energy called photons.

Gamma rays can pass completely through the human body;as they pass through they can cause damage to tissue and DNA and x rays form of ionizing radiation made up of photons.

X rays are capable of passing completely through the human body.

Medical x rays are the single largest source of man made radiation exposure..This is why certain radioactive materials are stored under water or in concrete or lead lined rooms,and why dentists place a lead blanket on patients receiving x-rays of their teeth . Therefore inserting the proper shield between you and a radiation source will greatly reduce or eliminate the dose you receive.

If a radiation emergency occurs,you can take actions to protect yourself,your loved ones and your pets.Get inside,stay inside and stay tuned.Follow the advice of emergency responders and officials.

 **( THE END )**