Principles of radiation toxicology

Chapter: Principles of radiation toxicology
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Most physicians have little training in radiation toxicology. Radiologists need to understand the principles of radiation for their professional lives, and those who order X-rays for diagnostic purposes are now required to have a basic understanding of radiation dosimetry. With the increasing availability of radiation sources, and widespread use of nuclear power, with potential for major accident in such facilities following natural disasters, it is helpful to have a basic understanding of the different sorts of radiation exposure, the clinical features, assessment of exposure based on these features, and basic principles of management for the different types of radiation. This chapter provides an outline to radiation biology and dosimetry. The different sources of radiation and their biological effects are outlined, and the general principle of triage and management of major radiation release discussed. Finally, in view of the fact that radiation sources have been used to cause major harm by ingestion, the key features of radiation ingestion and management are also discussed.

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The historical development of toxicology began with early cave dwellers who recognized poisonous plants and animals and used their extracts for hunting or in warfare. By 1500 BC, written recordings indicated that hemlock, opium, arrow poisons, and certain metals were used to poison enemies or for state executions. With time, poisons became widely used and with great sophistication. Notable poisoning victims include Socrates, Cleopatra, and Claudius. By the time of the Renaissance and Age of Enlightenment, certain concepts fundamental to toxicology began to take shape. Ionizing Radiation is defined as radiation capable for producing ions when interacting with matter in other words enough energy to remove an electron from an atom. In general, ionizing radiation reduces the rate of metabolism of xenobiotics both in vivo and in enzyme preparations subsequently isolated. Nonionizing radiation has less energy and, in general, is less interactive with biological material than ionizing radiation. Absorption of radiation is the prime consideration in radiation toxicology. Radiation can reach all tissues of the body directly from an external source, but the capacity to type of radiation. Toxic Principle. All parts are usually poisonous. However, the leaves may sometimes do not have the toxin.