TL dosimetry for doses evaluation of radiodiagnostic procedures performed in veterinary medicine

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The Report nº 148 of the National Council on Radiation Protection and Measurements (NCRP) provides guidance for the development of an effective radiation safety program and recommendations for the design of radiological facilities and for the use of radiographic, fluoroscopic and therapeutic equipment in veterinary medicine. These recommendations are designed to achieve the objectives of radiation protection: (1) to prevent the occurrence of clinically significant acute radiation damage, and (2) to limit the risk of stochastic effects such as cancer and genetic effects. For x- and gamma-ray equipment used by veterinarians, shielding and distance are the factors most readily controlled [1].

The reasons for using radiation in veterinary medicine are to either obtain optimum diagnostic information or to achieve a specific therapeutic effect while maintaining the radiation dose to the radiological personnel and the general public as low as reasonably achievable (the ALARA principle). Similarly, it is also important to avoid all unnecessary irradiation of the animal patient [1].

Individual monitoring devices are used to measure radiation exposure to personnel during the course of their work, to provide a check on the adequacy of the radiation safety program, to assist in keeping exposures consistent with the ALARA principle, to reveal improper radiation safety practices, and to detect potentially serious radiation exposure situations [1]. This work aims the doses evaluation in dogs submitted to radiodiagnostic procedures using the technique of thermoluminescent (TL) dosimetry. The radiation doses were assessed using TL dosimeters of $CaSO_4$:Dy produced at IPEN-CNEN. The dosimeters were selected and divided in groups according to their sensitivities (± 5%).

Aiming to the radiation doses assessment the radiodiagnostic procedures performed in thirty patient dogs of different breed and sizes were evaluated. During each examination parameters such as thicknesses of the two projections (latero-lateral e ventro-dorsal), field size, kV and mAs values and distances source-surface were attentively observed, to be reproduced during calibration and exams simulation using water phantoms with dimensions according to the animals characteristics. A quality-assurance program should be established that ensures both proper functioning of the x-ray machine and good image quality from a reasonable radiation dose.

[1] NCRP Radiation protection in veterinary medicine, NCRP Report Nº. 148 (National Council on Radiation Protection and Measurements), Bethesda, Maryland (2004).