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Radiological Procedures frequency, collective effective dose, and Cancer Risk: A single Center study in Saudi Arabia

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According to the World Health Organization, Saudi Arabia ranked 26th among healthcare levels globally. In 2023, over 18 million radiology procedures were conducted in public and private hospitals. This study aims to estimate radiological procedures frequency and annual collective and per capita effective dose in 2023-2024. Information was collected from King Khalid Hospital, Alkharj, Saudi Arabia. The radiological procedures, including computed tomography (CT), fluoroscopy, and interventional radiology (IR) procedures, were investigated. The collective effective dose was estimated using established Saudi Food and Drug Administration (SFDA) dose coefficients and procedure-specific frequency data. Subsequently, the attributable lifetime cancer risk was calculated based on current risk models and population demographics proposed by the International Commission on Radiological Protection (ICRP). The annual number of examinations was 500 thousand radiographic X-ray procedures (23% were CT procedures, representing 80% of the collective dose). The total collective per procedure is 1.2 mSv, resulting in the cancer risk of 1 cancer per 105 procedures, on average. The study revealed that 17% of radiographic procedures are not adequately justified, and 28% of the patient doses are higher than the institutional diagnostic reference level. The study revealed that proper justification and optimization can reduce the collective dose by up to 45%. The study highlights the importance of optimizing radiation protection practices and implementing strategies to minimize unnecessary exposure in the Saudi Arabian population. Furthermore, this study provides valuable baseline data for future risk assessments and the development of evidence-based policies to ensure the safe and effective use of radiological procedures.

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