عنوان مقاله:

Dosimetry of Critical Organs in Maxillofacial Imaging with Cone-beam Computed Tomography

محل انتشار:

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خلاصه مقاله:

Background: While the benefits of cone-beam computed tomography (CBCT) are well known in maxillofacial imaging, the use of this modality is not risk-free.Objective: The aim of this study was to evaluate the exposure doses received by patients during maxillofacial imaging with CBCT.Methods: Entrance surface dose (ESD) was measured by using thermoluminescent dosimeters (TLDs) attached to the eyes lids, parotid glands and thyroid of ۶۴ patients in two imaging centers (A and B). Phantom dosimetry was performed by a cylindrical poly-methyl methacrylate (PMMA) head-size phantom and an ionization chamber for different exposure parameters. NewTom VGi and Planmeca Promax ۳D CBCT scanners were used at centers A and B, respectively.Results: The mean ESD of the eyes, parotid glands and thyroid were ۲.۵۷, ۲.۳۳ and ۰.۲۸ mGy in center A, ۰.۳۵, ۲.۱۱ and ۰.۳۷ mGy in center B, respectively. ESD of the eyes revealed a significant difference in two centers; in center B, it was ۸۶.۴% lower than center A. In the phantom dosimetry, the measured doses of NewTom VGi were ۲.۶۳ and ۲.۰۸ mGy, respectively by changing field of view (FOV) size from ۸×۸ cm۲ (height × diameter) to ۶×۶ cm۲. For Planmeca Promax ۳D, it ranged from ۰.۹۸ to ۳.۲۴ mGy depending on exposure parameters.Conclusion: There is a wide range of radiation doses dependent on the units, patients and selected scan parameters. Inappropriate selection of exposure settings, especially FOV size, can seriously increase patient dose.

کلمات کلیدی:

Cone-Beam Computed Tomography, Radiation dosimetry, Entrance Surface Dose, Thermoluminescent Dosimetry, Maxillofacial Imaging, dentistry