

Evaluation of Patient Dose During Endoscopic Retrograde Cholangiopancreatography

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Introduction: Endoscopic retrograde cholangiopancreatography (ERCP) is an invasive technique that has been used for over 30 years in the diagnosis and management of pancreaticobiliary disorders. The intervention requires fluoroscopic and radiographic exposures, which impose radiation risks to the patients. Therefore, it is important to measure and effectively manage patient radiation exposure.

Objectives: The objectives of this study were to evaluate the patient ESD, to estimate the organ and effective doses during ERCP in three hospitals in Khartoum.

Methods: A total of 55 patients were examined in three hospitals in Khartoum state, Sudan during eight months (25, 45.45% in Fedail Medical Center (private), 11, 20% in Soba University Hospital, and 19, 34.54% in Ibn Sena Hospital (state). Thermoluminescence dosimeters (TLD)-GR200A) were used to measure patients' entrance surface doses (ESD). TLDs were calibrated under reproducible reference conditions. The signal was read using a manual TLD reader (Fimel PCL3, France), the soft ware program was (Theldo version 1E1). Patient dose measurements of local entrance dose to the skin have been carried out using three TLD in a plastic envelope mounted on patient skin at mid point of radiation field at a part of interest of the central axis beam. ESD was used to estimate the organ equivalent dose (H) using software provided by the National Radiological Protection Board (NRPB-SR262).

Results: The overall mean of ESD for all ERCP procedures was 42.4 mGy. The mean patient ESD in Fedail, Soba and Ibn sena centers were 26.7 mGy, 26.0 mGy, 72.4 mGy, respectively. The effective doses in three centers were 1.6, 1.56 and 2.67 mSv respectively and the overall mean was 2.01 mSv.

Table 1: patient radiation dose in ERCP (mGy)

Center	Mean±Sd	Minimum	1 st Quartile	Median	3rd Quartile	Maximum
Fedail	26.7±73.4	0.2732	3.55	5.4	12.93	365.7224
Soba	26.0±21.4	0.511286	5.020	33.2	45.857	51.6043
Ibn sena	72.4±91.3	0.195438	19.009	29.95	101.044	384.1659
All	42.4±75.8	0.195438	4.91	12.9	45.96	384.1659

Table 2: Patient organ dose in ERCP

Organ	organ equivalent dose(msv)		
	Fedail	Soba	Ibn sena
Pancreas	2.58	1.59	8.19
Red bone marrow	1.16	0.76	3.64
Liver	3.14	2.25	9.51
Breast	0.06	0.03	0.20
Ovaries	1.55	0.86	5.068
Testicles	0.13	0.06	0.46

Conclusions: Patients ESD in Ibn sena hospital was higher compared to other centers due to X ray machine characteristics. The liver organ equivalent dose was 4.43 and the pancreas was 3.36 mSv. Data shows asymmetry in distribution. These variations are due to the different indications, patient characteristics and pathological findings. The mean ESDs result for all centers was lower 30% than the previous studies.