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Evaluation of the patient exposure dose during ERCP Fluoroscopy guided procedures

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Purpose

Endoscopic retrograde cholangiopancreatography (ERCP) is a diagnostic/therapeutic fluoroscopy guided procedure that includes upper gastrointestinal endoscopy allowing the treatment of the bile and pancreatic ducts pathologies. Currently, ERCP is mostly used in therapy, which turns in to longer procedures, with potential higher doses of ionizing radiation to the patient and due to the cancer development risk it's relevant to evaluate dose exposure during ERCP. The International Atomic Energy Agency (IAEA) defined the mean dose area product (DAP) for ERCP diagnostic procedures as 15 Gy.cm2 and mean...

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Methods and materials

In this study, a non-probabilistic sampling method was used, and the hospitals were selected based on criteria of having picture archiving systems and communications (PACS), using a defined time interval by the author. The data consisted in 267 ERCP dose reports available, 198 from a public hospital performed with C-arm Philips, BV Endura and 69 from private hospital, with C-arm Siemens, Arcadis Varic. The statistical data treatment was carried out using the software SPSS. Descriptive statistics, mean, median, minimum and error values, exposure time, DAP...

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Results

At the public hospital, the data of 198 patients undergoing ERCP procedures showed a percentage of 49% of males and 51% females, corresponding to 98 and 100 patients, respectively. The mean exposure time was 4 minutes and 53 seconds, the mean DAP was 4,972 Gy.cm2, the median DAP value was 3,600 Gy.cm2 and the effective dose was 1,293 mSv. At the private hospital, the data of 69 patients undergoing ERCP procedures showed a percentage of 57% of males and 43% females, corresponding to 39 and...

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Conclusion

The present investigation allowed us to conclude that DAP values of each ERCP procedures are not entirely reflective of the fluoroscopy time, with only a positive moderate correlation. As can be seen, the median values of the two institutions under the study are extremely close, 4 minutes and 17 seconds in public and 4 minutes and 21 seconds in private hospital. However, considering the DAP values, a significant difference with 3,6 Gy.cm2 and 13,2 Gy.cm2, respectively, was observed. Exposure doses are within normal range compared...

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Personal information and conflict of interest

M. Granadas: Nothing to disclose S. I. Rodrigues: Nothing to disclose P. Sousa: Nothing to disclose O. Lesyuk: Nothing to disclose B. Vicente: Nothing to disclose R. P. P. Almeida: Nothing to disclose K. B. Azevedo: Nothing to disclose L. P. V. Ribeiro: Nothing to disclose A. F. C. L. Abrantes: Nothing to disclose

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Table 1 - Comparison of median: fluoroscopy time, DAP e E.

Study	Procedures number	T (Minutes:s)	DAP (Gy.cm²)	E (mSv)
Current study - CHUA	190	00:04:17	3,6	0,94
Current study - HBPA	69	00:04:21	13,23	5,45
(Saco et al., 2015) [1]	126	00:07:29	47,06	8,95
(Tsapaki et al., 2017) [2]	1622	00:05:30	15,6	-
(Hayashi et al., 2018) [3]	1157	00:10:00	18,1	-
(Neeman et al., 2018) [4]	636	00:07:50	2,39	0,61
(Hayashi et al., 2020) [5]	2770	00:10:00	13,3	3,5

Fig 1: *Comparison of median: fluoroscopy time, DAP e E between this study and...*