

Radiation doses to patients undergoing Enteroclysis

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Introduction

- An Enteroclysis a radiographic procedure in which a contrast medium is injected into the duodenum to permit examination of the small intestine.
- The procedure is manipulated by a highly trained radiologist to diagnose various problems of small bowel.
- During the procedure, considerable radiation dose is delivered to the patients. Furthermore, still few studies are performed in the literature.

Purpose

The current study intends to:

- (i) evaluate the radiation dose to the patient using TLDs during Enteroclysis, according to the protocol used at Radiology Department, University Hospital of Larissa (UHL), Greece
- (ii) estimate the thyroid surface dose (TSD) and doses to some radiosensitive organs located in irradiation field.
- (iii) estimate the risk of the radiation dose; and (iv) compare the results with literature.

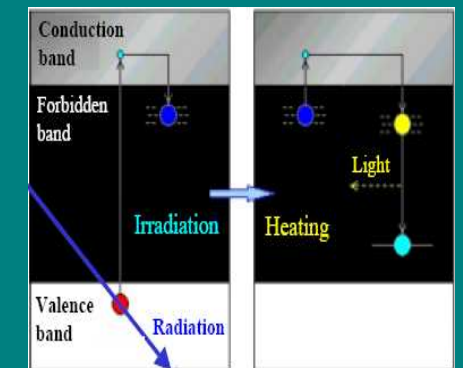
Materials and Methods

- A total of 46 Patients were examined and were divided into two groups according to the digital X ray machine used.
- Patients were divided into two groups according to the digital X ray machine used (Group A, 25 patients and Group B, 21 patients).

Materials and methods: Dosemeter

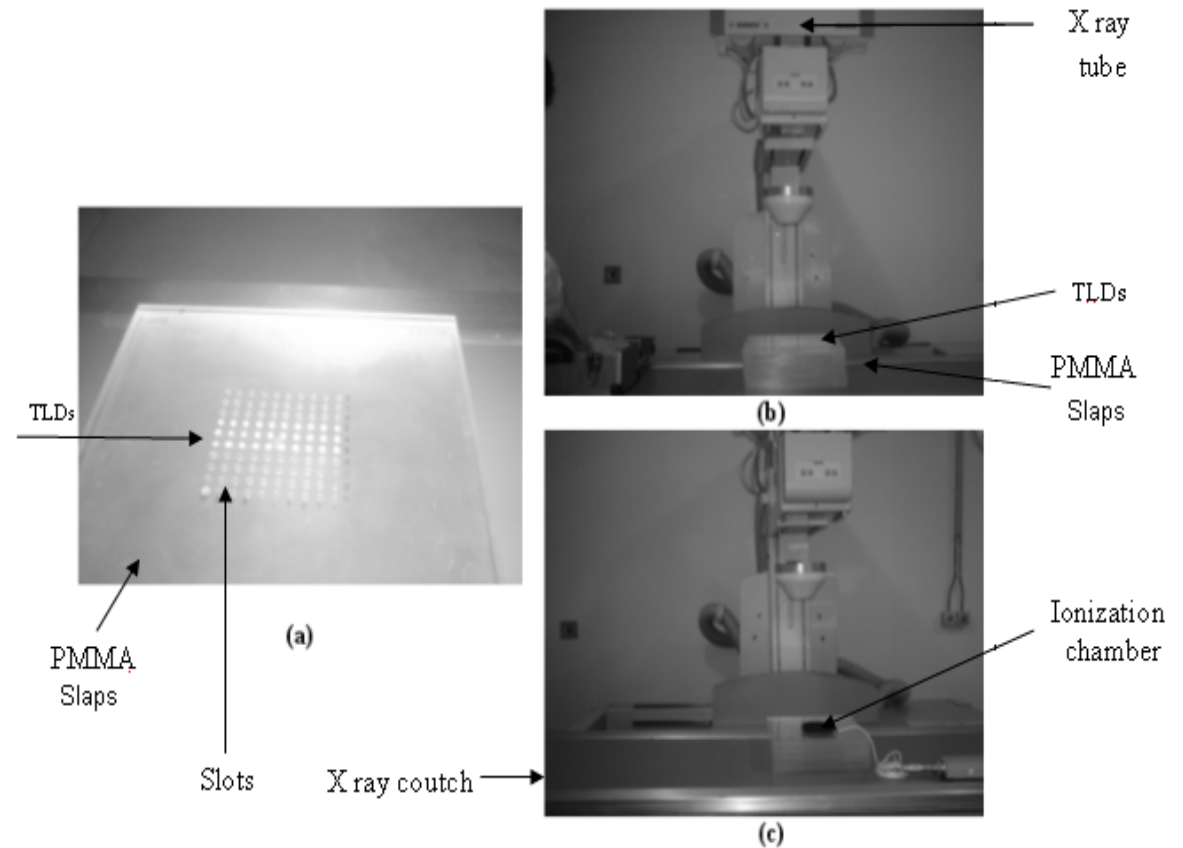
- Radiation dose measurements were made using two groups of TL dosimeters from Harshaw (Bicron-NE, Solon, Ohio, USA).

TLD-100 was selected to measure patient dosimetry



Materials and methods: Calibration

TLDs were calibrated under reproducible reference conditions using the same X-ray machine against an ionization chamber model 9060/10X5-60 connected to a Radiation Monitor Controller model 9010 (Radcal Corporation, Monrovia, CA).



Patient dose measurements

- ESD is directly measured using 3 envelopes contains 12TLDs placed on the patients' skin surface at the point of insertion of the central axis beam.
- A plastic envelope made of white polyethylene plastic foil, each contain 4 TLDs to protect the TLDs from any contamination.
- During the radiographic procedure the TLDs are kept in the required position and are fixed in place with cello-tapes.

Results

- The mean ESD was 601.2 mGy and the mean fluoroscopy time was 8.5 minute while the mean thyroid surface dose was 0.34 mGy.
- The radiation dose value for group A is lower by 20% less than group B due to filtration and fluoroscopic mode.

Comparison of patient radiation dose during enteroclysis procedures

Author	No.of patient	Mean dose	Effective dose (mSv)	No.of films	Procedure duration (min)
Present study	46	601.2 mGy	28	5	25
Hart et al (1994)	23	6.8 Gy.cm ²	1.5	6	9
Tsalafoutas et al (2005)	14	81 Gy.cm ² 428 mGy	21	9	20
Thoeni et al (1991)	25	123 mGy	NR	16	18
Ruiz -Cruces et al (2000)	33	54 Gy.cm ²	14	7	NR

NR: not reported

Conclusions

- The mean entrance surface doses in this study are high when compared with those reported in the literature.
- Patient dose reduction techniques should be applied in order to prevent the possible Radiation risk.
- The radiation dose value for group A is lower by 20% less than group B due to filtration and fluoroscopic mode.
- It is recommend that enteroclysis examination should be performed with fluoroscopic imaging to minimise the radiation dose