

ปริมาณรังสีและการกระจายรังสีจากการตรวจด้วยเทคนิคฟลูออโรสโคปี : การศึกษาในเนื้อเยื่อจำลอง

Radiation Dose and Dose Distribution from Fluoroscopy: Phantom Study

ช่วงเวลาดำเนินการ ปี พ.ศ. 2562

ผู้รับผิดชอบ ดร. วิฑิต ผึ้งกัน

ตำแหน่ง รักษาการผู้เชี่ยวชาญเฉพาะด้านการประเมินค่ากัมมันตภาพรังสี

Email: vithit.p@oap.go.th

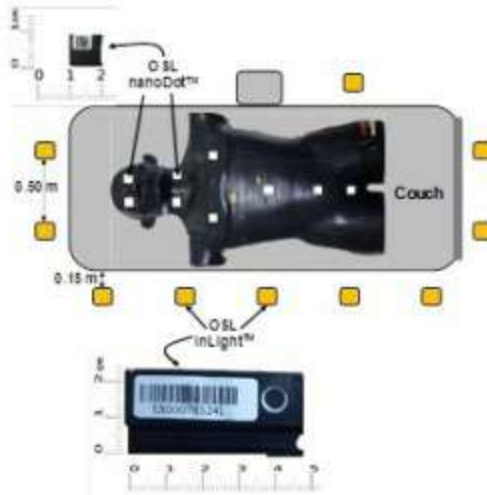
รายละเอียดสรุป

Background and Objective: Knowing the level of radiation dose will be a radiation protection guideline for patients and staffs. The purposes of this study were to define a conversion factor for optically stimulated luminescence (OSL) dosimeters and to measure the skin equivalent dose from four fluoroscopic techniques; barium swallow (BS), upper GI (UGI), barium enema (BE) and voiding cystourethrography (VCUG). The charts of radiation dose distribution from fluoroscope were plotted.

Methods: OSL dosimeters were attached on the phantom and irradiated with different x-ray energies. The conversion factors were calculated. Then, OSL dosimeters were placed on the organs of Rando phantom to measure the radiation equivalent dose. Finally, OSL dosimeters were placed on the column surrounding the fluoroscope to measure the scattered radiation.

Results: The relationship between energy and count was follow the equation $y = 126531e-0.0151x$. The highest skin equivalent doses were at abdomen (18 mSv) from barium enema technique, breast received the radiation dose at 8 mSv from barium swallow examination and the radiation dose of 17 mSv from upper gastrointestinal study. The voiding cystourethrography produced the highest radiation dose to uterus at 12 mSv. Moreover, the highest scattered radiations were from the middle of couch.

Conclusions: Knowing the radiation dose at radiosensitive organs, such as eye lens and thyroids, help the staffs to aware of the danger of exposing to radiation. Radiation staffs can avoid the high radiation area and the use of radiation protection can reduce the radiation.



Techniques	Organs	The scattered radiation dose from fluoroscopy (μSv)					
		Distance of 0.15 m			Distance of 0.50 m		
		head	middle	foot	head	middle	foot
BS	Thyroid	7.0	107.0	13.0	3.0	17.0	3.0
	Gonad	0.0	63.0	3.0	0.0	17.0	0.0
UGI	Thyroid	35.0	170.0	30.0	8.0	50.0	12.0
	Gonad	3.0	110.0	12.0	5.0	33.0	3.0
BE	Thyroid	73.0	680.0	60.0	40.0	300.0	32.0
	Gonad	3.0	370.0	13.0	3.0	183.0	8.0
VCUG	Thyroid	57.0	290.0	22.0	38.0	137.0	10.0
	Gonad	3.0	177.0	7.0	7.0	93.0	7.0