

Exposure to Patient During International Endourological Procedures

J. Hristova^{1*}, J. Vassileva¹,

I. Saltirov²

¹National Center of Radiobiology and Radiation Protection ,
Sofia, Bulgaria

^{1*} yuliya.hristova@gmail.com

²Military Medical Academy, Sofia, Bulgaria

International Conference on Radiation Protection in Medicine
Varna, Bulgaria 1 – 3 September 2010

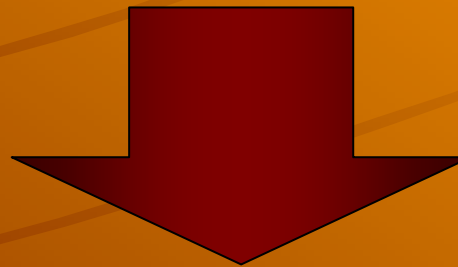


Exposure to Patient During International Endourological Procedures

Introduction:

Interventional endourological procedures are:

- ❧ complex*
- ❧ prolonged and may require more x-rays*
- ❧ repetitive*



- ❧ Patient skin doses can be high*
- ❧ Effective doses can be high*
- ❧ Deterministic effects can occur in staff*

Exposure to Patient During International Endourological Procedures

➤ Purpose:

The purpose of this work is to study doses to patients undergoing interventional endourological procedures.



Exposure to Patient During International Endourological Procedures

☛ Materials and methods:

The study was performed in a modern Clinic of Endourology and Shockwave Lithotripsy, equipped with two dedicated X-ray systems:

☞ *Access Uroskop (Siemens)*




☞ *Lithoskop (Siemens)*



Exposure to Patient During International Endourological Procedures

Materials and methods:

The following information was recorded for each patient:

- 
- ≈ type of the procedure*
 - ≈ patient age*
 - ≈ fluoroscopy time*
 - ≈ number of images acquired*
 - ≈ patient dose in air kerma-area product, P_{KA} , measured with KAP-meters integrated in the x-ray units*

Exposure to Patient During International Endourological Procedures

Materials and methods:

Ten types of procedures were included:

 *KUB*

 *Retrograde Uteropyelography*

 *Intubatio uteris cum stent JJ*

 *Uteroscopy*

 *Uteroscopy with intubatio uteris cum stent JJ*

 *Uteroscopy with US lithotripsy*

 *Uteroscopy with endoureterotomy*

 *Nephrostomia percutanea*

 *Percutaneous nephrolithotripsy*

 *Extracorporeal shockwave lithotripsy
of kidney and ureteral stones (ESWL)*

Exposure to Patient During International Endourological Procedures

Results:

From the collected sample of 300 patients the average, min - max and third quartile values were calculated.

FT, min			Number of images			$P_{KA\ total}, cGy.cm^2$		
AV	Min-Max	3 QRT	AV	Min-Max	3 QRT	AV	Min-Max	3 QRT
Kidney - Ureter - Bladder (KUB)								
N/A	N/A	N/A	1	1 - 1	1	40	25 - 55	47
Retrograde Uteropyelography								
1	0 - 3	1	2	1 - 3	2	261	23 - 1311	349
Intubatio uteris cum stent JJ								
0.9	0,5 - 2,2	0.9	2	1 - 8	3	161,6	51 - 779	190
Uteroscopy								
1	0 - 3	2	2	1 - 4	3	395	39 - 1717	1006
Uteroscopy and intubatio uteris cum stent JJ								
1	1 - 2	2	3	1 - 3	3	352	28 - 744	619

Exposure to Patient During International Endourological Procedures

Results:

From the collected sample of 300 patients the average, min - max and third quartile values were calculated.

FT, min			Number of images			$P_{KA \text{ total, cGy.cm}^2}$		
AV	Min-Max	3 QRT	AV	Min-Max	3 QRT	AV	Min-Max	3 QRT
Uteroscopy and US lithotripsy								
1	0 - 4	1	3	1 - 7	4	294	3 - 1091	464
Uteroscopy and endoureterotomy								
2	0 - 3	2	5	1 - 9	7	495	28 - 862	522
Nephrostomia percutanea								
2	0 - 3	2	2	1 - 5	2	395	36 - 1331	607
Percutaneous Nephrolithotripsy								
4	2 - 9	5	4	1 - 7	5	533	63 - 2197	632
Extracorporeal shockwave lithotripsy of kidney and ureteral stones (ESWL)								
3	1 - 5	3	3	2 - 6	4	389	102 - 1143	423

Exposure to Patient During International Endourological Procedures

☛ Results:

☞ *For all procedures the fluoroscopy time varied between 1 and 9 minutes.*

☞ *The highest value of mean P_{KA} 533 cGy.cm² was found for Percutaneous nephrolithotripsy, 495 cGy.cm² for Uteroscopy with endoureterotomy, 395 cGy.cm² for Nephrostomia percutanea, 395 cGy.cm² for Uteroscopy.*

☞ *The mean values of P_{KA} for ESWL, Uteroscopy with intubatio uteris cum stent JJ, Uteroscopy with US lithotripsy, Retrograde uteropyelography and Intubatio uteris cum stent JJ were between 162 and 389 cGy.cm².*

☞ *Individual patient doses varied between 3 and 2197 cGy.cm² and fluoroscopy time – between 0,5 and 9 min.*

Exposure to Patient During International Endourological Procedures

Conclusions:

The first study of patient doses in interventional urology in Bulgaria demonstrated that the exposure of patient depends on:

- ∞ the type of procedure*
- ∞ the complexity of procedure*
- ∞ operator's experience*
- ∞ exposure parameters*

Further studies in other department will aim at proposing national reference levels for most common urology procedures.