

POPULATION EXPOSURE PRODUCED BY UNNECESSARY EXAMINATIONS

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INTRODUCTION

The unnecessary radiological examinations and their implications referring to medical exposure and benefit against detriment problems represent an important subject of a great part of the literature. The evaluation of these is very important in the ex-communist countries, where such publications are almost completely missing. Our study follows to establish the number of unnecessary examinations in three roentgendiagnostic departments and their contribution to medical exposure.

MATERIAL AND METHOD

The study has been done during three months in three different radiological services: Unit A - a hospital of 315 beds, Unit B - a hospital of 147 beds and Unit C - an outpatient's department with 30 000 persons belonging to it. All the three X-ray installation has been in average 20 years old, without image amplifier.

The number of unnecessary examinations varied among 6 - 25 %.

TABLE 1

Unit	Nr. fluoroscopic examinations	Nr. radio-graphs	Nr. all examinations	Nr. unnecessary fl. ex.	Nr. unnecessary rad.	Nr. unnecessary at all
A	760	1 125	1 885	28 (3,6 %)	85 (7,55 %)	113 (5,99 %)
B	1 035	791	1 826	43 (4,1 %)	104 (13,1 %)	147 (8,05 %)
C	842	758	1 600	190 (22,5 %)	210 (27,7 %)	400 (25 %)

The causes of the unnecessary examinations were:

1. Factors exterior the X-ray department:

- the general practitioner, who recommended the X-ray examinations (insufficiency or lack of clinical examinations; the X-ray examination is not relevant for the prognosis; unknowing or carelessness of some examinations algorithm; unjustified controls; lack of utilisation the information's of the X-ray examination by the clinician)
- subjective recommendation elements (the patient's pressure; some financial interest of the physician; medico-legal or insurance purposes)
- patients insufficiently prepared for the examination
- the circuit of the examination's results and the films

2. Factors belonging to the X-ray department:

- professional training (radiologist, radiographer)
- the performance of the X-ray installations
- the quality of the materials used (films, developer, cassettes, follies)
- the way of the editing of the results

The number of the repeated radiographs is variable depending on pretension the radiologist about the film's quality. The most frequent repeated radiographs in the studied units were: chest, lumbar spine, cervical spine, skull, extremities, intravenous urography.

The mostly repeated fluoroscopic procedures were: chest, barium meal and barium enema. The reasons: unnecessary recommendation and improper preparation of the patients.

To appreciate the patient's exposure during the most frequently repeated procedures we could not apply any direct measurements: entrance surface dose per radiograph and dose-area product per examination because of lack of correspondent instruments.

We measured the exposure dose in the air, using a spherical ionisation chamber and keeping the same conditions of the real X-ray procedures. We investigated in this way 4 radiographs and 2 fluoroscopic procedures.

TABLE 2

RADIOGRAPHS	REFERENCE DOSE/FILM mGy (average values)	COMMENTS
Lumbar spine AP	24,59	Very different values depending from the X-ray installation
LL	57,63	
Cervical spine AP	16,3	Similarly.
LL	17,3	
Pelvis AP	23,37	Similarly.
Urography	97,49	Differences from number of films required
FLUOROSCOPY	REFERENCE DOSE/EXAMINATION mGy (average values)	COMMENTS
Chest (average duration of examination: 1,5 min.)	24,14	Different values depending from the X-ray installation and radiologist
Barium meal (average duration of examination: 6 min.)	96,54	Similarly.

CONCLUSIONS

The study of the reasons of the unnecessary X-ray examinations have a great importance in such countries, where the use of the old X-ray installations, the frequent use of fluoroscopic procedures, the lack of systematically organised quality assurance in X-ray departments, the lack clinical leaflets and diagnostic algorithms contribute to the growth of the medical exposure of the population and it is only partial controlled. As the replacing of the X-ray installations on national level is a slowly and very expensive process, it seems to be for great importance to put aside or improve the other reasons that lead to unnecessary examinations and irradiation, as follows:

1. Introducing a personal card for the X-ray examinations evidence
2. The responsible involvement of the clinician or general practitioner in recommendation of the radiological examination, with good knowledge of benefit against detriment of this
3. Transforming the radiologist from a simple executive into a decision taking factor; introduction of examination algorithms
4. Informing the patient about the implications of the X-ray examinations
5. Establishing of any criteria in order to editing of the results
6. Improving the education process and the training of the radiologists and radiographers
7. Implementing an organised form of the quality assurance in radiological departments.

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