



State Office for Nuclear Safety
Senovážné náměstí 9, Prague 1, Czech Republic
tel.: +420 221 624 111, fax: +420 221 624 396



RADIATION PROTECTION OF CHILDREN IN RADIODIAGNOSTICS IN THE CZECH REPUBLIC

*State Office for Nuclear Safety (SONS)
Jitka Nozickova
jitka.nozickova@sujb.cz*

Radiation protection of children in radiodiagnostics

- one of most important topic of medical exposure
- establishing “a good practice” require the cooperation of number of stakeholders

Legislation of the Czech Republic:

- Act. No.18/1997 Coll. (Atomic Act)
- Decree No.307/2002 Coll. on radiation protection as amended (prepared by SONS)

EC recommendation „European Guidelines on Quality Criteria for Diagnostic Radiographic Images in Pediatrics” was taken into account

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Legislative requirements:

- optimization of radiation protection in medical exposure
- justification of practice
- obligation to elaborate a written procedure for all standard types of medical exposure (the “Local Radiological Standards”, LRS)
- determination and evaluation of a patient dose by means of the “Local Diagnostic Reference Levels”
- availability of the medical physics expert
- the selection of the proper medical devices
- obligation to record individual medical exposure (or parameters of the examination)

The inspections of SONS were focused on:

1. inspections of perinatology departments (there are 15 departments)
2. inspection of those departments, where medical exposure of children up to age of 3 is expected, which could be reasonably anticipated at most of the radiology departments (still in progress)
3. inspection of CT departments (still in progress)

Results of inspections:

1. Perinatology departments – requirements:

- X-ray equipment – multi-pulse generators, short exposure time < 4 ms, nominal focal spot value 0,6 ($\leq 1,3$ mm)
- correct setting-up exposure parameters
- correct size of X-ray beam
- determination of the Local Diagnostic Reference Levels (LDRL)

2. Radiology departments with expected medical exposures of children up to age of 3 – requirements:

- X-ray equipment – QC of test reproducibility of short exposure time (< 10ms) – detected by the acceptance test and the status test

3. CT departments – requirements:

- AEC equipment and possibility of exposure mode application for children
- Local Diagnostic Reference Levels shall be adequately smaller for children than for adults

Non-compliance with specified requirements:

- inconvenient choice of X-ray devices (estimated at 4 from 15 perinatology departments)
- optimized setting-up of the exposure parameters not being used
- size of X-ray beam is not in compliance to the size of examined organ
- Local Radiological Standards are not elaborated yet
- LDRL are not estimated

Remedy of non-compliances:

- by elaborating of the record describing found non-compliance
- remedial actions considering the non-compliances are mandatory to perform for any inspected subject; if requirements for the devices intended to use for examinations of children are not fulfilled, the devices shall not be used for that examination
- the manner and form as well as a schedule of the non-compliance remedy shall be set by inspected subject itself

Conclusion:

- optimizing of medical exposure of neonates and children is a complex question, there is a need of coactions among consultants, radiology assistant and medical physics expert
- relevance of stated problems was acknowledged by experts mentioned above
- most of the medical departments have already improved the situation and made appropriate measures to remedy serious shortcomings, e.g. by purchasing new X-ray equipments

Conclusion (cont.):

- unambiguously positive benefit of carried out inspections – they shall go on
- focusing to the future – determination of the National Diagnostic Reference Levels for the medical exposure of children (in cooperation with the National Radiation Protection Institute)