The methods to improve occupational well-being in MRI units

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Target audience: The outcome of this project can be utilized in occupational health care when assessing safety of MRI workplaces and necessity of more detailed measurements. Guidelines are also given to different occupational groups about good safety practices.

Purpose: MRI units are unique workplaces where workers may experience real adverse health effects due to strong magnetic fields. The symptoms vary from vertigo to disturbance in eye-hand coordination. These are mainly caused by movement in static magnetic field which induces electric fields inside the body. In addition to the magnetic field, the personnel are exposed to an average of 80-90 dB noise level during an MRI scan (even 130 dB peaks).

We started a three year project on occupational well-being in MRI units in Finland in the beginning of 2012. The aim of this project is to improve working conditions, well-being, and safety of workers in MRI units. This will be achieved by assessing accident risk, identifying factors influencing well-being at work and measuring motion induced fields and noise in MRI units. We will also try to develop practices for physical examination of MRI personnel.

Methods: The project consists of two parts. First, a questionnaire is carried out to investigate the practices in different MRI units and to find out if the safety levels are sufficient. The attitude of different occupational groups against the exposure to magnetic fields and noise at MRI work will also be surveyed. In addition, the questionnaire will give information on the quality of life, work stress, and the subjective discomfort caused by the exposure. X-ray workers are used as a control group.

The second part includes the measurements of static magnetic fields and noise near 1.5 T and 3.0 T MRI scanners. Movement in the strong static magnetic field and the noise level outside the scan room (control room) are of special interest. The exposure to motion induced fields will be measured in typical working situations with a previously developed measuring system (Kännälä et al. 2009). The results will also be compared to the recently proposed guidelines of ICNIRP (International Commission on Non-Ionizing Radiation Protection).

Results: As a result of this project, we will provide an extensive summary about the safety of current MRI equipment and imaging practices as well as about the future scenario. The project will give guidelines for safe working with MRI to healthcare personnel.

Discussion: The practices for the occupational safety of MRI personnel need unification in Finland. This project provides valuable information about how to avoid the inconveniences of the strong magnetic fields and improve the acoustic comfort of working environment. Instructions on reporting of accidents and close call situations will be provided, which gives better chances to react to common problems in MRI units.

Conclusion: A three year project on occupational safety of MRI personnel was started in the beginning of 2012. The results of the project will be published in the future.

References: Kännälä S, Toivo T, Alanko T, Jokela K. Occupational exposure measurements of static and pulsed gradient magnetic fields in the vicinity of MRI scanners. Physics in Medicine and Biology 2009;54:2243–2257.