

Advanced methods to evaluate well-being of workers exposed to magnetic fields at MRI units

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Summary

MRI units are unique workplaces where workers may experience adverse health effects due to strong magnetic fields. These are mainly caused by movement in a static magnetic field which induces electric fields inside the body. A three year project on occupational well-being at MRI units was started in Finland in 2012. The aim of this project is to improve working conditions, well-being, and safety of workers at MRI units. The outcome of this project can be utilized in occupational health care when assessing safety of MRI workplaces.

Methods

The project consists of two parts. First, a questionnaire study was carried out to investigate the working practices at different MRI units and to find out if the present safety instructions are adequate. The attitude of different occupational groups towards the exposure to magnetic fields at MRI work was also surveyed. In addition, the questionnaire asked about the quality of life, work stress, and subjective discomfort caused by exposure to magnetic fields and acoustic noise exposure in operating rooms of MRI scanners. Nurses working with X-ray equipment were used as the control group.

The second part includes the measurements of static magnetic flux densities near 1.5 and 3.0 tesla (T) MRI scanners. Movement in the strong static magnetic field and the noise levels 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 be compared to the recently proposed guidelines of ICNIRP (International Commission on Non-Ionizing Radiation Protection) (ICNIRP 2009, ICNIRP 2014).

Results

The results of the study will reveal factors influencing well-being at work, and indicate the strength of the motion induced fields and of the noise exposure levels of the personnel at MRI units. As a final 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 scenarios. The project will give detailed guidelines for safe working with MRI to healthcare personnel.

Discussion

Until now, the practices concerning occupational health and safety of MRI personnel have not been uniform at various MRI units. This project provides valuable information to avoid inconveniences caused by strong magnetic fields and to improve acoustic comfort of MRI working environment. Instructions on reporting of accidents and near miss situations will be provided, which gives better chances to eliminate common occupational safety problems at MRI units.

References

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