Impact of cardiac magnetic resonance imaging on human lymphocyte DNA integrity.

Summary / Zusammenfassung
AIMS: Magnetic resonance (MR) imaging is widely used for diagnostic imaging in medicine as it is considered a safe alternative to ionizing radiation-based techniques. Recent reports on potential genotoxic effects of strong and fast switching electromagnetic gradients such as used in cardiac MR (CMR) have raised safety concerns. The aim of this study was to analyse DNA double-strand breaks (DSBs) in human blood lymphocytes before and after CMR examination.

METHODS AND RESULTS: In 20 prospectively enrolled patients, peripheral venous blood was drawn before and after 1.5 T CMR scanning. After density gradient cell separation of blood samples, DNA DSBs in lymphocytes were quantified using immunofluorescence microscopy and flow cytometric analysis. Wilcoxon signed-rank testing was used for statistical analysis. Immunofluorescence microscopic and flow cytometric analysis revealed a significant increase in median numbers of DNA DSBs in lymphocytes induced by routine 1.5 T CMR examination.

CONCLUSION: The present findings indicate that CMR should be used with caution and that similar restrictions may apply as for X-ray-based and nuclear imaging techniques in order to avoid unnecessary damage of DNA integrity with potential carcinogenic effect.

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