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MRI safety of a programmable shunt assistant at 3 and 7 Tesla


Abstract:
OBJECTIVE: Several new shunt technologies have been developed to optimize hydrocephalus treatment within the past few years. Overdrainage, however, still remains an unresolved problem. One new technology which may reduce the frequency of this complication is the use of a programmable shunt assistant (proSA). Inactive in a horizontal position, it impedes CSF flow in a vertical position according to a prescribed pressure level ranging from 0 to 40 cm H(2)O. METHODS: We exposed the proSA valve in an ex vivo protocol to MR systems operating at 3 and 7 Tesla to investigate its MRI safety. RESULTS: Following 3 Tesla exposure, no changes in valve settings were noted. Adjustment to any pressure level was possible thereafter. The mean deflection angle was 23 +/- 3 degrees. After exposure to 7 Tesla, however, there were unintended pressure changes, and the mechanism for further adjustment of the valves even disintegrated. CONCLUSION: According to the results of this study, proSA is safe with heteropolar vertical magnet alignment at 3 Tesla. Following 7 Tesla exposure, the valves lost their functional capability.

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