

Correlation Of Appearance Of MRI Perinidal T2 Hyperintensity Signal And Eventual Nidus Obliteration Following Photon Radiosurgery Of Brain AVMs

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Purpose

The aim of the study is to correlate the appearance of perinidal T2 hyperintensity signal with eventual angiographic obliteration of AVM nidus in response to radiosurgery treatment.

Materials and Methods

This retrospective study was conducted on 62 patients with brain AVMs who received photon radiosurgery treatments, using either a Linac-based technique at the Alexandria Linac Radiosurgery Center in Egypt (21 patients/AVMs) or a Gamma unit-based technique at the Koto Memorial Gamma Knife Center in Japan (41 patients/AVMs). All patients included in the study had serial clinical and radiological follow ups for 2 years after radiosurgery treatments.

Results

The follow up MRIs revealed that 50 (80.6 %) AVMs showed non-visualized nidus and 12 (19.4 %) AVMs showed decreased nidus size. The appearance of perinidal T2 hyperintensities in post-radiosurgery MRIs occurred in 34 (54.8%) patients on an average of 12 months after radiosurgery. Lower Spetzler-Martin grade ($p = 0.013$), smaller AVM volume ($p = 0.017$), and appearance of post-radiosurgery perinidal T2 hyperintensity signal ($p = 0.007$) were the statistically significant independent predictors of AVM obliteration. The later had a sensitivity of 66.7%, a specificity of 20%, and an overall accuracy of 60% in predicting the eventual obliteration of the AVM nidus.

Conclusion

The present study might help to improve our current understanding of the mechanisms behind the radiation-induced tissue changes following AVM radiosurgery. The appearance of perinidal high T2 signal in the follow up MRIs after radiosurgery would be a valuable indicator of the AVM response to radiosurgery treatment.