Gamma knife radiosurgery for arteriovenous malformation

Gamma knife radiosurgery for arteriovenous malformation is a safe treatment method although delayed complications may occur. Post-gadolinium enhancement of obliterated nidi may indicate an active post-irradiative process [1].

Enhanced nodular lesion on magnetic resonance imaging and chronic encapsulated expanding haematoma associated with cyst formation may have common aetiopathology caused by late radiation effects, mainly consisting of dilated capillary vessels with wall damage. Massive protein exudation from such damaged capillary vessels is important in cyst development [2].

Complications

see Adverse radiation effects

Advances in SRS procedures since 1990s have resulted in a lower risk of radiation induced complications (RICs), but fewer patients had AVM obliteration. Increasing the prescription dose for patients with medium- and large-volume AVMs by using current conformal dose-planning techniques may improve the obliteration rate while maintaining a low risk of RICs [3]

Volume staging remains advantageous over hypofractionation in delivering a higher dose to the target and for better sparing of normal brain tissue in the treatment of large cerebral arteriovenous malformations AVMs. More clinical data are needed, however, to justify the clinical superiority of this increased dose when compared with a hypofractionated treatment regimen [4].

Better conformity can favor the Cyberknife (CK) system for treatment of large AVMs at the cost of higher maximum doses and worse homogeneity. Linac with a micro-multileaf collimator (L-mMLC) is superior when shorter treatment time is required. Neither system can assure satisfying dose gradients outside large targets surrounded by numerous critical structures [5].

1)
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