RE-TREATMENT OF ARTERIOVENOUS MALFORMATIONS WITH RADIOSURGERY

One of the most common questions asked about brain or body radiosurgery is whether or not patients who have undergone prior radiation can receive radiosurgery. The answer, in general, is yes - but this is best determined by an experienced eye's view of the records, films and situation.

Part of the beauty of radiosurgery is that it can, when properly administered in experienced hands, deliver radiation precisely to the area of need minimizing effect on healthy surrounding tissues.

A recent publication evaluated re-treatment with radiosurgery for arteriovenous malformations (AVM). Arteriovenous malformation are a conglomeration of abnormal blood vessels often deep in the brain prone to bleeding with subsequent disasterous neurologic event such as stroke or even death.

Over the years and in experienced hands, radiation techniques have changed. While radiosurgery was initially developed for AVMs with the vast majority obliterated eliminating any further bleeding or death due to bleeding from them, there are a small proportion that do not obliterate on first attempt. A major question has been what happens when these are re-treated since surgery is not usually feasible.

Recently reported by Karlsson et al and published in Neurosurgery, were 115 patients with AVMs previously irradiated. The average time to re-treatment was 3.9 years with a range from 1.1 to 16.3 years. Since three patients were lost to follow-up, 112 were part of the study and of those, 89 were re-treated with radiosurgery. The age of patients ranged from 6 to 72 years with a median of 35. Before radiosurgery, 14 had embolization or radiographic maneuvers to occlude the blood from flowing through the abnormal blood vessels while 7 underwent surgery. The mean volume of the AVM was 3.2 cubic centimeters (cc). The lowest dose to the AVM was 20 Gray or 2000 rad.

Three patients died before follow-up angiography was performed. Angiography is a radiographic study placing a contrast agent in the blood vessel and taking x-ray pictures. The purpose is to determine occlusion of the AVM. Two of the three died of hemorrhage - one of unrelated cause. One other patient had the AVM surgically removed two years after radiosurgery and one could not undergo angiography because of concurrent disease. So, 107 patients were studied, with six of those patients yet to go through angiography. One-hundred-one patients were thus studied for radiosurgery.

The difference between the first and second angiogram-view of the AVM in 22% of patients was none, while 33% had a diminishment in size, 28% had significant decrease and 17% had obliteration of the treated area but a hidden, not observed or left behind area which was then treated. One patient had a new area adjacent to - but different than - that previously treated.

Of the results of follow-up angiography which is considered the definitive evaluation for patients with AVM, 9 malformations did not change in volume, 11 modestly decreased in size while 19 dramatically decreased in size and 62 were totally obliterated.

There were complications which were at a higher rate after the second treatment. Fourteen complications occurred while five were expected. In the two years after treatment, three hemorrhages occurred in 167 patient years or an incidence of 1.8%. Additional bleeds occurred at five, eight and twelve years.

The authors noted, "No hemorrhages occurred after the treatment in the 81 patients for whom the malformation was totally obliterated or for whom a minor rest of the nidus persisted after the second treatment, as judged in the two year angiogram."

The authors concluded that repeat radiosurgery "should be considered for patients for whom previous radiosurgery failed. The expected number of obliterations in this series was 65 and the observed number was 62, which is a non-significant difference."

Thus, this analysis shows that radiosurgery can indeed be performed on a repeat basis for those patients in need. The risks may be slightly greater but certainly appear markedly less than the risks of living life with an active AVM or invasive surgical intervention.

Radiosurgery is best performed in the hands of the most experienced radiosurgery centers since medical and technical judgments are crucial.