Vestibular Schwannoma pseudoprogression

Stereotactic gamma knife radiosurgery (GKS) may induce a transient enlargement of vestibular schwannomas (VS). This phenomenon, known as pseudoprogression or swelling, starts at about 3 months following GKS, peaks at about 6 months, and typically subsides thereafter, usually without significant neurological deterioration.

Although tumor growth with increasing symptoms or neurological deficit may herald treatment failure, the concept of pseudoprogression, or a transient increase in size followed by stability or regression, has been increasingly recognized following radiosurgical treatment of VS and should not be reported as treatment failure. However, although becoming recognized as a true phenomenon, we have a limited understanding of the natural history and predictors of pseudoprogression. In a landmark article in 2006, Pollock described 3 patterns of tumor enlargement after radiosurgery based on linear measurements of VS diameter [1].

Other case series have also supported the concept of pseudoprogression [2], [3] [4] [5] [6] [7] [8] using a variety of methods of tumor measurement, including volumetric analysis.

Following GKS, 43 patients (18.30%) showed Vestibular Schwannoma pseudoprogression, 15 (6.38%) exhibited hydrocephalus, 22 (9.36%) showed trigeminal neuropathy, 14 (5.96%) showed vertigo, and 25 (10.64%) showed facial myokymia. According to multivariate analysis, solid tumor nature was significantly associated with pseudoprogression and patient age was significantly associated with hydrocephalus. Patients receiving margin doses ≥13 Gy had a significantly higher probability of loss of serviceable hearing. Patients with smaller tumors had a trigeminal nerve preservation rate comparable with patients harboring larger tumors. Patients receiving margin doses <13 Gy or older patients had a significantly higher probability of vestibular nerve dysfunction [9].

Case reports

A 34-year-old female developed an aggressive enlargement of a VS 1 month after GKS. The patient was treated with an immediate external ventricular drainage and surgical resection via retrosigmoid approach for an acute neurological deterioration due to hydrocephalus and brainstem compression. Histopathological examination revealed a VS with abundant intratumoral thrombosis and necrosis, suggesting that its rapid expansion could be related to massive radiation-induced tumor necrosis. The present case indicated that rapid life-threating enlargement of a VS may occur as an early complication following GKS [10].

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