Cyberknife Radiosurgery for Arteriovenous Malformations: the Stanford Experience

Aditya K. Iyer MD MEng; Eric S Sussman MD; Aatman M. Shah; Zachary Adam Medress MD; Steven D. Chang MD

Introduction

The authors describe the Stanford University experience using CyberKnife radiosurgery for the treatment of intracranial arteriovenous malformations (AVMs).

Methods

A series of 111 patients with intracranial AVMs underwent CyberKnife radiosurgery at Stanford between 1999-2013. Our series consisted of 63 females and 48 males. The median age was 36 years (8-75), and 15 patients were pediatric (<18y). Forty-two patients (38%) presented with a prior bleed and the median Spetzler-Martin Grade was 3 (1-5), with 34 patients (31%) having AVMs in deep locations. Fifty-seven patients (51%) underwent prior embolization, and 20 patients (18%) underwent surgical resection prior to CyberKnife treatment. The median target dose was 20 Gy, administered in a single session for 81 patients, and fractionated over two to three sessions in the remainder of patients with larger malformations.

Results

Among the 111 patients with intracranial AVMs who underwent CyberKnife radiosurgery, 76 (72%) had clinical and radiographic follow-up and the median follow-up time was 35 months. There were only six post radiosurgery hemorrhages, which occurred at a median of 14 months after treatment. At the time of last radiographic follow-up, nine patients, 12% had complete obliteration, 38 (50%) had partial obliteration and 29 (38%) had stable AVMs. Only five patient experienced adverse radiation effects after Cyberknife treatment (defined as new neurological deficits in absence of new hemorrhage).

Conclusions

This is a report of the series of patients at Stanford University who underwent CyberKnife radiosurgery of intracranial AVMs. Like other series have reported, our series confirms that Cyberknife Radiosurgery is both safe and effective, with a high rate of obliteration and a low rate of hemorrhage.

Learning Objectives

By the conclusion of this session participants will

better understand the role of CyberKnife radiosurgery in the management of AVMs.

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