Supplementary Figure 1. Flow chart of participant selection for this study and their clinical course

354 patients with brain AVMs
April 2002–December 2016

115 Removal
64 Observation

175 GKS

25 Excluded
  - Follow up duration <1y 9
  - Inappropriate clinical data 12
  - Staged GKRS 4

150 initial GKS

104 Obliteration (69.3%)

46 Incomplete obliteration (30.7%)

25 Repeat GKS
(April 2002–December 2020)

4 Removal
  - Hemorrhage 3
  - Residual dural feeder 1

8 Observation

7 Dropout

2 Death due to hemorrhage
Supplementary Figure 2. Overall obliteration of arteriovenous malformations after repeat Gamma Knife radiosurgery

$P = 0.77$
Supplementary Figure 3. Radiation-induced changed after initial Gamma Knife radiosurgery and the rupture of arteriovenous malformations

$$P = 0.69$$