Embolization of Hemangioblastomas


Abstract

Object. In this study the authors compare the clinical outcomes after particle embolization of hemangioblastomas in the cerebellum and spinal cord. They also review the literature of similar cases.

Methods. Seven patients with hemangioblastomas in the spinal cord (four patients) and cerebellum (three patients) underwent preoperative embolization at the authors’ center. Magnetic resonance imaging and selective angiography studies as well as histological diagnoses were available in all patients. Embosphere particles (tris-acryl gelatin microspheres) were used in all cases. The smallest particle diameter ranged from 100 to 300 μm at the beginning of embolization in all patients.

The outcome of embolization was favorable in patients with spinal cord hemangioblastomas, but it was unfavorable for those with cerebellar hemangioblastomas; acute tumor bleeding and death occurred in all of the latter cases. The outcomes following embolization are very different for these two locations possibly because of the different capillary sizes.

Conclusions. The authors no longer use particle embolization to treat cerebellar hemangioblastomas.

The authors describe their experience with particle embolization of hemangioblastomas located either in the cerebellum or in the spinal cord. Embosphere particles used in this study ranged in diameter from 100 to 300 μm at the beginning of the embolization. These authors observe that the outcome after the endovascular procedure is favorable in spinal and unfavorable in cerebellar hemangioblastomas: all 3 patients harboring a cerebellar hemangioblastoma died due to hemorrhagic complications after embolization, probably because of venous obstruction due to the spherical shape of Embospheres that favors deeper penetration. The authors therefore no longer use particle embolization to treat cerebellar hemangioblastomas.

Unfavorable outcomes tend to be underreported;2 the paper by Cornelius and colleagues is based on the discussion of complications, which represents an important phase in the definition of better treatments. We would like to contribute to this discussion by reporting our recent experience with a patient who underwent preoperative embolization for a vermician cerebellar hemangioblastoma. This 28-year-old man was admitted to our department with a 1-week history of headaches, vomiting, and gait imbalance. Brain magnetic resonance (MR) imaging with gadolinium enhancement showed the presence of a large vermician tumor (4.5 × 4 × 3.5 cm in size) extending toward the pineal region. The mass, compressing the fourth ventricle and brainstem, showed an irregular enhancement after gadolinium administration; moreover, large vascular structures supplying the lesion were evident (Fig. 1A–C). The patient underwent preoperative angiography (Fig. 1D) and, after superselective catheterization of the left anterosuperior cerebellar artery, distal particle embolization using Contour emboli (150–250 μm in size; Boston Scientific) within the tumor feeders was performed with preservation of normal anterosuperior cerebellar artery branches and with a good, though incomplete, devascularization of the mass (Fig. 1E). No in-traprocedural complications were evident. After extubation, however, worsening of the patient’s preembolization neurological condition was observed with deterioration in his level of consciousness. A computed tomography (CT) scan showed an intratumoral hemorrhage with a marked mass effect (Fig. 1F); the patient underwent external ventricular drain insertion and tumor removal. He then underwent ventriculoperitoneal shunt positioning, and 4 months later he remains in a vegetative state.

Preoperative embolization of hemangioblastomas has been considered helpful in some cases,2,4 but some authors consider this procedure hazardous.1,3 Krishnan and Schackert1 described 3 cases of large solitary hemangioblastomas of the posterior cranial fossa; 1 of these was subjected to a partial preoperative embolization, but a posterior inferior cerebellar artery occlusion caused a cerebellar infarction. In their work, Takeuchi et al.3 conclude that partial embolization of hemangioblastomas does not reduce operative complications or morbidity, unless almost complete embolization is achieved. Our case confirms the data of Cornelius et al. and those in the literature, that embolization using small particles for posterior fossa hemangioblastomas is associated with high mortality and morbidity rates. The complication rate for posterior fossa hemangioblastomas, including those of Krishnan and Schackert and our case listed in Table 2 in the paper by Cornelius et al., is 50% (8 of 16 cases).

Cornelius and colleagues hypothesize that posterior fossa hemangioblastomas hemorrhaged because of venous obstruction caused by Embospheres and the subsequent congestion of tumor vessels, leading to their rupture. In our case, at histological examination the embolizing material was found in both vascular compartments, but significantly more in the venous spaces (Fig. 2), supporting the authors’ hypothesis.

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Fig. 1. Preoperative sagittal (A and B) and axial (C) T1-weighted MR images after contrast administration document the presence of a large vermian tumor extending toward the pineal region. The mass, compressing the fourth ventricle and brainstem, shows an irregular enhancement after gadolinium administration, and large vascular structures supplying the lesion are evident. Preembolization angiography (D) documented the vascular blush of the hemangioblastoma, whereas postembolization angiography (E) demonstrates a satisfactory devascularization of the mass. An early postembolization CT scan (F) shows the intratumoral hemorrhagic swelling with a marked mass effect on the brainstem.

Fig. 2. Photomicrograph of the tumor specimen. On the right, an arterial vessel is evident (asterisk); at the left and upper corners, 2 venous channels are dilated by a meshwork containing the Contour emboli (arrows). H & E, original magnification × 150.

References


RESPONSE: We thank Dr. Montano et al. for their letter to the editor concerning our article. Apparently, they also experienced a severe complication in a patient while embolizing a posterior fossa hemangioblastoma as we described in our article. The case they present is thoroughly illustrated with pre- and postoperative imaging.

Briefly, Montano and colleagues’ patient was a young symptomatic man with a large vermian hemangioblastoma. The agent used for embolization was Contour emboli. The