Brainstem cavernous malformation

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A 50-year-old man presented to the emergency department with a 4-week history of worsening ataxia. CT (figure 1) and MRI (figures 2 and 3) demonstrated a lobulated lesion of varying densities on CT and signal intensities on MRI ('popcorn' ball appearance) in keeping with different stages of haemorrhage in his midbrain and pons. There was no evidence of hydrocephalus (figure 4). He was admitted under the neurosurgical service and

Figure 1 Axial non-enhanced CT of the head demonstrating a heterogeneously hyperdense expansile lesion in the midbrain, consistent with varying ages of haemorrhage (arrow).

Figure 2 Sagittal non-enhanced T1-weighted MRI of the head demonstrating a lobulated heterogeneous lesion in the midbrain and pons, consistent with varying ages of haemorrhage (arrow).

Figure 3 Axial T2-weighted MRI of the head showing an expansile, lobulated lesion of heterogeneous signal intensities within the midbrain, in keeping with varying stages of haemorrhage (arrow). This imaging finding is the typical 'popcorn ball' appearance that is frequently used in the literature to describe a cavernous malformation.

Figure 4 Axial T2-weighted MRI of the head demonstrating a normal third ventricle (arrow).

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Figure 5 Axial non-enhanced CT of the head demonstrating an interval increase in the size of haemorrhage within the midbrain (arrow).

Figure 6 Axial T2-weighted MRI of the head demonstrating interval expansion of the third ventricle (arrow) and transependymal flow of cerebral spinal fluid (dashed arrow), consistent with hydrocephalus.

within 2 days, his ataxia worsened and he developed a new clinical finding of diplopia. Repeat CT (figure 5) and MRI demonstrated an increase in the size of his brainstem haemorrhage with interval development of hydrocephalus and transependymal flow of cerebral spinal fluid (figure 6).

This imaging appearance is in keeping with a cavernous malformation (aka 'cavernoma'). These are benign vascular hamartomas without neural tissue that contain haemorrhage-filled vessels that may be associated with calcifications.¹ Their approximate prevalence is 0.5% with men and women being equally affected.² The Zabramski classification of cavernous malformations divides these lesions into four types: (1) subacute haemorrhage, (2) degrading haemorrhage of various ages, (3) chronic haemorrhage and (4) punctate microhaemorrhages. These lesions may be associated with developmental venous anomalies, superficial siderosis, cutaneous cafe au lait spots or hyperkeratotic capillary-venous malformations (aka 'cherry angiomas').²

Owing to his worsening clinical symptoms and hydrocephalus, surgical resection was performed and surgical pathology confirmed a cavernous malformation of the brainstem.

Since surgical resection, this patient's ataxia and diplopia have improved.

Learning points

- ▶ Cavernous malformations are benign hamartomas containing haemorrhage-filled blood vessels, void of neural tissue.
- ▶ Classic imaging appearance on MRI is a non-enhancing 'popcorn' ball appearance of varying signal intensities, representing various stages of haemorrhage.
- ▶ These lesions may be observed if clinically silent.

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