Clinical History:

A 51-year-old man admitted to the emergency department with acute headache and nausea for two days that would not ease using normal medication. He is a smoker with dyslipemia and lower limb chronic ischemia. His neurological exam was unexceptional.

Imaging Findings:

Initial imaging with non-contrast CT was done. It showed an acute subarachnoid haemorrhage (SAH) in the perimesencephalic and prepontine cisterns with extension to the proximal segment of left Sylvian fissure (Figure 1). The cerebral CT angiogram (CTA) and digital subtraction angiography (DSA) were normal (Figure 2). Subsequent 3D TOF magnetic resonance angiography (MRA) showed no signs of aneurism (Figure 3). The susceptibility sequence detected siderotic remains in prepontomesencephlic cisterns and mild superficial siderosis in vermis folds (Figure 4).

Discussion:

Perimesencephalic haemorrhage is a clinical-radiological entity that represents a subtype of nontraumatic subarachnoid haemorrhage. It has a benign clinical presentation and course with a low rate of vasospasm, hydrocephalus and rebleeding [1]. The aetiology is not clear but is thought to be a venous rupture of superficial pontine or perimesencephalic veins [1]. Abnormal drainage of the basal vein of Rosenthal is another possible reason [4]. Studies show that a ‘primitive’ drainage pattern of this vein directly into the dural sinuses instead of the Galenic system is a risk factor for unilateral nontraumatic perimesencephalic SAH. Pathophysiological explanation can be vein rupture due to sudden increase in venous pressure, intracranial venous congestion and vein torsion or friction when it crosses over the tentorial margin [4].
Clinical manifestations of nontraumatic subarachnoid haemorrhage are an acute headache, nausea, vomiting and neck stiffness. Patients with perimesencephalic SAH are usually in a good condition with a favourable long-term evolution and prognosis. Cerebral angiogram is normal in approximately 95% of cases, and a 6-month follow up with cerebral DSA is recommended [2]. Vertebrobasilar aneurysms are responsible of only 5% of the nontraumatic SAH with perimesencephalic distribution. Other rare causes include cervical arteriovenous malformations and dural fistula [3].

To raise perimesencephalic SAH diagnosis, patients must be in good clinical condition (GCS 15) with a non-contrast CT performed in the first 72 hours of the onset of symptoms and a negative angiographic study [2]. Non-traumatic SAH has the following characteristics on CT: (1) It is centred anteriorly to the pons and midbrain, (2) It may extend into the basal cisterns and proximal/basal Sylvian fissure and interhemispheric fissure, (3) it may settle as sediment in the occipital horns of the lateral ventricles, but there is no intraventricular haemorrhage. Following criteria indicates need for conventional angiography (DSA) in case of negative CTA: (1) SAH in perimesencephalic cisterns anterior to midbrain Main Document, (2) SAH extension only into the anterior interhemispheric fissure, (3) SAH extension into the medial Sylvian fissures, (4) interventricular extension, no frank intraventricular haemorrhage, (5) No intraparenchymal haemorrhage.

Written informed patient consent for publication has been obtained.

**Differential Diagnosis List:** Non-aneurysmal perimesencephalic subarachnoid haemorrhage, SAH from a ruptured vetebrobasilar aneurysm, Spinal dural arteriovenous fistula, Vascular tumour (hemangioblastoma)

**Final Diagnosis:** Non-aneurysmal perimesencephalic subarachnoid haemorrhage.

**References:**


Figure 1

Description: Non-contrast head CT showing acute subarachnoid haemorrhage (white arrow) in the perimesencephalic cisterns with extension to the proximal segment of the left sylvian valley. Origin: Área Clínica de Imagen Médica, Hospital Universitario y Politécnico La Fe Valencia, España 2020
Description: Non-contrast head CT showing acute subarachnoid haemorrhage (white arrow) in the perimesencephalic cisterns with extension to the proximal segment of the left sylvian valley. Origin: Área Clínica de Imagen Médica, Hospital Universitario y Politécnico La Fe Valencia, España 2020
Description: Non-contrast head CT showing acute subarachnoid haemorrhage (white arrow) in the perimesencephalic cisterns with extension to the proximal segment of the left sylvian valley. **Origin:** Área Clínica de Imagen Médica, Hospital Universitario y Politécnico La Fe Valencia, España 2020
Figure 2

Description: Normal cerebral DSA. Origin: Área Clínica de Imagen Médica, Hospital Universitario y Politécnico La Fe Valencia, España 2020
**Figure 3**

Description: MRA 3DToF sequence with no evidence of intracranial aneurysm. Origin: Área Clínica de Imagen Médica, Hospital Universitario y Politécnico La Fe Valencia, España 2020
**Figure 4**

**Description:** Susceptibility-weighted sequence shows siderotic remains in prepontomesencephalic cisterns and mild superficial siderosis in vermis folds. **Origin:** Área Clínica de Imagen Médica, Hospital Universitario y Politécnico La Fe Valencia, España 2020