Letter

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SUBARACHNOID HEMORRHAGE IN ISOLATED CORTICAL VEIN THROMBOSIS

A rare presentation of an unusual condition

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Cerebral vein thrombosis (CVT) is a difficult diagnosis to establish, due to its widely variable clinical manifestations[1]. Among those, subarachnoid hemorrhage (SAH) is regarded as one of the rarest presentations and of relatively recent recognition[2,3]. Isolated cortical vein thrombosis (ICoVT), i.e. without concomitant venous sinus thrombosis, is an extremely rare presentation of CVT, being mainly reported as sparse case reports or small series of cases[1,4,5] .

We describe a case of ICoVT presenting with SAH, including clinical features, MR imaging findings and imaging follow-up.

CASE

A 31 year-old female patient presented with a 12-day history of worsening "thunderclap" pulsatile headache since she underwent an ankle surgery with spinal anesthesia. The symptomatology was then attributable to the procedure, until the patient developed syncope and transient right hemiparesis on the seventh day post-surgery. The patient reported use of oral contraceptives and denied family history of coagulopathies or deep vein thrombosis.

She underwent an MR imaging scan and fluid-attenuated inversion-recovery (FLAIR) sequence showed linear hyperintensities filling in the cortical sulci of the parietal lobes bilaterally, suggesting SAH (Fig 1A). Mild hyperintense lesions on FLAIR were also seen on the adjacent gyri (Fig 1B). In addition, tubular serpiginous structures, hyperintense on T1-weighted images and converging to the superior sagittal sinus (SSS) were noted adjacent to the areas suspected of SAH (Fig 1C,D). An MR venography showed no evidence of underlying sinus venous thrombosis (Fig 2A,B). The findings were compatible with a diagnosis of isolated cortical venous thrombosis associated with subarachnoid hemorrhage.

The patient was managed conservatively, with withdrawal of the oral contraceptives, physical rest, and anticoagulation

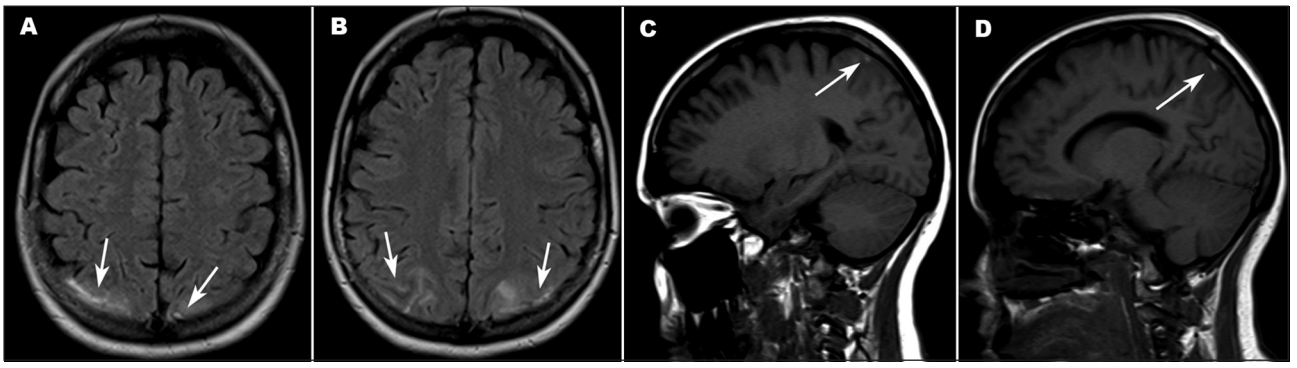

Fig 1. [A] Axial FLAIR (9000/2500/83) [TR/TE/TI] image shows linear sulcal hyperintensities in the parietal convexities (arrows). [B] Axial FLAIR (9000/2500/83) image showing hyperintensities also in cortical gyri of the parietal lobes (arrows). [C] Sagittal T1-weighted image (500/9,1) showing punctiform hyperintensity adjacent to the parietal lobe (arrow), suggesting thrombosis in a right cortical vein. [D] Sagittal T1-weighted image (500/9,1) with the same finding adjacent to the left parietal lobe (arrow).

HEMORRAGIA SUBARACNÓIDE NA TROMBOSE ISOLADA DE VEIA CORTICAL: APRESENTAÇÃO RARA DE UMA CONDIÇÃO INCOMUM

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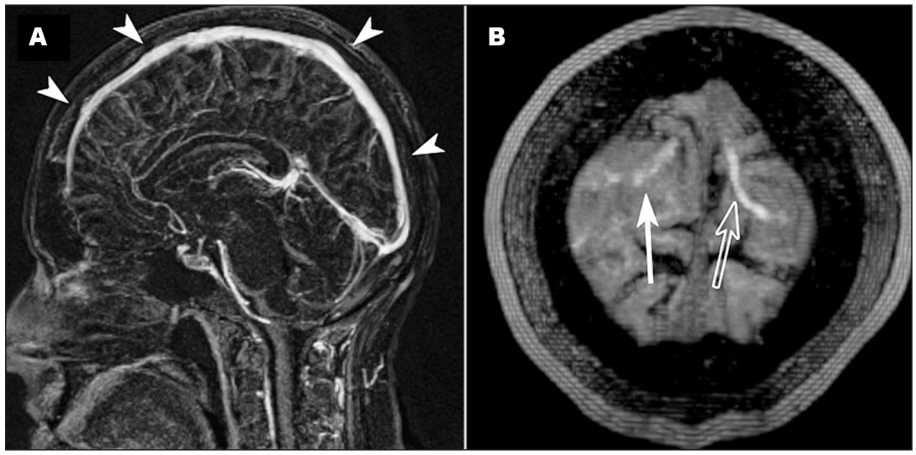

Fig 2. [A] MR Venography, sagittal view, maximum intensity projection (MIP) reconstruction, showing patency of the superior sagittal sinus (arrowheads). [B] MR Venography, oblique axial MIP reconstruction, showing both the right (arrow) and left (hollow arrow) hyperintense thrombosed cortical veins.

measures. The symptoms improved, and the follow-up MR imaging 10 days later showed resolution of the aforementioned findings (Fig 3).

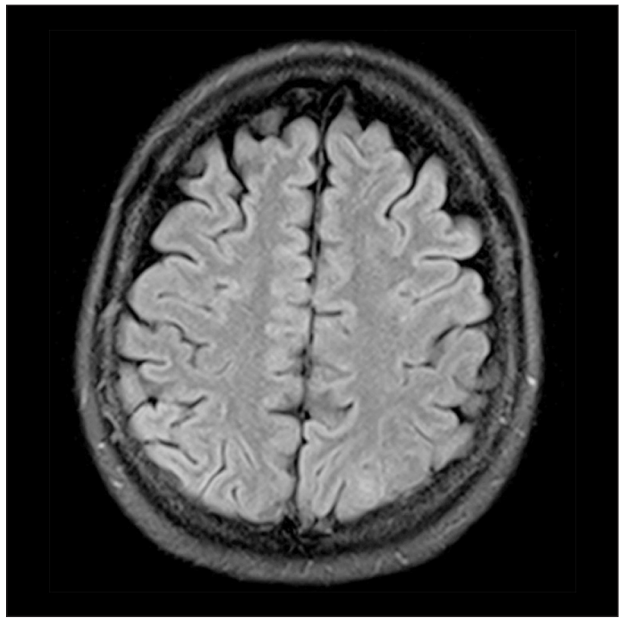

Fig 3. Axial FLAIR (9000/2500/80) image, 10 days after the first examination, showing complete resolution of the findings.

DISCUSSION

Cerebral vein thrombosis accounts for 1–2% of strokes in young adults[4]. There are more than 100 etiologic factors associated with the condition[6], among which the use of oral contraceptives, recent surgery, coagulopathies, dehydration and malignancy are the most prevalent. The clinical manifestations are highly variable, most frequently being presented as headache (95%), seizures (47%), focal motor deficits (43%), papilledema (41%), altered consciousness state (39%), intracranial hypertension (20%), or coma (15%)[7].

Subarachnoid hemorrhage is regarded as an extremely rare manifestation of CVT, being found in the literature only through isolated case reports[3,4]. Worthy of mention, though, is one series with 32 patients that reported 50% of them with more than 100 erythrocytes per cubic millimeter of CSF, although no MR imaging scans were available, and only two patients presented with sudden onset headache[8]. The exact cause of its association with CVT is object of speculation, with most of the theories suggesting rupture of small cortical veins secondary to hemorrhagic infarction or to venous hypertension[9]. The main distribution is along the cortical sulci at the convexities, with typical sparing of basal cisterns[3].

In patients with CVT, the dural sinuses are affected in as much as 98% of the time[5], being the involvement of the cortical veins usually secondary to retrograde propagation of the primary thrombus. Isolated cortical vein thrombosis is rather unusual, and also confined to case reports or small series[1]. The clinical manifestations and risk factors are not well established, but reviewed cases suggest that they are analogous to dural sinus thrombosis. When symptomatology is mild, the diagnosis may be often missed or underestimated, due to frequent anatomical variations in cortical vein distribution.

The concomitance of ICoVT and SAH is even rarer, and to our knowledge there are only 3 reports describing a total of 5 cases of this association[4,10,11]. Another article mentioned a case of ICoVT where the CT revealed "thin hyperdensities between frontal sulci", but this finding was interpreted as "cortical venous stasis and dilatation"[5].

We reported a case of ICoVT associated with SAH in a post-operative female patient in use of oral contraceptives. The presenting complaint consisted of "thun-

derclap" headache, and there were transient focal deficits during the evolution of the case. Once the imaging diagnosis was established and proper therapeutic measures were taken, rapid resolution of the symptoms was achieved. Our case is in accordance with the available reports in the literature regarding the risk factors[13], symptomatology and outcomes[4,11], and provides another example of this rare association.

In conclusion, SAH is a readily recognizable condition, most frequently urging invasive procedures or surgical measures, while ICoVT is related to a more subtle imaging finding, generally requiring only medical treatment. In the setting of SAH, CVT can be suspected whenever the cortical sulci are affected and the basal cisterns are spared. The imaging diagnosis is based on FLAIR, T1-weighted images and MR venography findings. Care should be taken to evaluate the cortical veins, for there may be thrombosis even though the sinuses are pervious. This case is thus an example of an unusual manifestation of a common finding – SAH – helping to establish the diagnosis of a rare condition – ICoVT.

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