Reversible cerebral vasoconstriction syndrome

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ABSTRACT

Background: Reversible cerebral vasoconstriction syndrome is characterized by thunderclap headache associated with multifocal vasoconstriction of cerebral arteries in patients without aneurysmal subarachnoid hemorrhage (SAH). The vasoconstriction reverts within three months. We report a 44-year-old man who had a thunderclap headache during sexual intercourse. A similar episode occurred at rest 36 hours later. The patient had already experienced a thunderclap headache 10 years earlier, during coitus. There were no abnormalities on examination. His brain computed tomography scan was normal and cerebrospinal fluid analysis showed no xanthochromia, 15 WBC/mm³ and 10 RBC/mm³. Lumbar puncture was repeated two days later (WBC = 3/mm³ and RBC = 43/mm³). An initial digital cerebral angiography showed a diffuse segmental intracerebral vasospasm. A new angiography after 15 days was normal. He remains headache-free after twenty six months. In conclusion, patients who have thunderclap headache with normal brain CT and cerebrospinal fluid without xanthochromia should be investigated for this syndrome. (Rev Med Chile 2010; 138: 1000-1003).

Key words: Cerebral arterial diseases; Coitus; Headache; Vasospasm, intracranial.

Síndrome de vasoconstricción cerebral reversible

El síndrome de vasoconstricción cerebral reversible se caracteriza por una cefalea lancinante asociada a una vasoconstricción multifocal de las arterias cerebrales, en pacientes sin hemorragia subaracnoidea causada por aneurismas. La vasoconstricción se revierte en un plazo de tres meses. Presentamos un paciente varón de 44 años que experimentó una cefalea lancinante durante el acto sexual. Un episodio similar repitió 36 horas después, pero mientras estaba en reposo. El paciente había sufrido una cefalea lancinante durante el coito, 10 años antes. El examen físico fue normal. La tomografía cerebral estaba normal y el líquido cefalorraquídeo era claro, con 15 leucocitos y 10 eritrocitos por mm³. Una angiografía cerebral digital mostró un vasoespasmo intracerebral difuso segmentario. Una nueva angiografía, efectuada 15 días después, fue normal. El paciente está libre de cefaleas después de 26 meses de seguimiento.

Thunderclap headache (TCH) is characterized by excruciating pain that reaches its peak intensity within less than one minute¹. Its incidence is 43/100,000/year². Subarachnoid hemorrhage (SAH) is responsible for 11 to 25% of the cases^{2,3}. Among its secondary causes, reversible

cerebral vasoconstriction syndrome (RCVS) is characterized by TCH associated with multifocal vasoconstriction of cerebral arteries in patients without aneurysmal SAH. The vasoconstriction reverts within three months. The CSF is normal or close to normal⁴. The pathophysiology of this

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syndrome is unknown. It has been postulated that it is caused by a transitory disorder of the cerebrovascular tonus^{4,5}.

TCH recurs in 94% of the patients with RCVS. In addition to headache, focal neurological deficits (21-63%) or epileptic crises (3%) may be found^{6,7}. The complications that have been described are ischemic stroke, hemorrhagic stroke, cortical SAH, cerebral edema and arterial dissection^{4,6,8-15}.

RCVS may occur spontaneously or, more frequently, there is a precipitating factor such as eclampsia or preeclampsia, puerperium, use of vasoconstrictor drugs, blood transfusion, tumors, hypercalcemia, porphyria, cranioencephalic traumatism, neurosurgical procedures and carotid endarterectomy⁶.

There are no clinical trials evaluating treatments for this syndrome. The use of vasoconstrictor drugs should be discontinued. Drugs that have been used to treat this syndrome include nimodipine, glucocorticoids and magnesium sulfate^{6,8-9,16}.

Case report

A 44-year-old man presented TCH during sexual intercourse. The pain began before reaching orgasm and was located in the occipital region, bilaterally. It was associated with nausea without vomiting, photophobia or phonophobia, and lasted for five hours.

Eighteen hours after the initial headache, a second episode of TCH occurred while he was resting. His clinical and neurological examinations

were normal.

In his past history, he reported one episode of pre-orgasmic headache similar to the above condition but of lower intensity, around ten years earlier. He was not using illegal drugs or other medications. He had been presenting tension-type headaches for 17 years.

His blood cells count, general biochemical tests, erythrocyte sedimentation rate, antinuclear factor and rheumatoid factor were normal. A cranial computed tomography (CT) scan gave normal results.

A cerebrospinal fluid (CSF) sample was obtained on the fourth day. The fluid was clear, with a leukocyte concentration of 15 cells/mm³ that was predominantly lymphomonocytic, red blood cell concentration of 10 cells/mm³, normal protein and glucose levels. The CSF test was repeated 48 hours later, and the fluid was found to be clear and colorless, with a leukocyte concentration of 4 cells/mm³, red blood cell concentration of 43 cells/mm³ and protein concentration of 72 mg/dL.

Since the patient continued to have headache, a cerebral angiography was performed on the eighth day of evolution. This showed diffuse arterial spasms affecting both the anterior and the posterior circulation (Figure 1).

The patient was started on nimodipine (60 mg every 6 hours orally), which he used for 30 days. The headache resolved after nine days. Angiography was repeated on the fiftieth day of evolution, and was normal. There were no new headache episodes during twenty six months of follow-up.

Figure 1. Digital angiographies performed on day 8 (A and C) and day 50 (B and D) after the start of the headache. The arrows show the arteries that present vasoconstriction.

Discussion

Our patient presented a condition of TCH associated with sexual intercourse. Sexual intercourse may serve as a trigger for headache relating to RCVS^{6,8,17-21}. This possibly occurs through sympathetic activation²².

The CSF presented a mild pleocytosis. Some authors have advocated that the leukocyte concentration in RCVS cases should be less than 10 cells/mm³ and the protein concentration less than 80 mg/dL⁴. In a large series, CSF abnormalities were found in 57% of the patients. The mean leukocyte concentration was 12 cells/mm³ (range from 5 to 35). Increased red blood cells concentration was also found (mean of 1,569 cells/mm³)⁶. Our findings were compatible with that report.

One important differential diagnosis to be made is with primary angiitis of the central nervous system. In this condition headaches generally start insidiously⁴. The CSF generally reflects a condition of aseptic meningitis with modest pleocytosis and elevated protein levels (mean protein concentration of 177 mg/dL and mean leukocyte concentration of 77 cells/mm³)²³. Although angiography shows that angiitis has a pattern similar to RCVS, its evolution over the course of time differs. The angiographic abnormalities may even stabilize or improve, but the condition does not revert²⁴. Reversion of vasospasm within less than three months in our case confirmed the diagnosis of RCVS.

The inclusion of primary TCH in the IHS classification is based on evidence that patients with sudden headaches who present normal cranial CT scans and CSF analyses evolve well^{1,25,26}. The other secondary causes, excepting subarachnoid hemorrhage, are generally rare.

Patients with vasospasm and TCH are classified as presenting secondary headache. Since some of these patients may have complications, it is necessary to differentiate them from cases of primary TCH. This may be difficult in patients whose only symptom is headache and in whom there are no triggering factors having a recognized relationship with RCVS. The characteristics of the headache do not allow this differentiation, which is only done by demonstrating the existence of vasoconstriction through complementary tests⁸. These tests may initially present as normal⁶.

Headaches relating to RCVS generally recur

within the first month after the first sudden headache, while primary TCH may continue to recur long after the first event^{6,8,25,26}.

In 7% of the patients with RCVS, there is a previous history of headache associated with sexual activity⁶. In the case of our patient, our attention was drawn to the episode of sudden headache that occurred ten years earlier. Since there was no documentation regarding the presence of vasospasm, we cannot state that it was the same disease. On the other hand, we cannot neglect this possibility.

The question that arises from this is whether primary TCH exists or whether the cases classified as such are the ones without complications and in which the imaging examinations initially gave normal results.

We consider that studies evaluating the presence of vasospasm in cases of sudden headache unrelated to aneurysmatic SAH are needed. Such studies would need to take into account the fact that vasospasm may not occur immediately after the headache. Comparison between TCH patients with and without vasoconstriction could provide better clarification regarding whether these are really two different conditions.

In conclusion, reversible cerebral vasoconstriction syndrome is a secondary cause of headache that can be associated with neurological complications such as ischemic stroke, hemorrhagic stroke, cortical SAH, cerebral edema and arterial dissection. Patients who have thunderclap headache with normal brain CT and cerebrospinal fluid without xanthochromia should be investigated for this syndrome.

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