CASE REPORT

Extensive intracranial involvement with multiple dissections in a case of giant cell arteritis

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SUMMARY

A 56-year-old man presented with weight loss, articular pain and minor neurological symptoms progressing over 1 month. Neurosonological evaluation suggested occlusion in intracranial segments of the left vertebral artery (VA) and of both internal carotid arteries (ICA) and hypoechoic halo sign in both superficial temporal arteries. The diagnosis of giant cell arteritis was supported by inflammatory markers and confirmed by biopsy. Despite early steroid initiation, he manifested fluctuant vascular deficits and became lethargic. Brain MRI indicated watershed infarcts and intracranial dissections of left VA and both ICA. The patient was stabilised with the association of prednisolone 2 mg/kg, methotrexate and oral anticoagulation. Since then he has been neurologically asymptomatic and control imaging showed only residual intracranial left VA stenosis, with no signs of temporal artery inflammation or new vascular lesions. This is to the best of our knowledge, the first reported clinical case with such an extensive intracranial involvement with multiple dissections.

BACKGROUND

Giant cell arteritis (GCA) is a chronic systemic granulomatous vasculitis typically occurring in patients over the age of 50, and involving large-sized and medium-sized arteries containing an elastic lamina.[1–7]

Superficial temporal arteries are the most commonly affected in this disease. The ophthalmic, posterior ciliary and vertebral arteries are also often involved. On the other hand, intracranial arteries are generally not affected.[1 6]

An arterial inflammatory process leads to intimal thickening, luminal irregularities, stenosis, and ultimately occlusion, which can provoke infarction or borderzone hypoperfusion. Occlusion or distal embolisation can also follow in situ thrombosis.[4 5]

GCA can present with a variety of symptoms, including neurological symptoms such as headache, jaw claudication, visual symptoms (diplopia, flimmer scotoma, amaurosis fugax) or cerebrovascular events (transient ischaemic attack and stroke in approximately 2–4% of patients with GCA).[1–4 7 8] These events occur in the vertebrobasilar territory more frequently than in general population (50–75% vs 15–20%) and are secondary to extracranial stenosis and occlusion of internal carotid and/or, more likely, vertebral arteries.[2–4 7 8]

Intracranial arteries are usually spared in GCA and we could not find reports of other cases of intracranial dissections as a presentation of this disease. This case report intends to call attention to the importance of keeping in mind that GCA may present in numerous and sometimes never before reported ways. This may lead to a wrong or late diagnosis, which can influence treatment and prognosis.

CASE PRESENTATION

A 56-year-old man presented with apathy, psychomotor slowing, anorexia, marked weight loss, large articular pain with an inflammatory rhythm (mainly around the shoulder girdle) progressing over 1 month. He also presented with gait impairment and constant frontotemporal headache without dysautonomia, nausea or vomit and unrelated to orthostatism but disturbing night sleep.

Abnormal findings on initial neurological examination included psychomotor slowing with delayed responses, left central facial palsy, a mild spastic tetraparesis and tenderness of the temporal arteries. Vital signs were normal.

Analytic workup showed mild normocytic normochromic anaemia (haemoglobin 12.8 g/dL), mild thrombocytosis (422×10^9/L) and increased values of C reactive protein (CRP) (8.89 mg/dL). Head CT was unremarkable. Moreover, cerebrospinal fluid analysis showed mild pleocytosis (a white cell count of 12 cells/mL, mostly mononuclear) with normal protein and glucose levels. Infectious, autoimmune, neoplastic and hormonal workup were unremarkable.

Initial cervical ultrasound indicated mild atherosclerotic pathology and high-resistance flow in cervical segments of the left vertebral artery (VA) with occlusive flow in V3 segment and inversion of its V4 segment with no other changes in transcranial arteries.

During the first few days, the patient showed rapid neurological deterioration with progressive impairment of awareness (Glasgow Coma Scale=12). Control ultrasonography at day 3 revealed a high resistance flow in the extracranial right internal carotid artery (ICA) maintaining a high-resistance flow in the left VA and also a bilateral hypoechoic halo sign in the superficial temporal arteries (more pronounced on the left side; figure 1). Both ophthalmic arteries were normal. At this time, superficial temporal artery biopsy was consistent with the diagnosis of GCA (figure 2).

Despite steroid initiation at day 4 (prednisolone 80 mg/day orally) there was a clinical deterioration with progressive impairment of mental status and several transient episodes of focal deficits (aphasia and right hemiparesis) as well as a laboratory

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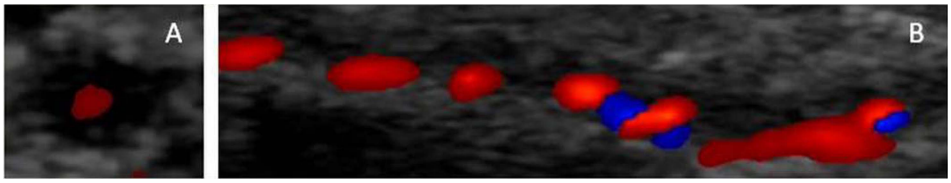

Figure 1 Superficial temporal artery ultrasonography on day 3—hypoechoic halo sign in transverse (A) and longitudinal (B) view of the left superficial temporal artery.

worsening with higher platelet count, CRP and erythrocyte sedimentation rate (ESR) values (519×10^9/L, 18.89 mg/dL and 83 mm/h, respectively).

Brain MRI showed multiple recent watershed infarctions and intracranial dissections of the left VA and of both ICA (figure 3). The third ultrasonographic study (7 days after admission) maintained previous findings.

The patient was started on warfarin, 15 mg weekly of methotrexate (MTX) and increasing dosage of prednisolone up to 120 mg (2 mg/kg) daily in order to achieve clinical stability.

OUTCOME AND FOLLOW-UP

Two months later, a follow-up neurosonological examination and MRI showed residual intracranial left VA stenosis (in the beginning of V4 segment), complete recanalisation of ICAs with no signs of temporal artery inflammation or new vascular lesions.

Three years after the initial presentation, this patient is neurologically asymptomatic and has an ESR value of 12 mm/h. As a complication of chronic steroid therapy, he had an aseptic necrosis of the left femoral head that required prosthetic hip replacement. After several unsuccessful attempts of steroid withdrawal he is still on 20 mg daily of prednisolone plus 8 mg weekly of MTX.

DISCUSSION

It is believed that the usual sparing of intracranial arteries in GCA is due to the fact that this disease involves an autoimmune reaction against arterial elastic tissue, which is absent or reduced within about 5 mm entering the dura.[3 8]

Analytic workup typically shows changes seen in systemic vasculitis, such as increased ESR and CRP values in >90% of patients. Furthermore, in between one-third and half of all patients, it can also be found as mild normocytic, normochromic anaemia, thrombocytosis, liver enzyme abnormalities or low complement.[1 2]

Our patient presented with systemic symptoms, headache and neurological deficits, which are all usually seen in patients with GCA. The diagnosis of this condition was also based on laboratory and imaging findings and confirmed through temporal artery biopsy. The presence of watershed infarctions secondary to dissections of the left VA and both ICA intracranially was demonstrated by MRI and ultrasonography. Other causes of arterial dissections were ruled out, such as infections and connective tissue disorders.

Among non-invasive imaging studies, ultrasonographic evaluation of the superficial temporal arteries has been emerging as an important diagnostic tool.[1 8] In fact, neurosonology can play a crucial role in demonstrating cerebral involvement and, more importantly, in the follow-up of these patients.[2] An irregular hypoechoic circumferential wall thickening around the lumen of the superficial temporal arteries, denominated 'halo sign', is typical and usually disappears after 2–3 weeks of treatment.[1] Arida *et al*[9] demonstrated that in the hands of experienced ultrasonographers, a unilateral halo sign has a specificity of 91% (95% CI 0.88 to 0.94) and a sensitivity of 68% (95% CI 0.61 to 0.74) for GCA.[9] The same authors reported that the presence of a bilateral halo sign improves specificity to 100%, but reduces the sensitivity to 43%.[9]

MRI can also reveal signs of inflammation of the superficial temporal arteries.[10] Bley *et al*[11] examined 21 patients for GCA, showing that contrast-enhanced MRI had a diagnostic sensitivity of 88.9% and a specificity of 91.7% when compared with the American College of Rheumatology criteria; the diagnostic sensitivity was 100% and the specificity 80% when compared with biopsy of the temporal artery.[11]

This clinical case also presents with some interesting details regarding the treatment. Clinical guidelines universally recommend rapid initiation of corticosteroid treatment and biopsy of the temporal artery as soon as possible.[12] However, there is currently limited data regarding the effectiveness of glucocorticosteroid sparing therapies in refractory GCA, namely methotrexate and azathioprine.[7] In our case, clinical and imagiological stability was only achieved through the institution of high doses of prednisolone in association with MTX and oral anticoagulation.

Antithrombotic medication in GCA is also recommended if there is no contraindication.[1 5 8] However, in intracranial dissections, this choice is controversial and no clear evidence-based recommendation has been issued. In our case, due to repeated transient ischaemic attacks with presumed embolic mechanism while on antiplatelet therapy, we decided to treat the patient with warfarin. Bearing in mind that the patient was on concomitant steroid therapy, it is nevertheless remarkable that there were no further ischaemic events reported.

Another unusual detail is the fact that although the majority of patients are able to discontinue corticotherapy after 1–2 years,[1] our patient has still not been able to do so, as CRP and ESR values tend to rise every time tapering is tried. However, there are reports of some patients with a relapsing chronic

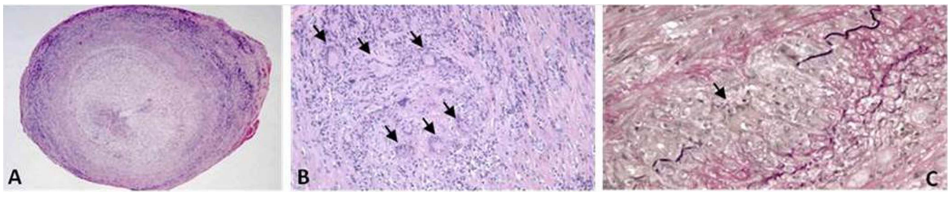

Figure 2 Superficial temporal artery biopsy. (A) H&E stain ×50, vessel with reduced lumen due to intimal thickening; inflammatory infiltrate; (B) H&E stain ×400, inflammatory infiltrate and giant cells (arrows); (C) elastic van Gieson stain ×400, giant cell (arrow) and fragmentation of the elastic lamina.

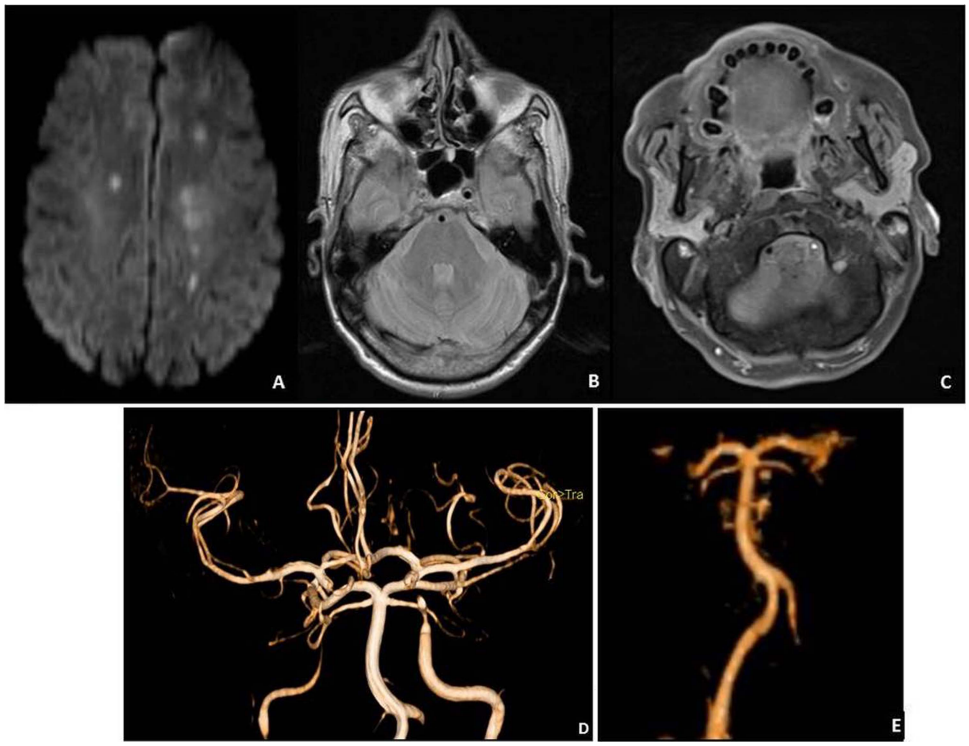

Figure 3 Subacute brain MRI and MR angiography. (A) Diffusion-weighted imaging showing internal borderzone infarcts bilaterally. (B and C) T1-weighted fat-suppressed images. Intramural haematoma of both internal carotid arteries (B) and left vertebral artery (C) are visible. (D and E) MR angiography with typical pencil-like occlusion of internal carotid arteries and the left vertebral artery.

course of disease, with a need of low-dose corticosteroids indefinite treatment, which implies significant risk of steroid-associated side effects.[1]

This is to our knowledge, the first reported clinical case with such an extensive involvement of intracranial vasculature.

Learning points

- Giant cell arteritis (GCA) may very rarely present with involvement of intracranial arteries.
- Multiple intracranial dissections are a possible presentation of GCA.
- Neurosonology plays a key role in the diagnosis and follow-up of patients with GCA.
- Extensive intracranial involvement in GCA appears to require long-term steroid therapy.

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Contributors JP has met the patient after the diagnosis and is involved in the follow-up. JD followed the patient in the initial phase and diagnosed, along with neurosonologists and neuroradiologists. JSF helped in the patient diagnosis. All the authors were involved in the writing and revision of the manuscript.

Competing interests None.

Patient consent Obtained.

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