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CASE REPORT

Giant Cell Arteritis: A Rare Cause of Oculomotor Nerve Palsy

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Abstract

Giant cell arteriitis (GCA) is a systemic granulomatous vasculitis that affects predominantly the large arterial vessels (the aorta and its major branches) but the inflammatory process can involve arteries of any size. It usually develops in females above 50 years of age and affects the temporal arteries. The disease has unpredictable clinical course, causing six major groups of symptoms: vascular (including headache and peripheral ischemia), visual (including loss of vision and ischemic optic neuropathy), rheumatic (myalgia and muscle stiffness), neurological (transient ischemia, stroke, mononeuropathy/multiple mononeuritis), extracranial (peripheral ischemia, Raynaud phenomenon, arterial aneurisms), and constitutional (fever, weight loss, night sweats, weight loss, etc.). Rarely, GCA may lead to III cranial nerve palsy. We describe a 76-years-old male patient who developed oculomotor nerve palsy as a first manifestation of GCA.

Key words: Giant cell arteriitis, III cranial nerve palsy, Diagnosis, Treatment.

1. Introduction

Giant cell arteriitis is a granulomatous vasculitis that affects mainly the large-size arteries and their branches, but arteries of all sizes may be involved in the inflammatory process [1, 2, 3]. It develops more frequently of women, often from Scandinavian descent, above the age of 50, and its incidence and prevalence increase with age [1, 2, 3]. Vascular inflammation can lead to the development of arterial occlusion and ischemic symptoms, such as visual loss, cranial nerve palsy, peripheral arterial ischemia with intermittent claudication, and muscle ischemia [1, 2].

The involvement of the III cranial nerve in GCA is relatively rare, but cases of oculomotor palsy as a first manifestation of the disease have been described [3].

We present a patient with GCA that debuted with III cranial nerve palsy.

2. Case presentation

A 76-years-old man presented to the Clinic of Neurology with slowly developing double vision and new-onset headache. The symptoms appeared about a year earlier and lateral deviation of the left eye appeared about two weeks before the admission. Initially, the patient had no headache, and about two weeks before the presentation to Neurology bilateral temporal headache and diffuse muscle pains appeared. About four weeks before presentation of Neurology the patient started having night sweats and noted significant weight loss – approximately 10 kg for the past month before the presentation. Computed tomography (CT) skan of the head was performed and revealed no abnormalities. At the admission to Neurology, the patient was bedridden and unable to walk because of severe headache and muscle pain and stiffness. The patient had medical history of arterial hypertension.

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The physical exam revealed hyperesthesia of the scalp, temporal region and forehead and palpable noduli above and around the left temporal artery. No other significant abnormalities were detected from the physical examination. The neurological exam revealed third left cranial nerve palsy with no clinical evidence of other neurological abnormalities.

The clinical-laboratory investigations showed increased inflammatory markers (ESR of 115 mm/I h., CRP 92.6 mg/l), mild anemia (red blood cell count 3.6 G/l, hemoglobin level 101 g/l) and leukocytosis (16 G/l). All other hematological, biochemical parameters and urianalysis were normal. Antinuclear and antineutrophil cytoplasmic antibodies were negative, C3 and C4 levels were within the normal limits.

The Doppler ultrasound investigation of the extracranial cerebral arteries revealed the typical thickening of the arterial wall affecting all branches of the external carotid artery with the "halo"sign (figure 1).

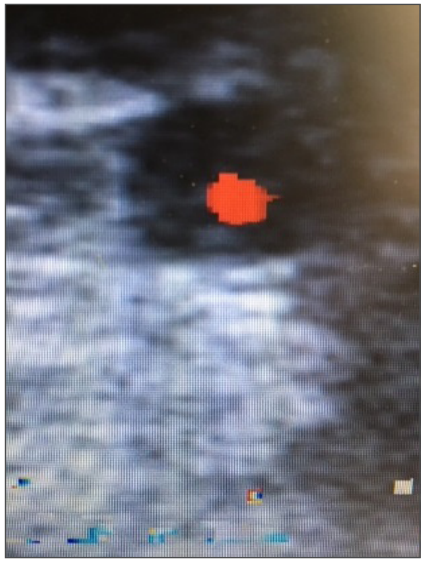

Figure 1. *Ultrasound investigation of the presented patient: axial image of superficial temporal artery branch demonstrating the typical "halo" sign.*

At the admission, the patient was immediately started on corticosteroids (intravenous 40 mg methylprednisolone daily) and on the next day muscle pain, stiffness and headache improved. The patient underwent biopsy of the temporal artery branch – the macroscopic examinatiom revealed bloodless vessel with thickened wall and narrowed lumen (figure 2). The histopathological investigation showed granulomatous inflammation with the presence of giant multinucleated cells and confirmed the diagnosis GCA. The patient was continued on corticosteroids, headache and muscle pain subsided and inflammatory markers, red blood cell count and hemoglobin levels returned to normal levels within two weeks. Unofortinately, the treatment had no effect on oculomotor nerve palsy. Corticosteroid treatment continued and the patient is still under close follow-up.

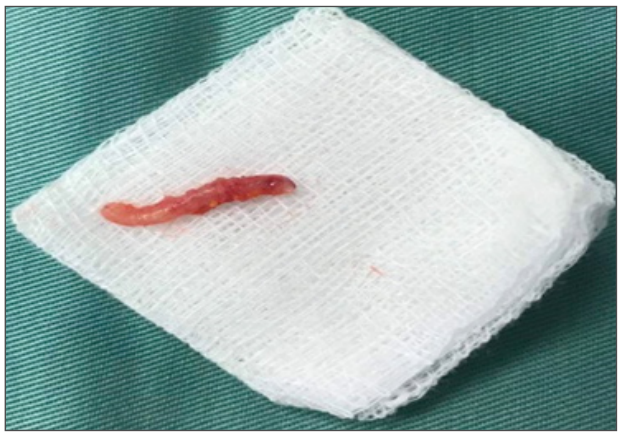

Figure 2. *Biopsy specimen of a superficial temporal artery branch with proliferative occlusion – no blood in the vascular lumen.*

3. Discussion

GCA is a large vessel vasculitis that can affect arteries of any size, but usually involves the cranial and upper extremity arteries. It develops more often in women above 50, and the incidence and prevalence of the disease increase with age [1,2,3]. The majority of patients are of Scandinavian descent [3]. The disease was first described by Sir J. Hutchinson in 1890 [4], and in 1932 Bayard T. Horton summarized the histologic appearance of granulomatous temporal arteritis [5]. From historical point of view, there are some evidences of the disease in ancient times – a probable case of GCA can be seen in a relief from a tomb in Egypt, called the blind harp-player, dating back approximately 1400 years b.c. and depicting a man playing a hap with his eyes closed, having marked prominence of the left temporal artery [6].

GCA is a rare disease with incidence around 27 / 100 000, with the number of cases increasing above the age of 50 [1,2,3,6,7]. The mean age of onset is 75 years [1,2,3,6,7]. The etiology of GCA is unknown, but genetic (Toll-like receptor 4 gene polymorphism and HLA-DRB1*04, female gender) and environmental factors (infections, smoking) have been suspected to play a role [7]. The pathogenesis of the disease is unclear but it has been related to vascular wall inflammation in response to the localized vascular lesion (involves mainly cell-mediated immune response) and endothelial damage and dysfunction in response to pro-inflammatory cytokines [6, 7].

The clinical course of GCA is unpredictable and often oligosymptomatic until severe flairs with systemic features (headache, scalp (temporal) tenderness and pain, jaw claudication, malaise, anorexia, weight loss, fever, and arthralgia) and acute vascular obstructions develop [6,7]. Extracranial involvement is relatively rare, but may occur. Six major groups of symptoms may be present [1,2,3,6,7]:

- Vascular: headache and peripheral ischemia; no intracranial artery involvement is usually observed.
- Visual: including loss of vision and ischemic optic neuropathy.
- Rheumatic: myalgia and muscle stiffness, polymyalgia rheumatica.
- Neurological: transient ischemia, stroke (especially in the posterior circulation), mononeuropathy/multiple mononeuritis (especially involving C5 nerve root), hearing loss, cranial nerve palsy. Involvement of the III cranial nerve is rare and not always reversible.
- Constitutional: fever, weight loss, night sweats, malaise, etc.
- Extracranial: dry cough, sore throat, throat pain (ischemic), thoracic and abdominal symptoms (ischemic), claudication, loss of pulse in the extremities, Raynaud phenomenon, digital ischemia, vascular aneurisms, etc.

Clinical-laboratory investigations are non-specific, revealing acute inflammation with increased ESR, C-reactive protein and leukocyte count, increased interleukin 6 levels. Autoantibodies (antrineutrophil cytoplasmic, antinuclear, anti-DNA, anti-glomerular basement membrane, anticariolipin, etc.) are usually negative, complement fractions usually show no abnormalities. Ultrasound and biopsy findings reveal vascular obstruction and decreased to absent blood flow in the affected artery branch. The specific "halo" sign on Doppler ultrasound may confirm the diagnosis – dark halo around the affected arterial blood vessel [7]. Histological examination shows inflammation and obstruction of the large arterial vessels and their branches – initially in lamina elastica interna et externa, adventitia or vasa vasorum, followed by marked thickening of the inflamed and infiltrated by lymphocytes, histiocytes, fibroblasts and multinucleated giant cells vascular wall with or without the formation of granuloma-like structures [6, 7]. Rarely, neutrophils and eosinophils may be present in the infiltrate, with or without vascular thrombosis and occlusion of blood flow [6, 7]. In the later stages of development, endothelial damage, marked thickening of the media and vascular lumen narrowing may develop [6,7]. Fibrinoid necrosis is not a typical sign of GCA and should prompt the physician to search for other disease, especially ANCA-associated vasculitis [7].

The imaging studies – contract-enhanced computed tomography (CT) with angiography and/or magnetic resonance (MR) angiography are very useful when extracranial involvement is present, especially when vascular biopsy is not possible. As mentioned above, the color Doppler reveals the typical "halo" sign, that we detected in our patient. CT and MR angiographic investigations allow imaging of the aorta and all its major branches, so these modalities are useful when ultrasound and biopsy evaluations are not applicable.

The diagnosis is based on the clinical signs and symptoms, the physical exam revealing decreased

pulsations and palpable noduli engaging the affected arterial vessel, the laboratory, imaging and the histological findings. Classification system for the diagnosis has been developed [8], but one should not forget that these criteria have been created for research purposes and can support, but cannot exclude the diagnosis GCA:

- Age >/= 50 years at the onset.

- Newly developed headache.

- Temporal artery abnormalities (tenderness, decreased pulsations).

- ESR >/= 50 mm/I h.

- Positive biopsy findings (vasculitis, predominance of mononuclear cells in the infiltrate, granulomatous inflammation, multinucleated giant cells).

GCA should be differentiated from other causes of vascular obstruction, including other systemic vasculitides, especially panarteriitis and ANCA-associated vasculitides, atherosclerotic ischemia and immune-mediated opticopathies.

The treatment of CGA is aimed at suppression of vascular inflammation and prevention/treatment of ischemia. As anti-inflammatory/immunosuppressive agents currently are used: corticosteroids (intravenous and oral), methotrexate and anti-interleukin 6 agents (tocilizumab) [7]. Other anti-inflammatory/immunosuppressive agents, such as statins, anti-tumor necrosis factor alpha agents, antimalarials and cytotoxics have shown no significant effect on vascular damage [7]. Ischemic symptoms should be treated immediately after diagnosing due to the risk of permanent ischemic end-organ damage, using anticoagulants, aspirin, vasodilators, revascularization, if needed. All other factors leading to vascular occlusion should be addressed, including smoking, treatment of co-existent diabetes, hypertension, dyslipidemia, hyperuricemia.

The prognosis of the disease depends on the timely diagnosis and adequate management.

In conclusion, we present a patient with III cranial nerve palsy as first manifestation of GCA that lead to the diagnosis of the disease. Despite the timely diagnosis and the adequate treatment with amelioration of the constitutional symptoms and decrease in inflammatory disease activity, the oculomotor palsy did not subside. The patient is on regular follow-up and still on corticosteroid treatment. GCA is a relatively rare disease but it should be considered as a possible cause of headache and cranial nerve palsy, especially in the presence of constitutional symptoms and systemic inflammatory activity, and corticosteroid treatment should be initiated as soon as possible, because of the potentially irreversible and even fatal consequences of the delayed diagnosis.

4. References

1. Bilton, E.J., Mollan, S.P. Giant cell arteritis: reviewing the advancing diagnostics and management. Eye 2023;37:2365–2373. https://doi.org/10.1038/s41433-023-02433-y
2. Piccus R, Hansen MS, Hamann S, Mollan SP. An update on the clinical approach to giant cell arteritis. Clin Med (Lond). 2022 Mar;22(2):107-111. doi: 10.7861/clinmed.2022-0041.
3. Thurtell MJ, Longmuir RA. Third nerve palsy as the initial manifestation of giant cell arteritis. J Neuroophthalmol. 2014 Sep;34(3):243-5. doi: 10.1097/WNO.0000000000000116.
4. Pearce JM. Sir Jonathan Hutchinson (1828-1913) and an early description of temporal arteritis. J Neurol Neurosurg Psychiatry. 1994 Feb;57(2):216.
5. Horton BT MT, Brown GE. An undescribed form of arteriitis of the temporal vessels. Proc Staff Meet Mayo Clin. 1932;7:700.
6. Kesten F, Aschwanden M, Gubser P, Glatz K, Daikeler T, Hess C. Giant cell arteritis--a changing entity. Swiss Med Wkly. 2011 Sep 28;141:w13272. doi: 10.4414/smw.2011.13272.
7. Ameer MA, Peterfy RJ, Khazaeni B. Giant Cell Arteritis (Temporal Arteritis) [Updated 2023 Aug 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan. Available from: https://www.ncbi.nlm.nih.gov/books/NBK459376
8. Hunder GG, Bloch DA, Michel BA, Stevens MB, Arend WP, Calabrese LH, Edworthy SM, Fauci AS, Leavitt RY, Lie JT. The American College of Rheumatology 1990 criteria for the classification of giant cell arteritis. Arthritis Rheum. 1990 Aug;33(8):1122-8.