Professional paper
Stručni članak

ISSN 1848-817X
Coden: MEJAD6 45 (2015) 3-4

Gigantocellular arteritis of the vertebral arteries as a cause of ishemic stroke

Gigantocelularni arteritis vertebralnih arterija kao uzrok moždanog udara

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Summary

Gigantocellular arteritis, temporal arteritis or Horton's arteritis is a systemic vasculitis and a chronic inflammatory disease of large and medium-sized blood vessels, especially the temporal arteries, the extracranial part of the carotid arteries, the thoracic and the abdominal arteries. Bilateral vertebral artery occlusion is a rare and serious manifestation of gigantocellular arteritis.

The paper reviews the case of a patient hospitalized three weeks after the onset of neurological symptoms, headache, vertigo, gait instability and sight loss. Pathological laboratory tests indicated erythrocyte sedimentation rate, elevated C-Reactive Protein, fibrinogen, thrombocytosis and leukocytosis. Clinical presentations, the course of the disease and a bilateral infarction of the posterior circulation confirmed by a brain computerized tomography scan, indicated possible cerebral arteritis, therefore corticosteroid therapy was introduced. The disease was complicated by the development of pneumonia, resulting in the death of the patient. A diagnosis gigantocellular arteritis of the vertebral arteries was definitely confirmed through autopsy and pathohistological analysis.

Key words: gigantocellular arteritis, stroke, vertebral arteries

Sažetak

Gigantocelularni arteritis, temporalni arteritis ili Horton's arteritis je sistemski vaskulitis i kronična upalna bolest velikih i srednje velikih krvnih žila. Uglavnom zahvaća temporalne arterije, esktrakranijski dio karotidnih arterija, torakalnu i abdominalnu aortu. Obostrana okluzija vertebralnih arterija je rijetka i ozbiljna manifestacija gigantocelularnog arteritisa.

U radu smo prikazali bolesnicu koja je tri tjedna prije bolničke obrade razvila neurološke ispade, glavobolju, vrtoglavicu, otežan hod i gubitak ravnoteže. Za vrijeme boravka na odjelu učinjena je laboratorijska obrada, patološki nalazi su bili ubrzana sedimentacija eritrocita, povišeni C reaktivni protein, leukocitoza i trombocitoza. Neuroradiološkom obradom dokazani su obostrano okcipitalno ishemijski infarkti. Klinička slika, laboratorijski nalazi i neuroradiološka obrada upućuju na cerebralni vaskulitis. Tijek bolesti je dodatno kompliciran razvojem pneumonije, što je rezultiralo smrtnim ishodom. Konačna dijagnoza gigantocelularnog arteritisa vertebralnih arterija potvrđena je obdukcijom i patohistološkom dijagnostikom.

Ključne riječi: gigantocelularni arteritis, moždani udar, vertebralne arterije

Med Jad 2015;45(3-4):135-138

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Primljeno / *Received* 2015-05-23; Ispravljeno / *Revised* 2015-10-13; Prihvaćeno / *Accepted* 2015-11-05.

Introduction

Gigantocellular arteritis (GCA) is a chronic inflammatory disease of large and medium-sized blood vessels. General symptoms – asthenia, anorexia, and fatigue are usually the first to appear. Increased body temperature, headaches and carotidynia also occur.[1]

The disease affects the peripheral and the central nervous system, usually manifesting itself as transitory ischemic attacks, ischemic strokes, dementia, spinal infarctions, mononeuropathies, polyneuropathies and subarachnoid haemorrhage.[2]

Bilateral vertebral artery occlusions (BVAO) are rare but serious complications of GCA.[3-6]

Obstruction and vertebral artery occlusion are the most frequent causes of ischemic strokes.

In patients with GCA, 50-75% of strokes occur in the vertebro-basillar circulation, compared with 15-20% strokes in patients without GCA. Inflammation of the arterial wall may result to occlusion and also arterial thrombosis causing brain ischemic.[4,5]

Case Report

A 75-year-old patient was admitted to the Neurology Department of the Emergency Service.

Three weeks before she was admitted to hospital, the disease manifested itself through the development of vertigo, dizziness, headache, vomiting, gait instability and elevated body temperature of up to 37.5°C. By the time the patient was admitted, her symptoms gradually progressed so that she became somnolent, her right limbs grew weaker, and she could no longer walk.

Her neurological status included somnolence, medium-severe paresis of the right limbs with facilitated MTR, ataxia, bilateral amblyopia and diminished cooperation during examination caused by poor general condition.

Cerebrovascular disease risk factors, earlier associated with the patient, included hypertension. Atrial fibrillation, hyperlipidemia and normocytic anaemia with thrombocytosis were revealed by laboratory tests.

During the patient's stay in hospital, neuroradiology examination was performed. The brain computerized tomography (CT) scan indicated bilateral occipital and right cerebellar hypodensic ischemic lesions.

Ultrasonic Doppler analysis of the carotid arteries and the vertebrobasilar system revealed stenosis of the right internal carotid artery in an initial stage. Doppler analysis of the vertebral arteries (VA) showed bilateral concentric thickening of the walls of the vertebral arteries extracranially with halo sign.

Chest radiograph showed parenchymal scarring and hyperinflation of the lungs. The heart size was within normal range.

The laboratory tests indicated CRP: 110, ESR: 57/93, RBC:4,07, Hgb: 107 g/L, Tr: 559, WBC: 16.1 x 10^9/l, 91% granulocytes, 7% lymphocytes, 2% monocytes, normal urinalysis results, PT: 67%, fibrinogen 4.05 g/l, APTT: 30 s, TT: 17 s, total bilirubin, AST, ALT, and GGT within normal value ranges, BUN: 11.60 mmol/l, creatinine: 88.2 μmol/l, glucose: 6.14 mmol/l, cholesterol: 8.14 mmol/l, and triglycerides: 2.03 mmol/l.

The patient was given an anti-oedema therapy, low-molecular-weight heparin and parenteral corticosteroids, but the applied therapy produced no significant improvement in her situation, bronchial pneumonia developed and the patient died.

No CT angiogram was made due to the poor overall condition of the patient, the progressive course of the disease and fatal outcome.

An autopsy revealed bilateral occipital and right cerebellar malacic lesions of the brain, and a secondary right cerebellar haemorrhagic infarction. Changes indicating arteritis, confirmed by histological analysis, appeared in the thoracic aorta and the vertebral arteries areas, even at macroscopic scale. Granulation tissue, plasma cells and Langhans and foreign-body giant cells were found in the peripheral layers of the vertebral arteries, while thrombi and abundant calcification unambiguously indicated GCA.

The autopsy indicated an initial stage of stenosis right internal carotid artery, which was a consequence of atherosclerotic changes.

Discussion

GCA is a chronic inflammatory disease of large- and medium-sized blood vessels. In individual families, it is generally related to the HLA-DR4 haplotype, indicating a genetic predisposition.[6]

Epidemiological observations and individual studies utilizing DNA analyses also indicated a possible infectious agent – Mycoplasma pneumoniae, Chlamydia pneumoniae and parvovirus B19.[7,8] Immunology research indicated an antigen driven disease with activation of local T lymphocytes and macrophages occurring in blood vessels, with an important role played by proinflammatory cytokines.

Research also indicated that circulating CD8 T cell count was reduced in patients with active GCA.

Anti-cardiolipin antibodies acting as reactive antibodies in endothelial lesions were discovered in patients diagnosed with GCA. The role of the IL-32 and the Th1 proinflammatory cytokines, possibly induced by IFN-y, IL 1b and TNF a, was noted as a significant arterial inflammation mediator in cases of GCA.

The IgG anti-cardiolipin antibodies were often found in patients experiencing relapses of GCA.[8,9]

General symptoms-asthenia, anorexia, fatigue were usually the first to appear. Increased body temperature, headaches and carotidynia also occured.

Cerebrovascular accidents were reported in 3-5% patients with GCA. Vertebral bilateral artery occlusion (VBAO) is a rare but serious complication of GCA.[10,11]

The clinical initial presentation of VBAO is vertigo, dizziness, nausea, vomiting, head and neck pain. Other common symptoms and signs include weakness, ataxia, visual loss, speech abnormalities, hemiparesis, cognitive disfunctions.[6,12]

Vertebral artery occlusion results in proximal vertebral arteries territory ischemia. Occlusion of extracranial vertebral artery causes ischemia in the medulla or cerebellum. Occlusion of an intracranial vertebral artery can cause ischemia in the lateral medulla. Ischemia in the middle vertebral artery territory is usually caused by occlusion of the basilar artery[13].

The primary causes of VBAO are embolism (30-40%), local atherothrombosis (15-35%), vertebral artery disease (approximately 5%), including GCA.

Laboratory tests usually indicate erythrocyte sedimentation rates exceeding 50 mm/h. C-Reactive Protein (CRP) and fibrinogen values are elevated. Anaemia of chronic disease, thrombocytosis as well as liver enzyme dysfunction are frequently established.

The diagnosis is set primarily based on clinical symptoms, comparison of laboratory test results and neuroradiological methods of CT or magnetic resonance (MR) angiography. The laboratory test results indicate a greater erythrocyte sedimentation rate (ESR) and an increased CRP level, but the diagnosis of the disease may not be ruled out even in cases of normal ESR and CRP values if typical clinical presentation is detected.[14,15]

Temporal artery biopsy represents the best approach to set the diagnosis. The biopsy checks for vasculitis with predominant mononuclear infiltration and granulomas, as well as multinucleated giant cells.

Schmidt and colleagues were the first to demonstrate the association between a periarterial inflammatory halo on duplex colour doppler and positive histology from biopsy.[16,17]

Treatment should start as early as possible. The initial corticosteroid dose is 40-60 mg of Prednisone or its equivalent. After two weeks, the dosage may be reduced to a maintenance dose of 7.5-10 mg Prednisone.[18,19]

The discussed patient exhibited correlation of multiple ischemic lesions of the brain, characterized by typical localization and known risk factors atrial fibrillation, secondary hypercoagulability, hypertension and hyperlipidemia.

Vasculitis was suspected based on clinical and laboratory test results, neuroradiological tests and duplex ultrasonography. Therefore, the usual therapy used to treat cerebral stroke was complemented by a corticosteroid treatment. The disease progressed because of the development of secondary complications despite the applied therapy and the patient died.

A diagnosis of the GCA of the vertebral arteries and VBAO was definitely confirmed through autopsy and pathohistological analysis.

The autopsy and the histopathological analysis established gigantocellular arteritis and thrombosis of both vertebral arteries as the main causes of bilateral occipital ischemic cerebral infarctions.

Unfortunately, no temporal artery biopsy was performed while the patient was alive because of her poor general condition and because the test could not be performed in the hospital that had admitted her.

Conclusion

Gigantocellular arteritis of the vertebral arteries was determined to be the cause of the ischemic cerebral infarction even though this occurs exceptionally rarely.

The paper reviews a case of patients with GCA of the VA with bilateral occlusive disease of the VA and posterior circulations infarction.

Early diagnosis of GCA is very important for immediate treatment initiation with immunosuppressive and antiinflammatory therapy.

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