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INTERNAL CAROTID ARTERY DISSECTION IN A PATIENT WITH RECENT RESPIRATORY INFECTION

Case report of a possible link

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ABSTRACT - The pathogenesis of spontaneous cervical artery dissection remains unknown. Infection-mediated damage of the arterial wall may be an important triggering mechanism. We describe a 21 year-old man with respiratory infection (bronchial pneumonia) which was diagnosed and treated with antibiotic few days prior to the right internal carotid artery dissection. The patient presented ischemic retinal and cerebral strokes. Based on literature review, we discuss the possibility of a causal link between infection and arterial dissection.

KEY WORDS: carotid dissection, infection, stroke.

Dissecção da artéria carótida interna em um paciente com infecção respiratória recente: relato de caso de uma possível associação

RESUMO - A patogênese da dissecção arterial cervical espontânea não é totalmente conhecida. O dano à parede arterial causado ou mediado por processos infecciosos pode ser um importante fator desencadeante. Descrevemos o caso de um homem de 21 anos que apresentou uma infecção do trato respiratório (broncopneumonia) diagnosticada e tratada poucos dias antes da dissecção da artéria carótida interna direita. O paciente apresentou lesões isquêmicas na retina e no território estriatocapsular, ambos à direita. Baseados na revisão da literatura, discutimos a possibilidade de uma relação causal entre infecção e dissecção arterial.

PALAVRAS-CHAVE: dissecção de carótida, infecção, AVCI.

Non-traumatic or spontaneous cervical artery dissection (CAD) is an important cause of ischemic stroke in younger patients[1]. Although increasingly diagnosed through modern neuroradiological techniques, its pathogenesis remains unclear.

Considering that most of the patients with CAD frequently do no present clinical features of classical heritable connective disorders (such as Marfan's syndrome, Ehlers-Danlos syndrome type IV), the occurrence of a spontaneous arterial dissection is probably the result of both an underlying arteriopathy and an environmental triggering factor. The last includes minor precipitating events such as hyperextension or rotation of the neck, some sportive activities, chiropractic manipulation of the neck, coughing, vomiting, sneezing and probably a recent infection episode[1-3]. The possibility of an infectious trigger is supported by findings of a seasonal variation in the incidence of spontaneous CAD in some countries of the northern hemisphere with a peak of incidence on fall[2,4], and it is reinforced by two prospective studies that found a higher prevalence of recent infection in patients with CAD compared with patients with ischemic strokes from other causes[2,3].

We describe a patient with a recent respiratory tract infection prior to the right internal carotid artery dissection which caused ischemic retinal and cerebral strokes.

CASE

Informed consent was obtained from the patient for the publication of this report. In August 2004, a 21-year-old man with fever, cough and purulent sputum was diagnosed as lobar pneumonia (leukocytosis: 16.9/nL and positive chest X-ray) and treated with levofloxacin for 3 days (Fig 1 A). Blood cultures were negatives. On the fourth day, pneumonia symptoms had improved, includ-

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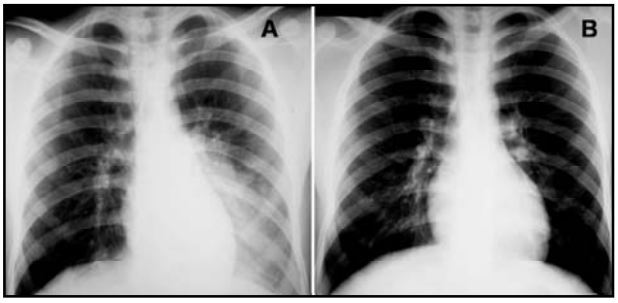

Fig 1. Chest X-ray. A: At first admission, prior to antibiotic treatment. B. After the treatment, at the second admission.

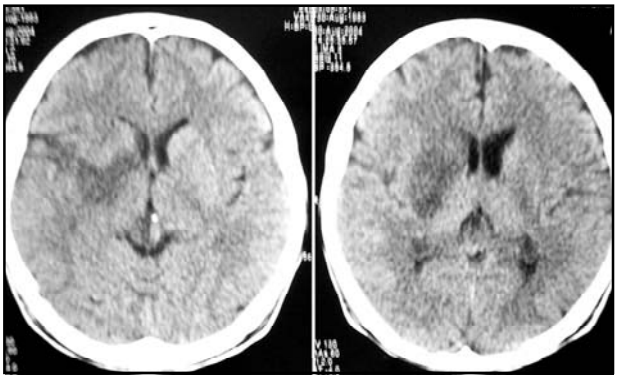

Fig 2. Brain CT: right striatocapsular ischemic stroke.

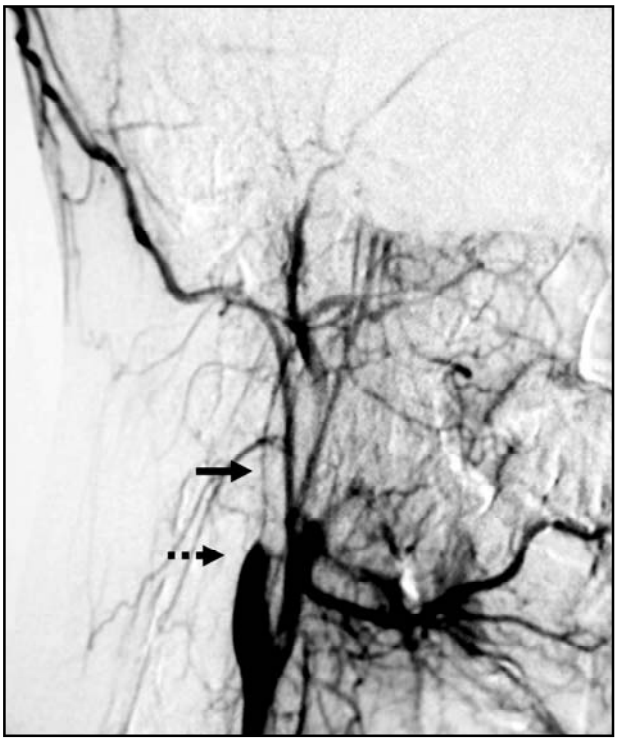

Fig 3. Digital angiography showing an irregular high-grade stenosis (solid arrow) starting about 2 cm distal to the right carotid bulb which has a tapered flame-like appearance (dashed arrow) suggestive of ICA dissection.

ing coughing, and he was discharged. In the same night, he woke up with a sudden onset of intense right hemicranial and retroorbital pain followed by visual disturbance and left hemiplegia. He returned to the hospital.

On physical examination he presented BP: 120/70 mmHg, HR: 64, Temperature: 38ºC. Neurological examination revealed right partial oculosympathetic palsy, right amaurosis with central retinal artery occlusion at fundoscopic examination, left-sided hemiplegia and hemisensory loss. The patient had no vascular risk factors, migraine or recent trauma. His history was unremarkable with the exception of sporadic marijuana use. There was no clinically apparent feature suggesting connective tissue disorder.

Brain CT revealed a right striatocapsular ischemic stroke (Fig 2). Doppler ultrasound suggested an occlusion in the submandibular portion of the right internal carotid artery with a luminal thrombus. Heparin was started. Four-vessel digital angiography showed an irregular high-grade stenosis at the right internal carotid artery (ICA) starting about 2 cm distal to the carotid bulb extending until an occlusion into the petrous bone. The proximal segment of the right ICA had a tapered flame-like appearance. There was an accentuation of the filling of the external carotid artery branches (Fig 3). These findings supported the diagnosis of arterial dissection.

At admission, routine biochemical and hematological serum parameters were normal except by a mild leukocytosis (12.6/nL) and elevated erythrocyte sedimentation rate (56mm/h). Both were normal within 1 week. Fever resolved within 24 hours. A new chest X-ray discharged a current pneumonia (Fig 1 B). Chest CT showed only residual pulmonary infiltrate at the site of the recent infection. Echocardiography was normal, except by a slight tricuspid regurgitation. After 20 days, the patient was discharged with anticoagulation therapy. Headache had a mild improvement and he could walk with assistance, but his right eye vision did not recover. After 3 months of follow-up and anticoagulation therapy, he was able to walk without assistance and no new ischemic event had been detected.

DISCUSSION

Vascular risk factors as smoking, hypertension, migraine, oral contraception and hyperhomocysteinemia have been found in many patients with arterial dissection. It is supposed that, chronically, they may weaken the arterial wall, but the exact mechanism is unknown and atherosclerosis appears not to be involved[1]. Some studies indicate that recent infection is among the most important risk factors for ischemic stroke in children and young adults[5-8] and is probably related to CAD[2,3,9]. In 1999, a prospective study comparing the prevalence of recent infection (within one week before CAD) in 43 consecutive patients with spontaneous CAD and in younger patients with cerebral ischemia from oth-

er causes found that infection in the preceding week was more common in patients with CAD than in patients without it. Respiratory tract infection (68% of infections), but not cough, sneezing and vomiting, was independently associated with CAD. In 35% of patients with CAD the infection had been diagnosed and treated by a physician before dissection or ischemia occurs[2]. In 2002, another case-control prospective study evaluated 47 patients with CAD and found similar results. Additionally the authors observed that the association between recent infection (considered as within four weeks) and CAD was stronger in patients with multivessel dissection[3]. In both studies, patients were characterized as having infection on a clinical prospective basis (face-to-face interview) without knowledge of biological and serological tests. In our patient, the positive history was obtained through direct interview and the confirmation through reviewing his medical files and recent laboratorial and radiological examinations.

Our patient did not present any suggestive clinical feature of a connective tissue disorder. However, even when no clinically apparent connective tissue disorder is detected, patients with spontaneous CAD are suspected of harboring an underlying structural defect of the arterial wall, although the exact type of arteriopathy remains elusive in most cases[1]. Considering the possibility of an underlying arteriopathy or a connective tissue disease, the damage due to the infection could be facilitated. As a general role, CAD is not considered an inflammatory arteriopathy. However, it is possible that an indirect inflammatory and immunological host response with activation of several inflammatory biochemical substances such as cytokines, free radicals and proteases could induce extracellular matrix degradation and thus weaken the vascular wall[3,10,11].

Almost a century ago, a large postmortem examination study[12] mentioned by Grau et al[8] showed that acute infectious disease could lead to considerable vascular injury such as focal destruction of smooth muscles and elastic fibers in the tunica media of larger arteries, which could either heal or transform into fibrous scars. Inflammatory infiltrates were rarely present, and the intima was involved only in the most severe cases. Although this had pointed to a possible infection-mediated vascular damage mechanism, coincidentally at the same and commonest site for arterial dissection (tunica media), further pathological studies to evaluate the exact mechanism underlying the clinically observed link between infection and arterial dissection are still lacking and the mechanism remains speculative. Although an inflammatory eosinophilic infiltrate was found in the tunica media of a fatal case of spontaneous coronary artery dissection[13], there is no report of a similar result in a CAD patient. Considering that most of dissections of the cervical arteries heal spontaneously and that the rate of death is less than 5 %[1], perhaps it explains why the autopsies studies are rare and pathological and immunological studies proving an infection-related mechanism remain lacking.

Regarding the microbial agents, although seroepidemiological studies have shown an association between raised antibody titres against Chlamydia pneumoniae and carotid atherosclerosis or stroke[14], there is no evidence of its relation to arterial dissection[2]. However, it is still possible that other bacterial or viral agents may damage the arterial wall either directly by infecting it, or indirectly by provoking an autoimmune reaction against some of its components. Additionally, it is important considering that mechanical stress by vomiting or coughing may trigger a CAD. A case of CAD was described in a patient with pertussis and severe paroxysmal coughing[15]. The observation in clinical practice shows that coughing is a far more common clinical manifestation than the incidence of arterial dissection. Probably the risk depends on the intensity of the coughing and the individual susceptibility to dissection, but, as an environmental trigger, infection seems to be independently more important than coughing, as showed by Grau et al.[2].

The diagnosis was made by conventional angiography which has long been the gold standard diagnostic test. Pathognomonic features of dissection like intimal flap or a double lumen are detected in less than 10 percent of dissected arteries[1]. Frequently, the appearance of an ICA dissection is an irregular high-grade stenosis or an occlusion starting about 2 cm distal to the carotid bulb. Characteristically, at the site the ICA has a tapered flame-like appearance[1]. Actually, MRI techniques are replacing conventional angiography in the diagnosis of CAD because of the improvement of resolution of MRI angiography, the capability of visualizing the intramural hematoma and the non-invasive approach, but, unfortunately, it is not largely available in many hospitals in Brazil yet.

In conclusion, we call attention to the diagnosis of CAD as an important cause of ischemic stroke in young patients and reinforce the possibility of recent infection as an environmental trigger factor for spontaneous CAD.

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