produce Cry toxins (delta-endotoxins) during the sporulation phase, which are pore-forming toxins that have insecticide activity. One feature that distinguishes Cry toxins is their remarkable specificity, and they are therefore harmless to non-target insects and animals[1]. Nowadays, they are widely used in insect control in agriculture and forestry, in the control of mosquito-borne human diseases, and in the development of transgenic insect resistant plants. Based on former laboratory studies, field experience and epidemiology studies, it has been widely accepted that products of *Bacillus thuringiensis* are safe to humans, animals, and the environment.

However, some recent laboratory studies put the safety of the pesticides in question. According to Cerstiaens's study, one of the Cry toxins, Cry1C, has been proved to be toxic to primary cultured neurons of Lymantria, in a concentration of 20 ug/ml *in vitro*,[2]. Likewise, it is possible that the insecticides also possess neurotoxicity to humans. On the other hand, a recent study addressed the effect of sub-lethal doses of biological and synthetic pesticides of *Bacillus thuringiensis* on female rats' reproduction apparatus during pregnancy; no miscarriages or malformations of the neonates occurred. But the pups, who received more or less of the insecticide, produced similar lesions in the kidneys, livers and lungs and had reduced fertility. This study suggested that sublethal doses of insecticides possibly provide chronic toxicity to humans[3].

There are only two literature reports of *Bacillus thuringiensis* infection in man between the year 1997 and the present, and all infected individuals had experienced either extensive burns or a blast injury, which predisposed them to infection[4]. Based on the literature, the symptoms of *Bacillus thuringiensis* infection or poisoning included mild irritative pulmonary symptoms, theoretical risk of respiratory infection in immunocompromised individuals, single corneal ulceration, mild gastroenteritis with heavy ingestion[5].

In this case, the patient had no vomiting, diarrhea or gastrolacage after swallowing the pesticides. We speculated that, high doses of insecticides were absorbed through the gastrointestinal tract, which secondarily induced diffused spinal cord injury. However, the specific mechanisms of this injury are unknown. It is possible that Cry toxins directly attacked neurons and lead eventually to cell death. Alternatively, the toxins possibly induced auto-immune responses against neurons.

We know that most poisonings from pesticides do not have a specific antidote. Therefore, decontamination is the most effective intervention. Unfortunately, the patient missed the best chance for treatment, which lead to her bad prognosis.

In conclusion, few human tests with high dose of *Bacillus thuringiensis* have been performed. In line with the increased spread of the use of such pesticides in agriculture and transgenic plants, the side effects of their long term applications deserve more consideration.

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To the Editor

Cerebral Amyloid Angiopathy Presenting with TIA-like Episodes

Cerebral amyloid angiopathy (CAA) is a common age-related cerebral small vessel disease characterized by a progressive deposition of amyloid-β in the wall of cortical and leptomeningeal small arteries, with or without capillary involvement. It is a frequent cause of spontaneous intracerebral hemorrhage and cognitive impairment in the elderly[1]. Another characteristic clinical presentation associated with CAA is transient focal neurological episode (TFNE). As recently reported, TFNE could be divided into a positive-symptoms form (aura-like) and a negative-symptoms form (transient ischemic attack-like)[2].

We present a case of probable cerebral amyloid angiopathy presenting with transient ischemic attack-like episodes.

Case presentation

A 69-year-old Caucasian man was admitted to the emergency department because of acute onset right arm weakness and speech impairment, lasting 30 minutes. A computed tomogram (CT) brain scan showed leukoaraiosis and mild cortical atrophy. The patient complained of a similar episode one day before. He was a smoker and moderate alcohol drinker; he had referred with higher blood pressure and mild carotid atherosclerosis for two years. He was taking ramipril, aspirin 100 mg and low-dose statin. ABCD2 score was moderate. At the admission to the Stroke Unit his blood pressure was 130/80 mmHg, heart rate was sixty rhythmic, and the neurological examination was normal. Epiaortic ultrasound study showed mild atherosclerosis; Trans-cranial doppler (TCD) ultrasound was normal as well as CT cerebral angiography. We thought transient ischemic attacks (TIA) episodes and started higher dose antiaggregation with aspirin 300 mg and atorvastatin 80 mg. The day after, the patient

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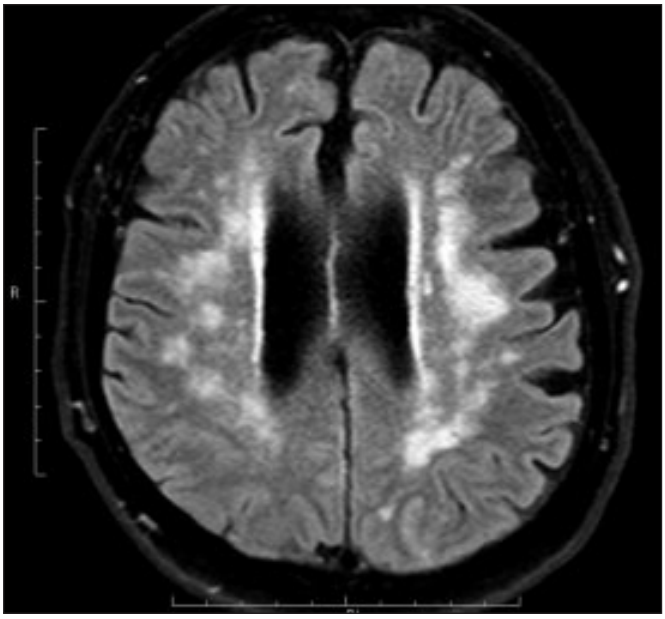

Figure 1: *Axial FLAIR brain image with periventricular white matter changes with early confluent pattern.*

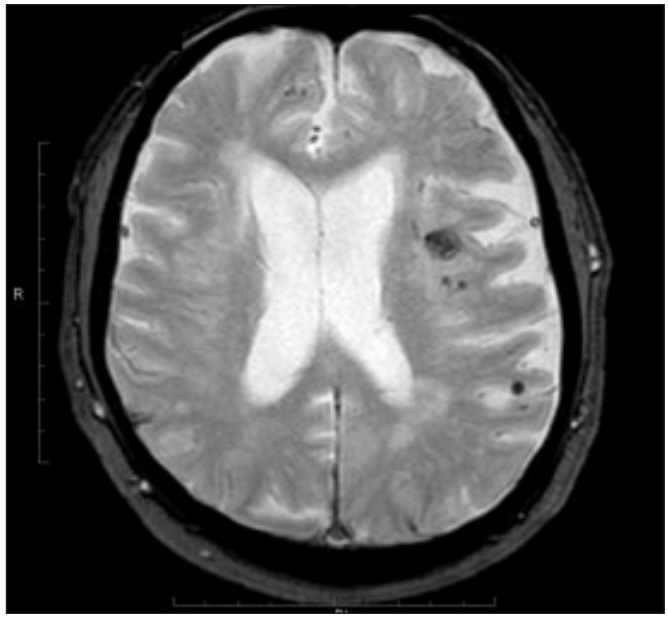

Figure 2: *Axial Gradient-Echo T2 brain image with cortical-subcortical microhemorrhages and small left-sided frontal macrohemorrhage.*

presented the same symptoms for ten minutes. Electroencephalogram and ecocardiogram were normal. Brain magnetic resonance imaging (MRI) showed white matter changes with early confluent pattern (Figure1), and cortical-subcortical microbleeds with a left-sided frontal hemosiderin area (Figure 2).

We considered the Boston criteria for diagnosis of Cerebral Amyloid Angiopathy and withdrew the aspirin. The patient was discharged with a diagnosis of probable CAA presenting with "negative-symptoms" TFNEs. At two months follow-up the patient was asymptomatic.

Discussion

Usually CAA presents with symptomatic intracerebral hemorrhage or cognitive impairment; rarer and atypical features include seizures, rapidly progressive cognitive impairment, headache and the so-called TFNEs. These are distinguished into positive (i.e. spreading paraesthesias, positive visual phenomena or limb jerking), and negative symptoms (i.e. sudden-onset limb weakness, dysphasias or visual loss). The pathophysiology of TFNEs is still unknown, even if microbleeds, superficial siderosis as well as white matter changes and inflammation seem to be important[2,3]. Charidimou et al suggest focal seizure-like activity or migraine aura-like cortical spread depression as the main mechanisms for focal episodes[2], but the involvement of small vessels remains still unexplained. Some experimental studies reported that high amyloid-β levels influence the endothelium-dependent reactivity dysfunction throught the reactive oxygen species production[4]. This, in turn, could be responsible for the changes in the white matter, supplied by the small vessels.

Although the pathophysiology remains unclear, the TFNEs are associated with an increased risk of subsequent intralobar symptomatic haemorrhagic events as early as two months[2], and aspirin intake could further increase the risk[5].

In our case the patient presented with TIA-like episodes suggestive of "negative symptoms" TFNEs, that disappeared after aspirin withdrawal and high dose statin intake. The symptoms could be secondary to the main hemosiderin area along the pyramidal tract, and antiaggregation interruption plus aggressive statin therapy may have contributed to the clinical improvement.

This report further suggests to consider CAA as possible cause of TIA episodes (i.e. TFNEs), especially in patients with posterior white matter changes, even without cognitive impairment. In these cases, antiaggregation interruption is strongly recommended.

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