

# *Mycoplasma pneumoniae* Infection: Risk Factor for Childhood Stroke

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## Introduction

Cerebrovascular disorders constitute the top 10 causes of death in children and result in significant morbidity as well.<sup>1</sup> The estimated incidence of childhood stroke varies, depending on the definition and inclusion criteria, and ranges from 2 to 13 per 100 000 children under age 18 per year in North America and Europe.<sup>2</sup> Risk factors for stroke can be identified in the majority of patients. Infectious illnesses are the second most common cofactor (30%) according to analyses of national data for the United States<sup>3</sup> and the United Kingdom.<sup>4</sup> *Mycoplasma pneumoniae* infection causes neurological complications, although it rarely causes stroke. In this article, we report a 10-year-old boy who had a cough and low-grade fever 2 weeks before he presented with right-sided weakness due to an acute ischemic stroke.

## Case Report

A 10-year-old boy who was previously healthy except for mild intermittent asthma was admitted to King Khalid University Hospital through the emergency department with sudden-onset right-sided weakness affecting the arm, leg, and face associated with a mild headache, but no history of fever, loss of consciousness, vomiting, behavior change, convulsions, or trauma. He had a mild cough 2 weeks earlier, for which he received oral antibiotics. He was born normally, full term with no perinatal problems. His development was normal and his school performance excellent. His medical and surgical history was unremarkable. There was no family history of stroke at a young age. His clinical examination showed normal higher mental function and speech. The cranial nerve examination revealed a right facial nerve palsy; the other cranial nerves were intact. The left upper and lower limbs showed normal tone, power, and reflexes. The right side tone was decreased in both the upper and lower limbs. The power was grade 3 in the right arm and grade 4 in the right leg. The deep tendon reflexes over the right knee and ankle were brisk. The right plantar reflex was up-going, and his gait was hemiplegic. His chest, cardiovascular, and abdominal examinations were normal. Laboratory testing showed a white

blood cell count of 7400/mm<sup>3</sup> with 37% neutrophils, 47.8% lymphocytes, 9.6% eosinophils, and 3.6% monocytes; hemoglobin 13.6 g/dL; platelets 258 000/mm<sup>3</sup>, and erythrocyte sedimentation rate 12 mm/h. The blood urea nitrogen, electrolytes, liver function, lipid profile, bone profile, hemoglobin electrophoresis, prothrombin time, activated partial thromboplastin time, serum ammonia, lactate, homocysteine level, protein C, S, and anti-thrombin III assays, prothrombin G 2010 mutation, Factor V Leiden mutation, anti-cardiolipin antibodies, double-stranded DNA antibodies, antinuclear antibodies (ANA), and anti-cardiolipin antibodies were all normal. Anti-mycoplasma IgM was positive (titer >1.5). Electrocardiography and echocardiography were normal. Magnetic resonance imaging of the brain showed an acute infarction involving the left thalamus and posterior limb of the left internal capsule, with no evidence of hemorrhage (Figure 1). Magnetic resonance angiography of the brain and neck and magnetic resonance venography showed no evidence of arterial dissection, vasculitis, or any abnormality. He was given aspirin for secondary stroke prevention and rehabilitation, and his weakness improved significantly apart from a persistent right-hand tremor.

## Discussion

Acute ischemic stroke (AIS) in children is not uncommon and multiple risk factors have been identified. Infection is the second most common cause of AIS and represents 24% of cases according to the International Pediatric Stroke Study.<sup>5</sup> Varicella zoster virus is the most common infectious agent while human immunodeficiency virus, *M pneumoniae*, *Chlamydia pneumoniae*, influenza A, parvovirus B19, *Borrelia burgdorferi* virus,

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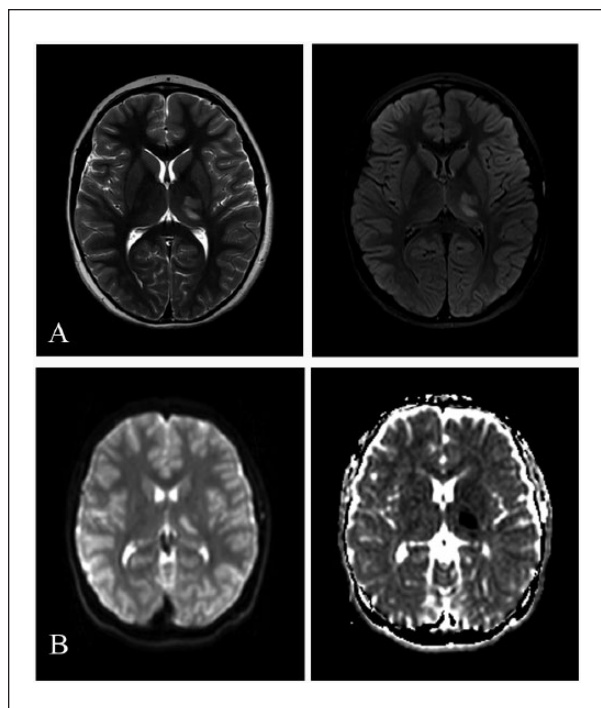
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**Figure 1.** Magnetic resonance imaging of the brain. (A) T2 and fluid-attenuated inversion recovery (FLAIR) sequences showed a focal high-signal-intensity lesion in the left thalamus and posterior limb of the left internal capsule. (B) Diffusion-weighted image (DWI) sequences showed a high signal intensity at the left thalamus and internal capsule on diffusion sequences and low signal intensity on the apparent diffusion coefficient (ADC) map indicating acute infarction.

and mumps virus have been identified. *M pneumoniae* infection has neurological manifestations in children, including meningitis, encephalitis, meningoencephalitis, cerebellar ataxia, acute disseminated encephalomyelitis, Guillain-Barré syndrome, transverse myelitis, and AIS.<sup>6</sup> Twelve cases of AIS with *M pneumoniae* infection have been reported worldwide in the English literature; this is the first report from Saudi Arabia. Several hypotheses explain the mechanism of AIS in *M pneumoniae* infection: direct damage to the central nervous system if the infection occurred within 3 days of the AIS; an immune mechanism if the stroke occurred 2 to 3 weeks after the respiratory disease subsided<sup>7</sup>; or a transient prothrombotic state leading to thrombus formation.<sup>8</sup> In this case, an extensive workup of the etiology underlying the AIS failed to identify any risk factors other than evidence of *Mycoplasma* infection, which manifested clinically as a mild cough and upper respiratory tract infection 2 weeks before his presentation. When this patient presented to our hospital for the acute state of stroke, his higher

mental function was normal, and central nervous system infection was not evidenced clinically, so we did not consider doing lumbar puncture. The possible mechanism was likely to be postinfectious.

## Conclusion

*Mycoplasma pneumoniae* can predispose patients to acute ischemic stroke. Screening for this agent in children with cryptogenic stroke is crucial, especially if the patient has clinical manifestations.

## Declaration of Conflicting Interests

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## References

1. Lynch JK, Hirtz DG, DeVeber G, Nelson KB. Report of the National Institute of Neurological Disorders and Stroke workshop on perinatal and childhood stroke. *Pediatrics*. 2002;109:116-123.
2. deVeber G, Roach ES, Riela AR, Wiznitzer M. Stroke in children: recognition, treatment, and future directions. *Semin Pediatr Neurol*. 2000;7:309-317.
3. Lo W, Stephens J, Fernandez S. Pediatric stroke in the United States and the impact of risk factors. *J Child Neurol*. 2009;24:194-203.
4. Ganesan V, Prengler M, McShane MA, Wade AM, Kirkham FJ. Investigation of risk factors in children with arterial ischemic stroke. *Ann Neurol*. 2003;53:167-173.
5. Mackay MT, Wiznitzer M, Benedict SL, Lee KJ, DeVeber GA, Ganesan V. Arterial ischemic stroke risk factors: the International Pediatric Stroke Study. *Ann Neurol*. 2011;69:130-140.
6. Sonneville R, Mourvillier B, Bouadma L, Wolff M. Management of neurological complications of infective endocarditis in ICU patients. *Ann Intensive Care*. 2011;1:10.
7. Leonardi S, Pavone P, Rotolo N, La Rosa M. Stroke in two children with *Mycoplasma pneumoniae* infection. A causal or casual relationship? *Pediatr Infect Dis J*. 2005;24:843-845.
8. Kim GH, Seo WH, Je BK, Eun SH. *Mycoplasma pneumoniae* associated stroke in a 3-year-old girl. *Korean J Pediatr*. 2013;56:411-415.