

**RELATO DE CASO****Childhood posterior circulation ischemic stroke: an uncommon cerebrovascular disease. Case report*****Acidente vascular cerebral de circulação posterior na infância: uma doença cerebrovascular incomum. Relato de Caso***

Linoel Curado Valsechi<sup>1</sup>, Raquel Siqueira Leonel de Paula<sup>1</sup>, Manuelina Mariana Capellari Macruz Brito<sup>1</sup>, Lucas Crociati Meguins<sup>1</sup>, Regina Célia Ajeje Pires Albuquerque<sup>1</sup>

**Abstract**

**Introduction:** Stroke is characterized as a sudden onset of neurological deficit that results from a cerebrovascular event. The most commonly identified causes of ischemic stroke in children are cerebral arteriopathies, congenital, or acquired cardiac diseases, sickle cell disease, and thrombophilias. In children, due to the low incidence and absence of specific methods to assess and measure correctly this entity, stroke recognition is usually delayed. **Case Report:** A 20 months-old girl was admitted to the emergency department presenting a history of two episodes of vomits, irritability, continuous crying, and strabismus that started suddenly. On neurological assessment, it was found divergent strabismus with right medial rectus muscle palsy and reduced right pupillary reflex to light associated with instable gait. Brain magnetic resonance imaging (MRI) showed an ischemic lesion on the right pontomesencephalic region. The patient received clinical support. On the fifth day, she was discharged with a prescription of aspirin, good clinical conditions, stable gait, and persistence of the divergent strabismus. **Conclusion:** Posterior circulation ischemic stroke is an important cause of morbidity and mortality on pediatric population and must be remembered to avoid diagnosis delay.

**Descriptors:** Stroke; Children; Posterior Circulation Artery Ischemia.

**Resumo**

**Introdução:** O Acidente Vascular Encefálico (AVE) é caracterizado por um déficit neurológico súbito, resultado de um evento cerebrovascular. As causas mais comuns de Acidente Vascular Encefálico isquêmico em crianças são arteriopatias cerebrais; doenças cardíacas congênitas ou adquiridas; doença falciforme e trombofilias. Nas crianças, devido à baixa incidência e ausência de métodos específicos para avaliar e medir essa entidade correntemente, o reconhecimento do Acidente Vascular Encefálico é atrasado. **Relato de Caso:** Uma criança do sexo feminino de 1 ano e 8 meses foi admitida na Emergência apresentando história de dois episódios de vômitos, irritabilidade, choro inconsolável e estrabismo de início súbito. Ao exame neurológico apresentava estrabismo divergente com paralisia do músculo reto medial direito e redução do reflexo pupilas ao estímulo luminoso à direita, associado à marcha instável. Ressonância Magnética do encéfalo (RM) demonstrou lesão isquêmica na região pontomesencefálica à direita. A paciente recebeu suporte clínico e no quinto dia recebeu alta hospitalar com receita de aspirina, em boas condições clínicas, estabilidade da marcha e com persistência do estrabismo divergente. **Conclusão:** Acidente Vascular Encefálico isquêmico de circulação posterior é uma importante causa de mortalidade e morbidade na população pediátrica e deve ser lembrada para evitar o atraso no diagnóstico.

**Descritores:** Acidente Vascular Encefálico; Criança; Isquemia Arterial da Circulação Posterior.

<sup>1</sup>Fundação Faculdade Regional de Medicina de São José do Rio Preto-(FUNFARME)/Faculdade de Medicina de São Jose do Rio Preto(FAMERP)- São José do Rio Preto-SP-Brasil.

**Con lito de interesses:** Não

**Contribuição dos autores:** RCAPA orientação do relato de caso. LCM relato do caso e revisão literatura. MMCMB coleta de dados e revisão literatura. RSLP coleta de dados e revisão literatura. LCV elaboração do manuscrito.

**Contato para correspondência:** Linoel Curado Valsechi

**E-mail:** lcvalsechi@gmail.com

**Recebido:**20/10/2015; **Aprovado:** 15/01/2016

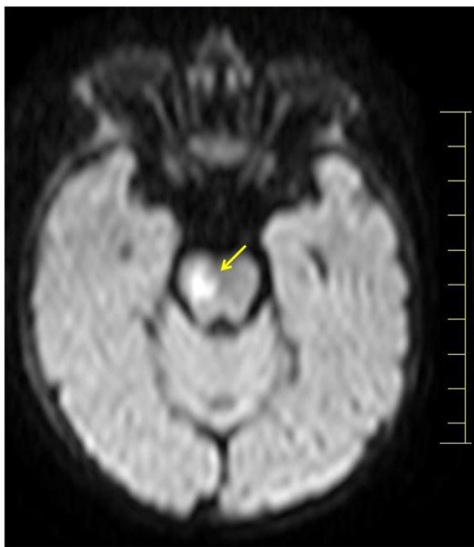
## Introduction

Stroke has been identified as an important childhood disorder and with different risk factors, outcomes, and presentations of those from adults<sup>(1-4)</sup>. It presents an incidence ranging from 0.2 to 7.9/100,000 children/year with a mortality rate reaching 0.6 to 5.3/100,000 pediatric strokes/year. More than half of the survivors will develop some neurologic or cognitive deficit creating an important social and economic problem<sup>(5-9)</sup>. However, posterior circulation ischemic stroke is an uncommon cerebrovascular event in pediatric population with limited published data on English literature regarding the possible risk factors and outcomes<sup>(10-11)</sup>.

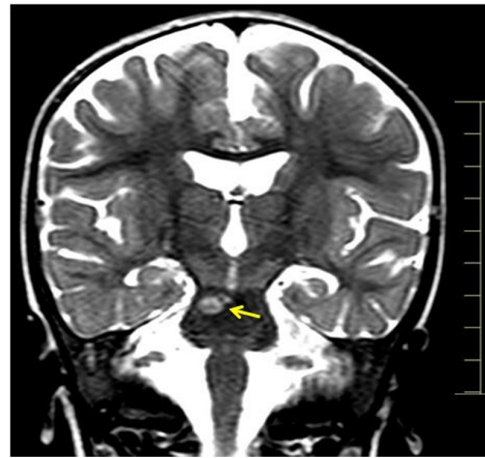
The aim of the present report is to describe the case of a pediatric patient with arterial ischemic stroke of the vertebrobasilar circulation and to discuss the current knowledge of the clinical approach to this patient.

## Case Report

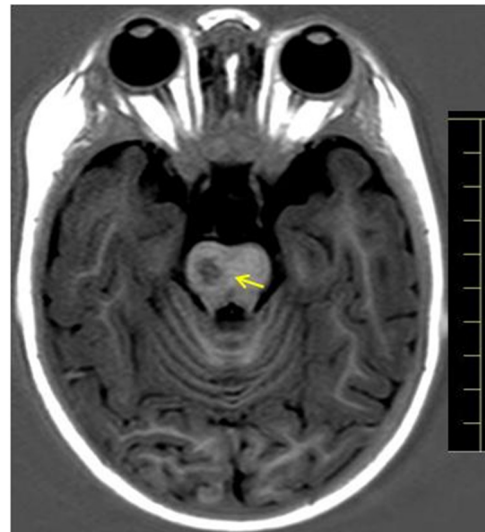
A 20 months-old girl was admitted to the Emergency Department presenting a history of two episodes of vomits, irritability, continuous crying, and strabismus that started suddenly. The mother noted the events on the morning of the same day. The patient's medical and family history was negative for any infectious, metabolic, and/or vascular disease. She was presenting an appropriate neuropsychomotor development. The general clinical examination of the patient revealed a body temperature of 93,92°F (37,4°C), blood pressure of 110x70mmHg, normal cardiorespiratory examination, and no edema on limbs. On neurological assessment, we found divergent strabismus with right medial rectus muscle palsy and reduced right pupillary reflex to light associated with instable gait. The remaining of the neurological examination was essentially normal. Laboratorial blood examination and computed tomography of the brain were found within normal range. Brain magnetic resonance imaging (MRI) showed an ischemic lesion on the right pontomesencephalic region (Figures 1, 2, and 3).



**Figure 1.** Axial Diffusion-Weighted MRI of the brain showing acute ischemic stroke on the right side of the pons (Arrow)



**Figure 2.** Coronal T2/TSE-Weighted MRI of the brain showing acute ischemic stroke on the right side of the pons (Arrow)



**Figure 3.** Axial T1/IR-Weighted MRI of the brain showing acute ischemic stroke on the right side of the pons (Arrow)

MRI angiography did not show any vascular steno-occlusive lesion. Laboratorial hypercoagulability investigation did not reveal abnormalities. Transthoracic echocardiogram showed anatomical cardiac chambers and no anomalous communication. As no other clinical abnormality was found, a diagnosis of acute ischemic stroke of the posterior arterial circulation was made, and the neurologic symptoms were attributed to it. The patient received clinical support and, on the fifth day, she was discharged with a prescription of aspirin, in good clinical conditions, with stable gait, and persistence of the divergent strabismus. After 2 months, the patient presented complete recovery of the right medial rectus muscle movement. She is currently being followed on outpatient appointments.

## Discussion

Arterial ischemic stroke in childhood is a notable cause of long-term disability with many children often living for many years with significant neurological sequelae<sup>(12)</sup>. Usually different from those of adult patients, many risk factors are pointed as potential

etiologies related to the mechanisms of arterial ischemic stroke in children<sup>(13)</sup>. However, important questions concerning the clinical recognition, best treatment options, and outcomes remain unsolved. In the present study, we discuss potential etiologies and risk factors, clinical presentation, and possible clinical approach of pediatric patients with arterial ischemic stroke, particularly those affecting the posterior arterial circulation. The most commonly identified causes of ischemic stroke in children are cerebral arteriopathies, occurring in as many as 50% to 80% of all pediatric cases, congenital, or acquired cardiac diseases, sickle cell disease, and thrombophilias<sup>(14)</sup>. Vertebral arterial dissection is the most frequently identified etiology of posterior circulation acute ischemic stroke in childhood with important recurrence rate<sup>(11)</sup>. However, arterial ischemic stroke affecting the vertebrobasilar circulation may be of undetermined cause in around 10% of pediatric patients<sup>(10)</sup>. In the present case, we did not find any possible risk factor or cause to explain the cerebrovascular event. The clinical presentation of arterial ischemic stroke differs greatly among prenatal, perinatal, postnatal, and childhood stroke. Hemiparesis or hemiplegia is found in about 65% of all initial clinical presentation of pediatric patients with ischemic stroke. This is the most important initial presentation. Cranial nerve involvement is uncommon and seen in about 1.8% of patients<sup>(13)</sup>. On the present study, our patient showed right oculomotor nerve palsy that evolved well and, after 2 months of follow-up, presented complete recovery. There are no randomized controlled studies describing the best evidence therapy to pediatric patients presenting acute ischemic stroke of the posterior arterial circulation. However, initial management should emphasize supportive measures, such as stabilization of airways, administration of oxygen, and maintenance of euglycemia<sup>(12,14)</sup>. Data regarding the efficacy of secondary prevention strategies in childhood stroke are extremely limited. However, acetyl salicylic acid (ASA) is widely used<sup>(13)</sup>. In our case, the patient was discharged and instructed to take ASA daily.

### Conclusion

In conclusion, childhood posterior circulation ischemic stroke is an important cause of morbidity and mortality on pediatric population and must be remembered to avoid diagnosis delay.

### References

1. Mallick AA, O'Callaghan FJ. Risk factors and treatment outcomes of childhood stroke. *Expert Rev Neurother*. 2010;10(8):1331-46. doi: 10.1586/ern.10.106.
2. Munot P, Crow YJ, Ganesan V. Paediatric stroke: genetic insights into disease mechanisms and treatment targets. *Lancet Neurol*. 2011;10(3):264-74. doi: 10.1016/S1474-4422(10)70327-6.
3. Beslow LA, Jordan LC. Pediatric stroke: the importance of cerebral arteriopathy and vascular malformations. *Childs Nerv Syst*. 2010;26(10):1263-73. doi: 10.1007/s00381-010-1208-9.

4. Bejot Y, Benatru I, Rouaud O, Fromont A, Besancenot JP, Moreau T, et al. Epidemiology of stroke in Europe: geographic and environmental differences. *J Neurol Sci*. 2007;262(1-2):85-8.
5. Satoh S, Shirane R, Yoshimoto T. Clinical survey of ischemic cerebrovascular disease in children in a district of Japan. *Stroke*. 1991;22(5):586-9.
6. Giroud M, Lemesle M, Gouyon JB, Nivelon JL, Milan C, Dumas R. Cerebrovascular disease in children under 16 years of age in the city of Dijon, France: a study of incidence and clinical features from 1985 to 1993. *J Clin Epidemiol*. 1995;48(11):1343-8.
7. Arias E, Anderson RN, Kung HC, Murphy SL, Kochanek KD. Deaths: final data for 2001. *Natl Vital Stat Rep*. 2003;52(3):1-115.
8. Lynch JK. Epidemiology and classification of perinatal stroke. *Semin Fetal Neonatal Med*. 2009;14(5):245-9. doi: 10.1016/j.siny.2009.07.001.
9. Lynch JK, Nelson KB. Epidemiology of perinatal stroke. *Curr Opin Pediatr*. 2001;13(6):499-505.
10. Mackay MT, Prabhu SP, Coleman L. Childhood posterior circulation arterial ischemic stroke. *Stroke*. 2010;41(10):2201-9. doi: 10.1161/STROKEAHA.110.583831.
11. Ganesan V, Chong WK, Cox TC, Chawda SJ, Prengler M, Kirkham FJ. Posterior circulation stroke in childhood: risk factors and recurrence. *Neurol*. 2002;59(10):1552-6.
12. Jordan LC, Hillis AE. Challenges in the diagnosis and treatment of pediatric stroke. *Nat Rev Neurol*. 2011;7(4):199-208. doi: 10.1038/nrneuro.2011.23.
13. Yilmaz A, Teber S, Bektaş O, Akar N, Uysal LZ, Aksoy E, et al. Treatment challenges in pediatric stroke patients. *Stroke Res Treat*. 2010;2011:1-9. doi:10.4061/2011/534362.
14. Bernard TJ, Goldenberg NA. Pediatric arterial ischemic stroke. *Hematol Oncol Clin North Am*. 2010;24(1):167-80. doi: 10.1016/j.hoc.2009.11.007.

Linoel Curado Valsechi é médico residente do segundo ano do serviço de neurocirurgia da Faculdade de Medicina de São José do Rio Preto (FAMERP). E-mail: lcvalsechi@gmail.com

Raquel Siqueira Leonel de Paula é médica neurologista pediátrica formada pela Faculdade de Medicina de São José do Rio Preto (FAMERP).

Manuelina Mariana Capellari Macruz Brito é médica neurologista, com subespecialização em distúrbio do movimento pelo Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto (HCFMRP).

Lucas Crociati Meguins é médico neurocirurgião, doutor em Epilepsia, com subespecialização em neurocirurgia vascular pela Faculdade de Medicina de São José do Rio Preto (FAMERP).

Regina Célia Ajeje Pires Albuquerque é médica neurologista pediátrica com mestrado na área de Ciências da Saúde e chefe do serviço de Neurologia Pediátrica do Hospital de Base de São José do Rio Preto (FUNFARME).