Case Report

Endovascular aspiration of clot in a 3-year-old child with embolic infarct of right middle cerebral artery

ABSTRACT

Stroke in children is common and is associated with long-term morbidity. The incidence of stroke is 13/100,000 in children above 1 month, with higher incidences in neonates and premature infants. It has to be differentiated from other diseases which have a similar presentation. We present a case of a 3-year-old female child with embolic stroke of right middle cerebral artery managed with endovascular clot retrieval done under general anesthesia.

Key words: Neurointervention; pediatric; stroke

Introduction

Stroke is common in children. The incidence of stroke is 13/100,000 in children above 1 month, with higher incidence in neonates and infants.[1] The incidence of acute ischemic stroke is 0.6–7.9/100,000children/year.[2] Although stroke occurs in similar vascular territories in children and adults, its presentation may differ.[2] Adults with stroke present with hemiplegia, aphasia, facial deviation, and altered sensorium. Stroke in children can be missed due to its varied and nonspecific presentation in children. The children may present with seizures, irritability, and altered sensorium. Hemiparesis can also be a presenting feature in children but is difficult to recognize. It is often mistaken for more common pathologies such as postictal Todd's paresis, focal seizures, or intracranial lesions. This may result in delay in instituting appropriate management of children with stroke and would require high index of suspicion.

Access this article online	
Website: www.saudija.org	Quick Response Code
DOI: 10.4103/sja.SJA_688_17	

Case Report

A 3-year-old female child presented to the emergency department with irritability, inability to walk by herself, weakness of the left hand and leg and left-sided deviation of mouth as noticed by the parents. She had fever, cold, and cough for previous 3 days. On examination, the child was irritable, afebrile, and had stable vitals. Neurological examination revealed hypotonia and sluggish reflexes on the left side with the child unable to lift the left upper and lower limbs above the bed. The child was treated as postictal Todd's paresis secondary to partial febrile seizures. When the symptoms did not improve after 6 h, an urgent magnetic resonance imaging (MRI) of the brain was done [Figures 1 and 2]. The MRI revealed occlusion of the right middle cerebral artery at its origin with a large penumbra. The child was urgently shifted to the neurointervention suite for endovascular clot retrieval under general anesthesia. The child was induced with intravenous propofol (2 mg/kg). Muscle relaxation was achieved

How to cite this article: Gandhe RU, Bhave CP, Kakde AS, Sathe KA. Endovascular aspiration of clot in a 3-year-old child with embolic infarct of right middle cerebral artery. Saudi J Anaesth 2018;12:643-5.

Rajashree Uday Gandhe, Chinmaya Pradeep Bhave[1], Avinash Sahebarav Kakde, Kalyani Anand Sathe

Departments of Neuroanesthesia and neurocritical care and [1]Neuroanesthesia, Kokilaben Ambani Hospital, Mumbai, Maharashtra, India

Address for correspondence: Dr. Avinash Sahebarav Kakde, 2001/B, Atelier, Rustomjee Urbania, Mumbai-Nashik Highway, Majiwada, Thane - 400 601, Maharashtra, India. E-mail: avinashkakde87@gmail.com

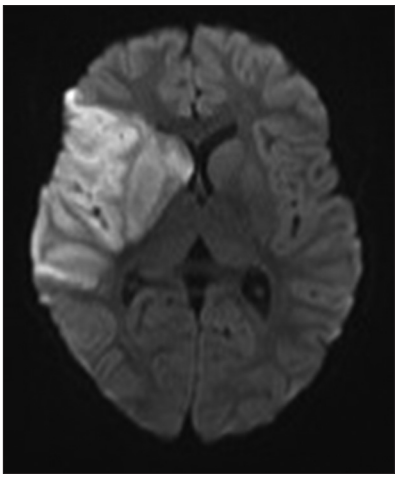

Figure 1: Magnetic resonance imaging (diffusion scan) showing right middle cerebral artery infarct

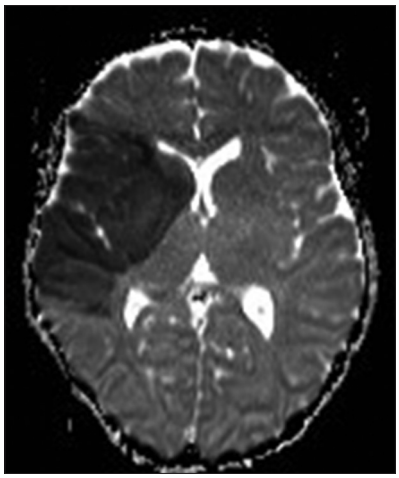

Figure 2: Magnetic resonance imaging (apparent diffusion coefficient scan) of the same patient

with intravenous atracurium (0.7 mg/kg). The airway was secured with appropriate-sized endotracheal tube. Anesthesia was maintained with a mixture of air and oxygen (50:50) and sevoflurane (0.5–1 minimum alveolar concentration). Cerebral angiography confirmed the MRI findings. The clot was retrieved using suction aspiration device. Postprocedure angiogram revealed complete revascularisation of the right middle cerebral artery and normal blood supply in other intracranial blood vessels. The child was extubated after adequate reversal of neuromuscular blockade. Postprocedure, prothrombotic workup and an echocardiography were done. The echocardiography revealed severe mitral regurgitation with vegetation on the anterior mitral leaflet. The child was treated with antibiotics for infective endocarditis and physiotherapy. The child was discharged with significant improvement in power of the left upper and lower limbs and was able to walk on her own without support.

Discussion

Arterial ischemic stroke (AIS) in children is a known cause of significant morbidity in children having implications on their personal and family life. This in turn has economical and social consequences.[3] Risk factors of AIS in children include arteriopathy (Moyamoya disease), heart diseases, chronic systemic diseases (Sickle-cell anemia), prothrombotic states (Protein C and S deficiency), acute systemic conditions (sepsis, dehydration, fever >48 h), and intracranial pathologies.[3] Heart diseases associated with AIS include atrial myxoma,[4] valvular heart disease, and patent foramen ovale. These in addition to the use of membrane oxygenators, cardiac surgeries, and cardiac catheterizations account for approximately one-third of total cases of childhood strokes.[5] In our case, postprocedure echocardiography revealed mitral regurgitation with vegetations on anterior mitral leaflet.

Rafay *et al*. in their review of 209 children with AIS observed significant prehospital and inhospital delay in the diagnosis.[2] The prompt diagnosis of AIS was hampered by lack of experience of first responders to childhood stroke, uncommon presentation of stroke in children, and wide differential diagnosis of focal neurological deficit. In our case, a diagnosis of postictal Todd's paresis following partial febrile seizure was made, and the child was treated accordingly. This led to a delay in prompt management.

Treatment options for AIS are pharmacological and nonpharmacological. Pharmacological treatment strategies in children are based on adult guidelines and include intravenous administration of plasminogen activators (tPA 0.9 mg/kg over 1 h), anticoagulants (unfractionated heparin 75–100 U/kg bolus then 20 U/kg/h, low molecular weight heparin enoxaparin 1 mg/kg/dose) for acute stroke, and long-term administration of anticoagulants and antiplatelet agents.[5] Our patient did not fit the criteria for thrombolysis as presentation was outside the window period (>4.5 h).[1]

Use of endovascular treatment for stroke in children is still unclear despite its proven beneficial effect in adult patients with ischemic stroke.[1] As our patient was not a candidate for intravenous therapy, endovascular treatment was offered. Stroke patients are usually distressed due to the deficits as a result of the stroke. This compounded with their inability to lie motionless during the endovascular therapy would have a detrimental effect on imaging and in turn successful treatment. As a result, general anesthesia or conscious sedation is planned for patients who seem to be uncooperative during endovascular treatment. General anesthesia itself carries risk of worse outcomes due to hemodynamic changes, neurotoxicity, prolonged intubation, or delay in treatment. The advantage of general anesthesia is that the procedure becomes more simple

due to an immobile patient, and general anesthesia is preferred if mechanical thrombectomy is to be done.[6]

Care was taken to minimize hemodynamic fluctuations during induction of general anesthesia and endotracheal intubation. Along with routine American Society of Anesthesiologists' recommended monitoring, blood pressure was continuously monitored and was kept within 10% of baseline values. Hypotension was strictly avoided during the procedure.

Conclusion

Diagnosing ischemic stroke in children requires a high degree of suspicion as it can be easily missed. Children with ischemic stroke should be screened for potential risk factors. Pharmacological treatment measures offer good outcomes if presented within window period. Endovascular treatment, though unproven in children, can be considered if the child has presented outside the window period. Hemodynamic fluctuations should be avoided while administering general anesthesia to stroke patients as this may result in worse neurological outcomes.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Rivkin MJ, Bernard TJ, Dowling MM, Amlie-Lefond C. Guidelines for urgent management of stroke in children. Pediatr Neurol 2016;56:8-17.
2. Rafay MF, Pontigon AM, Chiang J, Adams M, Jarvis DA, Silver F, *et al.* Delay to diagnosis in acute pediatric arterial ischemic stroke. Stroke 2009;40:58-64.
3. Mackay MT, Wiznitzer M, Benedict SL, Lee KJ, Deveber GA, Ganesan V, *et al.* Arterial ischemic stroke risk factors: The international pediatric stroke study. Ann Neurol 2011;69:130-40.
4. Al-Mateen M, Hood M, Trippel D, Insalaco SJ, Otto RK, Vitikainen KJ, *et al.* Cerebral embolism from atrial myxoma in pediatric patients. Pediatrics 2003;112:e162-7.
5. Amlie-Lefond C, Gill JC. Pharmacology in childhood arterial ischemic stroke. Semin Pediatr Neurol 2010;17:237-44.
6. Froehler MT, Fifi JT, Majid A, Bhatt A, Ouyang M, McDonagh DL, *et al.* Anesthesia for endovascular treatment of acute ischemic stroke. Neurology 2012;79:S167-73.