

# Cerebral hyperperfusion syndrome after intracranial stenting of the middle cerebral artery

## **Boby Varkey Maramattom**

**Abstrac** 

Cerebral hyperperfusion syndrome (CHS) is a rare complication following cerebral revascularization. It presents with ipsilateral headache, seizures, and intracerebral hemorrhage. It has mostly been described following extracranial carotid endarterectomy and stenting and it is very unusual after intracranial stenting. A 71-year-old man with a stuttering stroke was taken up for a cerebral angiogram (digital subtraction angiography), which showed a dissection of the distal left middle cerebral artery. This was recanalized with a solitaire AB stent. After 12 h, the patient developed a right hemiplegia and aphasia. Computed tomography brain showed two discrete intracerebral hematomas in the left hemisphere. This is the first reported case of CHS following intracranial stenting from India.

**Keywords:** Cerebral hyperperfusion syndrome, cerebral revascularization complication, intracranial stenting and cerebral hyperperfusion



### Introduction

Although cerebral hyperperfusion syndrome (CHS) is well documented after carotid endarterectomy and carotid artery stenting, only a few cases have been described after intracranial stenting. [1-5] After the Stenting versus Aggressive Medical Therapy for Intracranial Arterial Stenosis and Vitesse Stent Ischemic Therapy trials demonstrated the inferiority of intracranial stenting compared to aggressive medical treatment, this procedure has been largely abandoned. [6-7] However, intracranial stenting is still used in carefully selected patients with good results. [8]

Cerebral hyperperfusion is defined as a >100% increase in cerebral blood flow (CBF) compared to the baseline and it is generally associated with postprocedural hypertension. CHS has an estimated incidence of 0.4%–2.7% after CE and usually presents with ipsilateral headache or migrainous phenomena, seizures, or intracerebral hemorrhage (ICH). I would like to report

an unusual case of CHS following middle cerebral artery (MCA) stenting.

# **Case Report**

A 71-year-old man presented to us with fluctuating motor aphasia of 3 h duration. Magnetic resonance imaging of the brain showed multiple acute infarcts in the left MCA territory and he was started on antiplatelets and statins. By the next day morning, he had developed global aphasia and transient right-sided weakness. His blood pressure (BP) was 150/90 mm Hg and he was taken up for a four-vessel digital subtraction angiography which showed a possible dissection with a thrombus in the distal left MCA [Figure 1]. After obtaining consent, a 4 mm × 15 mm solitaire AB neurovascular modeling device (ev3, Irvine, USA) was placed across the lesion into the superior MCA

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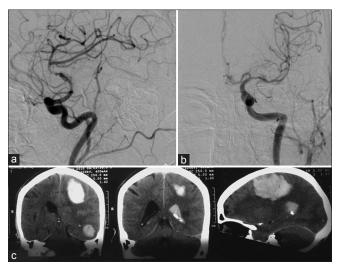


Figure 1: (a) Top left panel shows an irregularity in the left middle cerebral artery MI segment, suggestive of dissection. (b) Top right panel shows a patent middle cerebral artery poststenting. (c) Bottom panels; computed tomography scan images showing left temporal and frontal intracerebral hematomas

division with good recanalization. About 5000 U of intravenous heparin was administered during the procedure. Postprocedure, the patient was sedated and ventilated, but had severe hypertension, exceeding 240/140 mm Hg which was difficult to control even with multiple antihypertensives. The next morning, a routine computed tomography (CT) brain (12 h later) showed two discrete intracerebral hematomas (ICH) in the left frontal and temporal areas [Figure 1]. Transcranial Doppler (TCD) showed elevated mean flow velocities of >130 cm/s in the left MCA. Antiplatelets were discontinued and he was started on antiedema measures. Coagulation parameters were normal. On examination, now he had a dense right hemiplegia and global aphasia. His BP was brought down to baseline levels only after 5 days. Two weeks later, a repeat CT showed resolution of the ICH and no fresh infarcts. The patient had a residual Wernicke's aphasia and right hemiplegia at follow-up even 6 months later.

#### Discussion

Risk factors for CHS include age >75 years, preexisting hypertension, high-grade stenosis with poor collateralization, decreased cerebrovascular reactivity, and increased peak flow velocities.<sup>[9]</sup> Reperfusion of ischemic territories can also lead to "reperfusion injury," wherein oxidant production, complement activation, and increased microvascular permeability result in an impaired blood-brain barrier, intracerebral edema, and ICH. CHS is a devastating complication because of the high morbidity and mortality of nearly 60%–80% associated with this condition.<sup>[5]</sup>

After cerebral revascularization, the advent of severe headache, seizures, or focal neurological deficits after cerebral revascularization should be presumed to signify CHS unless proved otherwise. TCD studies are helpful in monitoring elevated peak systolic velocities in the intracranial arteries as a marker of impending CHS.<sup>[10]</sup> In about 15% of patients, TCD signals may be hampered by poor bone windows. In such patients, near-infrared spectroscopy may be a useful option to monitor CBF.<sup>[11,12]</sup> All critical care physicians should be aware of this entity for better monitoring and prevention of this postprocedural complication in the ICU.

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#### Conflicts of interest

There are no conflicts of interest.

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