

## An unexpected reduction in the value of near-infrared spectroscopy in a child with moyamoya disease

Dear Editor,

Anesthetic management during surgery for cerebrovascular disorders poses unique challenges. Continuous cerebral oxygenation monitoring using near-infrared spectroscopy (NIRS) helps to assess perioperative events during such surgeries.<sup>[1]</sup>

A written informed consent was taken from the parents of the child. A 3-year-old female patient weighing 14 kg presented with tonic-clonic seizures and weakness of left side of body. She was diagnosed with moyamoya disease and scheduled for a right-sided encephalo-duro-arterio-myo-synangiosis surgery under general anesthesia. Before induction of anesthesia, NIRS optodes were applied to the forehead and the baseline values noted were 81 and 95 on left (Lt) and right (Rt) side, respectively. These values gradually increased to 85 and 95 on Lt and Rt side after preoxygenation. Post induction of anesthesia NIRS values were 89 and 95 on Lt and Rt side. NIRS optodes had to be removed as they interfered with surgical site. The surgery was completed

uneventfully and the trachea was extubated after reversal of neuromuscular blockade. NIRS optodes were reapplied just prior to tracheal extubation. While assessing her, gradual drop in NIRS values was observed from 89 to 40 and 94 to 66 on Lt and Rt side, despite giving 100% oxygen for 10 minutes. She had complete reversal of neuromuscular blockade with spontaneous limb movements, complete eye opening, and grimacing. Her body temperature was 36.8°C. Since child was fully awake and all other vital parameters were within normal range, we extubated her trachea. Postoperative NIRS monitoring showed gradual improvement and her computed tomographic scan did not show any new changes.

A reduction in NIRS values by 20% of baseline or an absolute value of less than 50% is considered to be significant.<sup>[2]</sup> During the perioperative period, factors that could lead to a bilateral reduction in NIRS values are situations in which the cerebral metabolic rate of oxygen consumption (CMRO<sub>2</sub>) is increased. This includes awakening, seizures, and hyperthermia. If such situation is suspected, CMRO<sub>2</sub> can be decreased by deepening anesthesia, adding anticonvulsants drugs, and by maintaining normothermia. In our case, seizures and hyperthermia were ruled out, as our patient was fully awake and normothermic. In our patient the rationale for bilateral reduction in NIRS values immediately prior to tracheal extubation is based on the fact that the awakening is one of the factors which can affect the NIRS values by increasing the oxygen demand. Since there is

associated hypometabolism as evidenced from reduced tracer uptake in PET scan,<sup>[3]</sup> it is justified that the fall in NIRS values on healthy (Lt) side (normal) will be greater compared to Rt side (diseased). Our case reiterates the fact that sudden cerebral oxygen desaturation during awakening, though physiological, requires particular attention in cerebrovascular diseases.

### 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.

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### Conflicts of interest

There are no conflicts of interest.

**Jayanth R. Seshan, Indu Kapoor,**

**Hemanshu Prabhakar, Charu Mahajan**

Department of Neuroanaesthesiology and Critical Care, All India Institute of Medical Sciences, New Delhi, India

**Address for correspondence:** Dr. Indu Kapoor,  
Department of Neuroanaesthesiology and Critical Care,  
Neurosciences Centre, All India Institute of Medical Sciences,  
New Delhi - 110 029, India.  
E-mail: dr.indu.me@gmail.com

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