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## Cervical plexus block for carotid endarterectomy: Is ultrasound safe enough?

Sir,

Regional anaesthesia is a popular choice for carotid endarterectomy (CEA) because the detection of cerebral ischaemia is easier in a conscious patient. The use of ultrasound improves efficacy, facilitates performance of regional nerve blocks and reduces the risk of complications. We describe an occurrence of transient brainstem anaesthesia following cervical plexus block under ultrasound guidance (USG) for CEA.

A 58-year-old American Society of Anesthesiologists Physical Status-III hypertensive male was scheduled for CEA under regional anaesthesia after informed high-risk consent. No sedative was administered and monitoring with invasive blood pressure monitoring was commenced. An 18-gauge Tuohy needle was used to administer total 20 ml of a 50:50 percent mixture of 0.5% bupivacaine plain and 2% lignocaine. For superficial cervical plexus block, the needle was introduced from lateral side at C5/6 level and 10 ml of local anaesthetic (LA) mixture was deposited below sternocleidomastoid muscle and prevertebral fascia under ultrasound guidance with high-frequency probe using in-plane approach. For deep cervical plexus block, after visualisation of hyperechoic transverse process of C3 vertebra, 5 ml of LA mixture was deposited just above it followed by repeating the same procedure at C4 level. The drug was given in aliquots of 1–2 ml after negative aspiration of CSF or blood while observing the spread of LA under USG. Constant communication with the patient was maintained and vitals were also

monitored. Within 5 min of administering the drug at C4 level, the patient suddenly became unconscious and developed respiratory arrest with loss of tone of both upper and lower limbs. The pupils were fixed and dilated. The trachea was immediately intubated and the lungs ventilated with 100% oxygen. The gag, pharyngeal and peripheral reflexes were absent during intubation and no anaesthetic agent was administered. At this time, blood pressure and heart rate were 90/60 mmHg and 84/min, respectively. Intravenous fluids were rushed and nor-epinephrine infusion was started while 12-lead electrocardiograph did not reveal any fresh changes. Arterial blood gas and sugar were within normal range. The surgery was deferred and the patient was shifted to intensive care unit. Haemodynamics remained stable thereafter and nor-epinephrine infusion was tapered off after 1 h. The patient developed spontaneous respiratory efforts and became conscious with no neurological deficits after 1.5 and 2 h, respectively, of the episode and subsequently extubated 2.5 h after the event. Next day on interrogation, the patient had no recall of the incident, except of LA being administered.

Our report highlights the occurrence of possible brainstem anaesthesia following deep cervical plexus block for CEA. The rapid loss of consciousness, absence of seizures, a normal ECG and arterial blood gas, hypotension, apnoea, absence of reflexes on laryngoscopy, the temporal association of drug administration and full neurological recovery suggest the diagnosis of brainstem anaesthesia. Local anaesthesia systemic toxicity seems unlikely since there were no neurological symptoms or electrocardiograph changes after injecting the drugs. Ultrasound aids in visualisation of the spread of LA, reduces the drug dosage, possibly avoids inadvertent damage, or accidental puncture of neighbouring

structures, shortens the block performance time, onset time and reduces the number of needle passes. However, it provides the two-dimensional views, instead of a three-dimensional (3D) view. Hence, we possibly missed posterior spread (third dimension) of LA towards intrathecal space or trickling of LA towards intrathecal space along the dural cuff of nerve roots later, after deposition of drug, resulting in transient brainstem anaesthesia. 3D view provides simultaneous visualisation of multiple planes of view, information about the spatial relationship between anatomical structures and accurate volume measurements for measuring LA spread.<sup>[1]</sup> We commonly administer both superficial and deep cervical plexus block for CEA. A combination of 10 ml of 0.5% bupivacaine and 10 ml of 2% lignocaine was used to provide a faster onset and longer duration of action. Madro *et al.* and Koköfer *et al.* have administered 25 ml and 20 ml of LA for ultrasound-guided regional block.<sup>[2,3]</sup> Kavakli *et al.* observed lesser additional analgesic use and higher patient satisfaction in combined group.<sup>[4]</sup>

To conclude, our case report doesn't undermine the importance of USG in cervical plexus block but highlights that brainstem anaesthesia can still occur. Availability and expertise of 3D ultrasound in future, to visualise real-time spread of drug in all three dimensions will help in preventing such complication.

#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initial will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

#### Financial support and sponsorship

Nil.

#### Conflicts of interest

There are no conflicts of interest.

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**Received:** 05<sup>th</sup> May, 2019

**Revision:** 10<sup>th</sup> June, 2019

**Accepted:** 03<sup>rd</sup> September, 2019

**Publication:** 10<sup>th</sup> October, 2019

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| Quick response code  | Website:<br>www.ijaweb.org     |
|  | DOI:<br>10.4103/ija.IJA_351_19 |

**How to cite this article:** Nagpal A, Mittal M, Mahajan S, Swami AC. Cervical plexus block for carotid endarterectomy: Is ultrasound safe enough?. *Indian J Anaesth* 2019;63:868-9.

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