the local laboratory check a high lactate value is prudent, particularly if the diagnosis is not firmly established. In this regard it is useful to have previously established the response to glycolate of both point-of-care and laboratory systems. This case has highlighted the fact that more understanding of equipment and its mechanisms of action are critical in interpreting the data.

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References

1. Morgan TJ, Clark C, Clague A. Artifactual elevation of measured plasma L-lactate concentration in the presence of glycolate (Clinical Investigations). *Crit Care Med* 1999; 27(10): 2177–2179.
2. Brindley PG, Butler MS, Cembrowski G, Brindley DN. Falsely elevated point-of-care lactate measurement after ingestion of ethylene glycol. *Can Med Assoc J* 2007; 176: 1097–1099.
3. Lactate Gen.2, 2003-12, V 1 EN, Roche COBAS INTEGRA 400/700/800 Method Manual V 3 2005–2007, Roche Diagnostics GmbH, D-68298 Mannheim, Germany.
4. Mansouri S. Application of miniaturized sensors in clinical and laboratory settings for measuring blood analytes including glucose and lactate. *Ann Biol Clin* 2003; 61: 193–198.
5. Gabow PA, Clay K, Sullivan JB, Lepoof R. Organic acids in ethylene glycol intoxication. *Ann Intern Med* 1986; 105: 16–20.

Low bispectral index values in a 2-yr-old with a large bifrontal porencephalic cyst

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EDITOR:
Bispectral index (BIS) is routinely used as a monitor of depth of anaesthesia. Unusually low BIS values may be seen during cerebral ischaemia [1], in neuroradiology during glue embolization [2], in patients with dementia [3] and in persons with genetically determined low-voltage electroencephalographic (EEG) signals [4]. Recently, we detected persistently low BIS values in a patient diagnosed with large porencephalic cysts in the frontal lobes.

A 2-yr-old male child, weighing 12 kg, was admitted to our neurosurgical ward with major complaints of increasing head size since 4 months of age, two episodes of generalized tonic-clonic seizures a week ago and delayed milestones. The child responded to commands, recognized his mother but had difficulty in holding his head with a tendency to fall while walking. Contrast-enhanced computed tomography showed two large cystic intraparenchymal lesions in the frontal lobe, suggestive of porencephalic cysts with paucity of periventricular matter and prominent ventricles. Magnetic resonance imaging showed bilateral communicating frontal lobe porencephalic cysts with secondary aqueductal stenosis and secondary corpus callosal hypoplasia (Fig. 1). He was scheduled for an elective frontal craniotomy and fenestration of frontal porencephalic cyst with right cystoperitoneal shunt. In the operating theatre, routine monitors (electrocardiogram, non-invasive blood pressure and pulse oximetry) were attached. A BIS monitor (A-2000; Aspect Medical Systems, Newton, MA, USA) was also attached. The BIS sensor (paediatric) was applied to the forehead and left temporal area. A low BIS value of 39 was observed. Lower values persisted till induction of anaesthesia. General anaesthesia was induced with thiopental sodium 40 mg after fentanyl 20 μg. Rocuronium 10 mg facilitated tracheal intubation. Anaesthesia was maintained with sevoflurane in an oxygen and nitrous oxide mixture (1 : 2). Intermittent boluses of fentanyl and rocuronium were given to facilitate mechanical ventilation to target an end-tidal carbon dioxide value of 32 ± 1 mmHg. Throughout the surgical procedure, the BIS values remained between 30 and 40 with a signal-quality index (SQI) of more than 90%. Due to the low BIS values, the sevoflurane concentration was reduced from inspired concentration of 1–0.2%. Still, no changes in the BIS values were observed. No burst and suppression pattern was observed and the electromyography value remained below 30. At the end of an uneventful surgery, the anaesthetics were discontinued and neuromuscular block reversed. The trachea was extubated and the child cried actively. The BIS value continued to remain low, even 6 h later in the neurosurgical ICU.

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Figure 1.
Magnetic resonance imaging showing bilateral communicating frontal lobe porencephalic cyst.

BIS monitoring has been largely used to monitor the depth of anaesthesia. However, nothing has been published regarding the role of BIS monitoring and its validity in neurosurgical patients with raised intracranial pressure. Since the BIS algorithm analyses the EEG signals of the patient, it should be expected to vary or else alter the values displayed, to some extent, especially in patients with grossly elevated intracranial pressure.

Schnider and colleagues [4] reported a case in which, due to the patient's EEG amplitude being genetically very low, the BIS value was 40 during consciousness. This EEG pattern occurs with an incidence of approximately 10% of the population. It has also been suggested that emotional tension may induce low-voltage EEG activity. In our patient, an increase in intracranial pressure as a result of the cyst may have resulted in decreased cerebral perfusion pressure and thereby caused global cerebral ischaemia over a long period. This may have been responsible for the lower BIS values. A large prospective study may be needed to validate the role of the BIS monitor in neurosurgical patients with signs of raised intracranial pressure as in cases of gross hydrocephalus or patients with large intracranial cysts. Lower BIS values in these patients may not reflect the true hypnotic state and could be a result of cerebral ischaemia or even low-voltage EEG signals. To adjust the level of anaesthesia based entirely on BIS could be erroneous and inappropriate.

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References

1. Merat S, Levecque JP, Le Gulluche Y, Diraison Y, Brinquin L, Hoffmann JJ. BIS monitoring may allow the detection of severe cerebral ischemia. *Can J Anaesth* 2001; **48**: 1066–1069.
2. Prabhakar H, Rath GP. Change in bispectral index following intraventricular bleed in neuroradiological suite. *Anaesth Intensive Care* 2007; **35**: 138–139.
3. Renna M, Handy J, Shah A. Low baseline Bispectral Index of the electroencephalogram in patients with dementia. *Anesth Analg* 2003; **96**: 1380–1385.
4. Schnider TW, Luginbuhl M, Petersen-Felix S, Mathis J. Unreasonably low bispectral index values in a volunteer with genetically determined low-voltage electroencephalographic signal. *Anesthesiology* 1998; **89**: 1607–1608.

Perioperative outcome of pacemaker patients undergoing non-cardiac surgery

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EDITOR:
There has been a remarkable evolution in the technology of cardiac pacemakers since the first implantation in the 1950s. Apart from the basic functions of cardiac pacing and sensing, some pacemakers are now able to preserve atrio-ventricular synchronization (dual-chamber pacemaker) and/or to adjust heart rate to metabolic demand (rate-responsive pacemaker). All currently implanted pacemakers have some programmable features that have made pacemaker devices more dependable and more complex [1]. On the

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