Dear Editor,

We report the use of bilateral bispectral index (BIS) monitoring during the maintenance of general anesthesia in a patient who had previously undergone functional hemispherectomy, and propose bilateral BIS monitoring to ensure the safe conduct of general anesthesia in patients who have had epilepsy surgery.

A 16-year-old woman with hypomelanosis of Ito (HI) was scheduled for surgical correction of a left wrist contracture and left cavus foot deformity under general anesthesia. She had left hemiplegia and right hemianopia, but otherwise normal cerebral function. At the age of 8 months she had undergone right functional hemispherectomy for medically intractable epilepsy caused by right hemimegalencephaly (HME), a recognized feature of HI. Nonetheless, she continued to take carbamazepine as anticonvulsant therapy. Laboratory tests revealed slight elevations in the serum concentrations of total cholesterol, creatine kinase, alanine transaminase, and γ-glutamyltransferase.

Asymmetric BIS values were anticipated in view of the known right hemispheric lesion and asymmetric cerebrovascular anatomy (Figure 1). Thus, bilateral BIS monitoring was established using two BIS sensors and two BIS-VISTA™ A-3000 monitors running algorithm version 4.0 (Covidien, Mansfield, MA) to titrate anesthetic depth and monitor intra-operative seizure activity. Bilateral BIS sensors were placed as described by Fudickar and colleagues1. A signal quality index of >50% was considered reliable. A regime of total intravenous anesthesia using propofol, rocuronium and remifentanil was chosen for anesthetic management. Ventilation was controlled to maintain normocapnia. Although a number of transient asymmetries between the right- and left-sided BIS values were observed, there were no significant differences (mean ± standard deviation: 43.8 ± 5.3 versus 44.9 ± 9.2; P = 0.15) during steady-state anesthesia. Surgery and anesthesia were concluded uneventfully, and the patient recovered without incident.
Epilepsy surgery, such as functional hemispherectomy, is indicated in children with medically intractable epilepsy caused by HME\(^2\). Cerebrovascular asymmetry may be evident after epilepsy surgery and changes in cerebral blood flow (CBF) are known to affect BIS values; however, we observed no significant differences between the right- and left-sided BIS values during steady-state anesthesia in this case. Nevertheless, we have already experienced significant differences in BIS values when recorded on both sides during general anesthesia in a patient with Sturge-Weber syndrome who had previously undergone hemispherotomy\(^3\). Chiron and colleagues reported changes in CBF after hemispherectomy in a child with HME: single photon emission computed tomography (SPECT) showed that after surgery CBF had reduced from baseline levels in the abnormal cerebral hemisphere, but had increased in the normal hemisphere\(^4\). The results of a SPECT study by Soufflet and colleagues suggest that changes in CBF before and after epilepsy surgery cannot easily be predicted\(^5\). In their case series, mean CBF in the cerebral hemisphere affected by HME was decreased after surgery in 64% but normal in 36% of cases, whereas the mean CBF in the unaffected hemisphere was normal in 82% and increased in 18% of cases. Consequently, it is advisable to titrate anesthetic depth using bilateral BIS monitoring to ensure the safe conduct of anesthesia in patients who have had epilepsy surgery.

**Conflict of interest**

None.

**References**


The key to Lock-up Postoperative Pain

**STEP I**
Initial bolus
Inject 1 ampoule Tramal® 100 mg i.v. or i.m. slowly over 2-3 minutes

**STEP II**
Ways of administration after initial bolus

- **Infusion**
  - Inject 3 ampoules Tramal®, each 100 mg, in 500 ml of infusion solution.
  - Infusion rate 12-24 mg Tramal®/h (160-200 drop/min or 30-60 ml/h).
  - Subsequent increments of 25 mg with a lock-out time of 5 minutes.

- **PCA**
  - Usual dose 50 mg or 100 mg iv. 1 h up to a total dose of 400 mg except for patients with altered cardiovascular function who might receive a daily dose of up to 600 mg.

  - Further treatment with Tramal® bolus on demand.

- **Injection**
  - If needed further doses of Tramal® up to a total of 200 mg (excluding the initial bolus) within the first 60 min.

**STEP III**
Follow-up

- 50 mg 1-2 capsules every 4-6 hours
- 50 mg 20-40 drops every 4-6 hours
- 100 mg 1 suppository every 4-6 hours
- slow release 1 tablet every 12 hours

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**Intra-Operative**

- Loading Dose
  - 2.5 - 3 mg/kg at wound closure

**Post-Anaesthesia Care Unit**

- Loading Dose
  - If intra-operative dose not given then BOLUS I.V.*
    - 100 mg over 2-3 mins

- An intra-operative loading dose of Tramal® will reduce PONV rates**

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Grunenthal
For patients with localized

BURNING

SHOOTING

STABBING

Neuropathic pain

WORKS WHERE IT HURTS
BRIDION—optimal neuromuscular blockade management and improved recovery

**Predictable and complete reversal**

- 98% of BRIDION patients recovered to a TOF ratio of 0.9 from reappearance of T₂³ within 5 minutes¹
- 97% of BRIDION patients recovered to a TOF ratio of 0.9 from 1 to 2 PTCs ¹ within 5 minutes²

**Rapid reversal**

- BRIDION rapidly reversed patients from reappearance of T₂³ in 1.4 minutes¹
- BRIDION rapidly reversed patients from 1 to 2 PTCs ¹ in 2.7 minutes³

BRIDION is indicated for the reversal of neuromuscular blockade induced by rocuronium or vecuronium. In children and adolescents (aged 2-17 years), BRIDION is only recommended for routine reversal of moderate rocuronium-induced neuromuscular blockade.⁴

Important safety information

BRIDION is not recommended in patients with severe renal impairment. Studies in patients with hepatic impairment have not been conducted, and therefore, patients with severe hepatic impairment should be treated with prudence. Contraindications should be considered when administering BRIDION to pregnant women as no clinical data on exposed pregnancies are available.

BRIDION has not been investigated in patients receiving neuromuscular blockers in the intensive care unit (ICU) or setting. If neuromuscular blockade is required within 24 hours of BRIDION administration, a non-reversal neuromuscular blocking agent should be used instead of neuromuscular reversal. The most commonly reported adverse reactions were hypoxia (mild or instance case) and anaphylactic complications (coughing, sneezing, lip swelling, or flushing on the endotracheal tube). In patients treated with BRIDION, a few cases of awareness were reported. These reactions are rare and, in a few instances, allergic-like reactions (i.e., flushing, hypotensive episodes). Following BRIDION were reported. Physicians should be informed of the possibility of allergic reactions and take necessary precautions. In a study of patients with a history of positive reactions, two cases of anaphylaxis were reported in 2 patients and a causal relationship could not be fully excluded. Volunteer studies have demonstrated no clinically relevant effects on memory or cognitive function.

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