Bispectral index sensor as a possible cause of postoperative visual loss after frontal craniotomy

Editor—Postoperative visual loss (PVL) after non-ocular surgery is rare, but a devastating complication. 1–3 We report a patient with unexpected PVL after brain tumour removal by frontal craniotomy. The development of PVL was attributed to the bispectral index (BIS) sensor (BIS standard, Aspect Medical Systems) fixed on the forehead.

A 38-yr-old female patient was undergoing right frontal brain tumour removal. She had complained of headache and nausea suggesting increased intracranial pressure, but otherwise she was quite healthy. After placing a BIS sensor on the left forehead, general anaesthesia was induced with a target control infusion of propofol and continuous infusion of remifentanil 0.5 μg kg⁻¹ min⁻¹. Her trachea was intubated after vecuronium 6 mg. Anaesthesia was maintained with target control infusion of propofol and continuous infusion of remifentanil 0.15–0.25 μg kg⁻¹ min⁻¹. Skin incision was performed bilaterally along the hairline on the forehead, and the myocutaneous flap was retracted anteriorly and inferiorly near the orbit. Right frontal craniotomy was performed, during which the connector between the BIS sensor and cable was turned down to the left side and also fixed on the left forehead. The surgical procedure was uneventful, but lasted >8 h. Systolic arterial pressure was controlled between 120 and 140 mm Hg. BIS value stayed between 40 and 50. Total amount of fluid infused was 5200 ml, blood loss was 290 ml, and urine output was 2680 ml. She emerged from anaesthesia uneventfully after surgery. Her first complaint of left visual loss and several small blisters above her left eyelid were noted after admission to the intensive care unit. An ophthalmologist’s examination revealed the following: her left eye was completely blind, the left direct light reflex disappeared although the consensual light reflex was normal, the left ocular muscle function was slightly impaired, and the fundal appearances presented normal optic disk and retina. Dexamethasone was administered immediately. The fundal appearances continued to be normal without the appearance of cherry red spot. Imaging studies revealed neither cerebral infarction nor surgery-related injury to the orbit or optic nerve. Electroretinogram showed slight b-wave reduction suggesting left retinal damage, whereas fluorescein angiography demonstrated normal retinal circulation. The absence of visual evoked potential suggested injury between the optic nerve and the optic tract. The left direct light reflex began to appear after 1 month, but her vision is still only to hand movement. Left optic disk became pallid after 2 months, suggesting the development of optic nerve atrophy.

Bilateral orbital infarction attributed to orbital compression by retraction of a myocutaneous flap over the eyes during frontal craniotomy has been reported, 4 and occlusion of the ophthalmic artery and its branches led to ischaemia of the whole orbit because of increased intraorbital pressure. In our case, the bulky BIS sensor and connector fixed on the left forehead may have caused orbital compression when the myocutaneous flap was retracted near the orbit, increasing left intraorbital pressure. Several small blisters above the left eyelid suggested firm retraction. Increased intraorbital pressure caused vascular insufficiency to the optic nerve, leading to the development of PVL. Left retinal damage and ocular muscle dysfunction also developed as the result of ischaemia caused by increased intraorbital pressure. On the other hand, impaired orbital venous drainage caused by increased cerebrospinal fluid pressure associated with brain tumour might contribute to vascular insufficiency. 5 We should be cautious when placing a BIS sensor on the forehead during frontal craniotomy.

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Video laryngoscopy and external laryngeal manipulation

Editor—We read with interest the article written by Groeben and colleagues, 1 comparing direct laryngoscopy with video laryngoscopy in expected difficult tracheal

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