Case Report

Intracranial bleeding following induction of anesthesia in a patient undergoing elective surgery for refractory epilepsy

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Abstract

Background: A patient with refractory epilepsy due to underlying mesial temporal sclerosis underwent general anesthesia for an elective anterior temporal lobectomy and amygdylo-hippocampectomy. He was a known hypertensive and his blood pressure was well controlled on medication.

Case Description: Following induction of general anesthesia and subsequent opening of the craniotomy flap it was noted that the patient had a very swollen brain that herniated out of the dural defect. There was an underlying spontaneous intraparenchymal bleed encountered in the region of the left temporal lobe with associated subarachnoid hemorrhage within the sylvian fissure. The clot was evacuated and subsequently brain swelling reduced allowing us to proceed with the intended surgery. Despite the intracranial findings there was no overt abnormality in the hemodynamic status from the time of induction of anesthesia to the craniotomy opening excepting a mild nonsustained elevation of blood pressure at the outset.

Conclusion: This case is of interest due to the fact that spontaneous intraparenchymal bleeding after induction of anesthesia has not been reported before in literature and should be considered in any patient in which brain swelling occurs in a setting of elective neurosurgery in which the primary lesion does not cause elevated intracranial pressure.

Key Words: Anesthesia technique – general anesthesia, complication – brain swelling, intraparenchymal hemorrhage

INTRODUCTION

Recent developments in techniques of anesthesia have brought about numerous beneficial effects. Although relatively safe, it is important to realize that complications still may occur in an otherwise healthy patient. The central nervous system with its carefully regulated surroundings is particularly sensitive to insult or injury resulting from the anesthetic process. The mortality arising from anesthetic related complications can be as high as 2.2 per 10,000 patients.[1]

Intracranial bleeding occurring in patients associated with anesthetic techniques is well reported. However, this is specifically so for spinal or epidural anesthesia.[2] Although the occurrence of elevated mean arterial pressure during the induction phase of anesthesia from intubation or drug administration has been realized for many years now, there
have not been reported instances of these changes resulting in intraparenchymal bleeding excepting in patients with preexisting intracranial vascular pathology like an aneurysm.

CASE REPORT

The patient was a 47-year-old male with hypertension who was diagnosed with multi drug-resistant Left (L) temporal lobe seizures secondary to (L) mesial temporal sclerosis. His seizure had started at the age of 35 years. The seizure semiology was that of a complex partial seizure with secondary generalization. Electroencephalography (EEG) revealed the seizures to be originating from the (L) temporal lobe. A Video EEG further confirmed the (L) temporal seizure focus and was concordant with the previous EEG and imaging features. He was investigated with a magnetic resonance image of the brain, which revealed evidence of mesial temporal sclerosis of the (L) temporal lobe. Patient was then submitted for neuropsychological evaluation and found to be suitable for epilepsy surgery. He was admitted for an elective anterior temporal lobectomy with amygdalo-hippocampectomy. The preoperative imaging done did not reveal evidence of any other underlying abnormality in the brain besides the mesial temporal sclerosis.

Patient was admitted electively for his surgery. During the preoperative evaluation he was found to be well with a controlled blood pressure of 130/80 on a single oral antihypertensive medication. Just prior to induction, his blood pressure was noted to be 150/100. Patient was subsequently induced using intravenous propofol, fentanyl, and rocuronium. Intubation was then done using an appropriately sized tube. No difficulty was encountered during this procedure. Patient was then maintained on total intravenous anesthesia (TIVA). Blood pressure monitoring revealed that the initial postinduction blood pressure was 150/100, which subsequently was controlled and maintained so throughout the surgery at a range of systolic 170-120 and diastolic 90-60. Patient was subsequently handed over to the neurosurgical team.

Following craniotomy, it was noted that the dura and underlying brain was very tense. Upon durotomy, the brain bulged out and there was evidence of subarachnoid hemorrhage seen over the cortical surface. A transcortical approach was attempted via the medial temporal gyrus. During corticectomy, an intraparenchymal clot was encountered. The clot was evacuated and subsequently a left selective amygdalo-hippocampectomy was performed [Figure 1a-c].

In the immediate postoperative patient was kept ventilated and sedated. A computed tomographic (CT) scan of his brain revealed the presence of a small residual temporoparietal intraparenchymal clot as well as bleeding with the subarachnoid space especially in the region of the left sylvian fissure [Figure 1d]. CT Angiography as well as digital subtraction angiography was done and revealed no evidence of any underlying vascular lesion that might be the source of intraparenchymal bleeding that was noted intraoperatively. This patient’s postoperative course was complicated with hydrocephalus with ventriculitis as well as nosocomial pneumonia. Despite aggressive therapy he succumbed to widespread infection about one month postoperatively.

CONCLUSION

Maintaining stable hemodynamics during surgery is one of the fundamental aspects of anesthesia especially in patients with hypertension. It is believed that preoperative antihypertensive therapy decreases the incidence of perioperative complications.[3] Elevation of pulse and blood pressure have been well documented as occurring due to laryngoscopy and tracheal intubation in even nonhypertensive patients under a variety of anesthetic methods.[3] These responses that can be seen in even normal subjects might be enhanced and prove dangerous to hypertensive patients especially during intubation. This is despite the fact that the patient may be on medication with well controlled hypertension.[4] The precise etiology of the cardiovascular changes following intubation is not confirmed. A commonly used explanation is on the basis of a reflex autonomic (sympathetic) reaction to the mechanical stimulation of the larynx and trachea. A patient’s preoperative anxiety or his reflex baroreceptor response to minor hypotension following the administration of anesthetic agents may also accentuate this.

Figure 1: (a-d) The brain is edematous with evidence of subarachnoid bleeding overlying the cortical surface upon opening the dura. Blood clots can be seen protruding out through a defect in the cortical surface (a). On further exploration, an intraparenchymal clot was noted in the region of the temporal lobe (b). Following evacuation of the clot, the brain appears more relaxed (c). A noncontrast computed tomographic image of the brain taken after the surgery reveals evidence of residual intraparenchymal clots in the temporal region.
Previous accounts of patients developing intracranial bleeding in literature are present, but are usually in the setting of regional anesthesia specifically epidural procedures. Cases in which these bleeds occur in general anesthesia, in contrast, are in those in whom there exists an underlying vascular lesion such as an aneurysm or an arterio-venous malformation. In this case, both the investigations, pre- and postoperatively, did not reveal evidence of any such lesion. His only risk factor would be the fact that he was a known hypertensive who was on medication. The blood pressure readings in this patient prior to anesthesia and during the initial postintubation period, although slightly elevated were not sustained.

This case is highlighted due to the fact that this patient was planned for an elective surgical procedure and developed a complication somewhere between the time of induction of anesthesia and the opening of the dural flap. The intraparenchymal bleed that was seen is unlikely to have occurred prior to induction as the patient was well and preoperative investigation parameters were unremarkable.

Thus it can be seen that even nonsustained moderate elevation of blood pressure may possibly trigger a complication such as this in patients undergoing general anesthesia. It may be advised that more vigilant blood pressure monitoring and control is prudent to avoid the occurrence of such disastrous complication occurring especially in the setting of an elective surgical procedure.

REFERENCES

1. Forbes AM, Dally FG. Acute hypertension during induction of anaesthesia and endotracheal intubation in normotensive man. Br J Anaesth 1970;42:618-24.
2. Malik P, Malhotra N, Kad N, Malhotra P. Intracranial haemorrhage after lumbar dural puncture in a patient with brain metastasis. Indian Anaesthesiologist Forum; Online ISSN 2007, 0973-0311.
3. Oguchi T. Can we adopt the hypertension guidelines for the management of hypertension as the perioperative guidelines for hypertensive patients. J Clin Anesth 2002;26;913-9.
4. Prys-Roberts C, Melocke R, Foex P. Studies of anaesthesia in relation to hypertension. I Cardiovascular responses of treated and untreated patients. Br J Anaesth 1971;43:122-37.
5. Sandhu K, Dash HH. Anaesthesia Related Neurological Complications. Indian J Anaesth 2004;48:439-45.