Be careful to avoid hemodynamic disturbances in craniosynostosis surgery!

A 2-year-old ASA 1 male child weighing 12 kg presented to us with complaint of increasing skull deformity since birth. He was diagnosed to have non-syndromic coronal craniosynostosis and was scheduled for cranial vault remodeling and fronto-orbital enhancement procedures. In the operating room, standard ASA monitors were attached and 22G IV access was established. His baseline heart rate and blood pressure (BP) were 112/min and 90/48 mm Hg, respectively. A standard technique of fentanyl/propofol/cisatracurium/sevoflurane with oxygen in air (50:50) was used. Central venous line, intra-arterial catheter, and two wide bore cannulae were inserted following anesthesia induction. The patient’s hemodynamic parameters were within normal range until the bone flap was raised. After the bone flap was completely removed [Figure 1] surgeons covered the exposed brain with a large saline-soaked gauge pad till they finish the remodeling of the resected bony part. While the surgeons were putting the large gauge pad on the exposed brain, we observed a sudden decrease of heart rate from 118/min to 44/min and increase in invasive BP from 92/45 mmHg to 118/63 mmHg. The airway pressure and end-tidal CO2 levels were within normal limits and the depth of anesthesia was maintained. Surgeons were instructed to remove the gauge piece, which led to normalization of vitals over the next 3-4 mins. We observed two more episodes of bradycardia while the surgeons were replacing the bone flap. Those too normalized upon removal of the pressure on the brain. After this, the surgeons proceed very gently in the surgery and no more episodes of bradycardia and/or hypertension were observed. The rest of the intraoperative course was uneventful and the child was extubated in the operation room following reversal of neuromuscular blockade. The child had an uneventful course and was discharged on
Letters to Editor

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Cranial vault remodeling with fronto-orbital enhancement procedure is often performed for coronal craniosynostosis.\cite{1,2} The different causes of hemodynamic disturbances in a craniosynostosis surgery can be blood loss, venous air embolism (VAE), anaphylactic reaction, or a trigemino-cardiac reflex (TCR)\cite{2,3}. Normal airway pressure and ETCO2 levels ruled out VAE/anaphylactic reaction in our case. No apparent blood loss during the event and sudden onset of bradycardia with hypertension that resolved upon removal of direct pressure on brain went more in favor of a diagnosis of either TCR or a sudden increase in ICP causing Cushing’s response in our case. In fronto-orbital enhancement procedure, often the surgeons remove the total cranial vault leaving behind only a strip of bone along the coronal suture [Figure 1]. Following this, surgeons try to achieve local hemostasis and then cover the exposed brain with saline-soaked gauge pads. At this point, TCR can occur due to stimulation of trigeminal nerve endings in dura mater or if the pressure applied on the brain is high, then it may cause a transient increase in ICP and initiate a Cushing’s response secondary to brain stem compression. In our case, most probably the hemodynamic response was due to TCR or due to an increase in ICP, which spontaneously subsided following removal of inciting event. So with this report, we want to make the readers aware of the possibility of hemodynamic disturbances secondary to TCR or direct compression of the exposed brain in craniosynostosis surgery. Gentle surgical manoeuvres by the surgical team and prior preparedness to manage the hemodynamic changes might help in favorable outcome in these procedures.

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