Late venous air embolism following insertion of Mayfield head pins

Dear Editor,

Venous air embolism (VAE) is not an uncommon event during neurosurgical procedures. It is an iatrogenic complication that occurs when air from the atmosphere enters into the systemic circulation specifically when the surgical site is above the level of heart producing a sub-atmospheric pressure in the open veins.

A 27-year-old male diagnosed as a case of fronto-temporo-parietal meningioma was posted for craniotomy and excision under general anesthesia. His Glasgow Coma Scale [GCS] was 15, and no neurological deficit was present. All laboratory investigations were within normal limits. His magnetic resonance imaging was suggestive of large well-defined lesion in left Sylvian fissure, extending into left basal cistern with mass effect. Following anesthesia induction, a Mayfield pin was used to stabilize the head of the patient in a supine position. The pin was removed and reinserted by the surgeon to improve the surgical access. Half an hour later, the surgeon repositioned the patient with head end elevated by 30 degree. We observe a sudden fall in end-tidal carbon dioxide concentration [$EtCO_2$] from 30 to 19 mmHg with a drop of oxygen saturation from 100% to 95%. Rest of the vital parameters including heart rate and blood pressure demonstrated no change from baseline. We started the management with administration of 100% oxygen and intravenous fluids. We could aspirate 4–5 ml of air through the central venous line catheter [Arrow triple lumen central venous catheter, 7 French sizes, and 16-centimeter length]. We confirmed the central venous line position with electrocardiogram as a guide. The superior vena cava – right atrium junction positioning of the central venous line was confirmed with a tall *P* wave, which was equal to R wave height. The time frame between the event and air aspiration was one and half minutes. Within 1–2 min of air aspiration, oxygen saturation returned back to normal and $EtCO_2$ rose up to 25 mmHg from 19 mmHg. No further episodes of VAE occurred during surgery.

Mayfield head pin is commonly used in neurosurgical patients to keep the head stable during surgery. The literature is scarce in case reports showing an association of VAE and Mayfield head pins in adult patients.[1,2] Ture H *et al*. observed that the rate and severity of VAE were significantly lower in patients with 30-degree head elevation than in patients with 45-degree head elevation undergoing craniotomy in semi-sitting position.[3] This was a case of late VAE during repositioning of patient possibly following air entrainment through diploic veins injured at first attempt of pin insertion. In our case, we could not find any other possible explanation for this sudden decrease in $EtCO_2$ except for the traumatized initial skull pin site being culprit for air entrainment after a change in position. At this time point, the surgery was not started and anesthetic depth was well maintained. The proper scanning of the surgical site by a surgeon before pin insertion, avoidance of sudden change in patient positioning, and proper suturing of the initial traumatized pin insertion site could avert this iatrogenic complication.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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