Venous air embolism during deep brain stimulation surgery in an awake child

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To the Editor,

Venous air embolism (VAE) has been reported as a rare occurrence during deep brain stimulation (DBS) for movement disorders.¹ As might be expected, the incidence of VAE is much less with DBS than with other neurosurgical procedures.^{1,2} The occurrence of VAE in children undergoing DBS has not been described. General anesthesia and sedation have each been successfully utilized for DBS in children.^{3,4} That being said, there are advantages and disadvantages to using general anesthesia and sedation in children undergoing DBS from both an anesthesia and a neurosurgical perspective. We report a case of VAE in an awake and spontaneously breathing child undergoing DBS.

A 9-yr-old, 31 kg child with primary dystonia presented to our institution for globus pallidus internus mapping and DBS. Prior to the start of DBS, the patient was sedated with propofol for stereotactic head-frame placement and magnetic resonance imaging to map for electrode placement. Following completion of the study, the patient was transferred awake to the operating room where standard monitors were placed (i.e., bispectral index processed electroencephalogram [BIS monitor] and supplemental oxygen administered via nasal cannula with an end-tidal carbon dioxide [ETCO₂] sampling line). The patient was positioned supine on the operating table with a 30° head-up tilt. An infusion of dexmedetomidine was initiated. A 1 µg · kg⁻¹ bolus *iv* was given over 10 min, followed by a maintenance infusion of 0.2–0.7 µg · kg⁻¹ · hr⁻¹. The procedure was well underway and uneventful until burr hole drilling. Soon thereafter, the patient began to cough and complain of chest pain. These intraoperative signs and symptoms were

accompanied by a decrease in SpO₂ from 100 to 88% and a decrease in ETCO₂ from 39 to 16 mmHg. At this point in time VAE was suspected. The patient was immediately placed in the Trendelenburg position; a facemask was applied, and the surgical field was flooded with saline. The patient remained without evidence of hemodynamic instability or deviations in the electrocardiogram. The decision was made to close the operative field, and within 10 min the patient returned to baseline. Afterwards, a computed tomography scan was performed and the patient remained in the hospital overnight for observation. No further sequelae were observed, and the patient returned a few weeks later for DBS without complications.

Venous air embolism in an awake and spontaneously breathing child undergoing DBS has not been reported previously. This case underscores the importance of a high index of suspicion for VAE in the presence of coughing during DBS. A similar case of coughing with VAE was described in an adult patient undergoing DBS.⁵ In addition, since this child was awake and complained of chest pain, this finding availed us with useful information. Ultimately, the combination of our patient's cough and complaint of chest pain as well as the information we derived from the monitors confirmed our diagnosis of VAE and led to successful treatment.

Competing interests None declared.

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