

## Air embolism following hysteroscopy

Madam,

A 39-year-old female, American Society of Anesthesiologists (ASA) class II with secondary infertility was posted for day care hysterolaparoscopy under general anesthesia. Patient had history of snoring with body mass index (BMI) of 33Kg/m<sup>2</sup>, good functional capacity, normal hemodynamic parameters, and investigations. Standard ASA monitors were attached operating room and anesthesia was administered using propofol 150mg and trachea was intubated with 7.5mm ID endotracheal tube after achieving neuromuscular blockade with atracurium 40mg. Patient was taken on controlled ventilation with V<sub>T</sub> of 500mL, respiratory rate 12/min, and Positive End Expiratory Pressure (PEEP) of 5cmH<sub>2</sub>O on isoflurane at 1.5%. The patient was positioned in the lithotomy position with 20°–30° head down tilt. Cervical dilatation was difficult as the cervix was fixed. After dilating the cervix, the surgeon proceeded with hysteroscopy using hysteroscope at set with normal saline as the medium. Following insertion of the hysteroscope, there was a sudden drop in the EtCO<sub>2</sub>. Alongwith, there was central cyanosis, electrocardiograph (ECG) showed junctional bradycardia, blood pressure fell to 70/40 mm Hg and SpO<sub>2</sub> was not recordable. Bilateral air entry was rechecked, there was no wheeze or murmur and no change in airway pressures. The operative procedure was deferred and the patient was taken on 100% oxygen. Carotid pulse was not palpable, cardio-pulmonary resuscitation (CPR) was initiated immediately, and return of spontaneous circulation (ROSC) was achieved after 5 minutes of high quality cardiopulmonary resuscitation. There was ill sustained ventricular tachycardia with systolic BP of 70 mm Hg. Cardioversion was done and inotropic support started. White frothy secretions were noticed in the endotracheal tube suggestive of pulmonary edema. Invasive monitoring was instituted and trans-thoracic echocardiography performed, following the event which showed normal left ventricular function, dilatation of the RA/RV with pulmonary artery systolic pressure (PASP) of 28 mmHg with no air in the heart. PaCO<sub>2</sub> on arterial blood gas analysis (ABG) was 115 mmHg with an EtCO<sub>2</sub> of 20 mmHg at that time which decreased to 75mmHg over 30 minutes. Patient was shifted to the intensive care unit (ICU); she continued to have unstable hemodynamics. Around midnight she had a cardiac arrest, was resuscitated but could not be revived.

After a post-event detailed debriefing, we construed that, forceful cervical dilatation could have led to some occult

laceration, formation of false passages, and opening of sinuses resulting in entrainment of ambient air which might have been aided by the Trendelenburg position. It could also have been caused by some air entering through the hysteroscope, in which saline was being purged with no control over the pressure being applied. As there was a sudden drop in EtCO<sub>2</sub> and desaturation (which are classic signs of air embolism) with bradycardia presenting a little later, the possibility of reflex vagal stimulation in this patient who was in an adequate plane of anesthesia, was ruled out. The immediate management of air embolism includes stopping further air entrainment by occluding the surgical field, flooding with saline, positioning the patient to trap gas in the apex of the right ventricle, and maintaining hemodynamics. However, in our patient the course of events was too rapid and the primary focus shifted on to CPR and these measures could not be instituted effectively. The unstable hemodynamics of the patient precluded us from investigating other differential diagnosis of thromboembolism (a possibility of underlying deep vein thrombosis (DVT) though unlikely could not be ruled out) by (CT) Computerized tomography angiography. We speculate that the micro air emboli due to the bubble-surface<sup>[1]</sup> effect led to the fatal sequelae of pulmonary hypertension, pulmonary edema, and systemic inflammatory response syndrome (SIRS).

Air embolism has been widely reported in hysterolaparoscopic procedures.<sup>[2]</sup> It can occur because of entrainment of ambient air with patient in Trendelenburg position or from air present in the irrigating fluid which is pushed in at high pressure. Simple measures like adequate hydration prior to surgery, use of controlled ventilation, avoiding Trendelenburg position, flooding, and occluding the surgical field in case of suspicion of embolism can prevent catastrophic complications. As for the surgical procedure, avoiding laceration of the mucosa, keeping the os occluded, using irrigating fluid with a controlled pressure and checking for any air bubbles prior to insertion are important. A continuous echocardiographic imaging of patients undergoing hysteroscopy showed continuous flow of bubbles in 85% patients with an increased PASP in 70% and transient desaturation in 30% of these patients.<sup>[3]</sup> This high incidence of presence of air necessitates awareness and prompt treatment in patients posted for hysteroscopy.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

**Neeru Luthra, Namrata, Anju Grewal**

Department of Anaesthesia, Dayanand Medical College and Hospital,  
Ludhiana, Punjab, India

**Address for correspondence:** Dr. Neeru Luthra,  
H. No. 1227/2b/1, Lane No. 2, Kitchlu Nagar Extn,  
Ludhiana, Punjab, India.  
E-mail: drneeru1977@yahoo.co.in

**References**

1. Mirski MA, Lele AV, Fitzsimmons L, Toung TJ. Diagnosis and treatment of vascular air embolism. *Anesthesiology* 2007;106:164-77.
2. Groenman FA, Peters LW, Rademaker BM, Bakkum EA. Embolism of air and gas in hysteroscopic procedures: Pathophysiology and implication for daily practice. *J Minim Invasive Gynecol* 2008;15:241-7.
3. Leibowitz D, Benshalom N, Kaganov Y, Rott D, Hurwitz A, Hamani Y. The incidence and haemodynamic significance of gas emboli during operative hysteroscopy: A prospective echocardiographic study. *Eur J Echocardiogr* 2010;11:429-31.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Access this article online	
<b>Quick Response Code:</b>	<b>Website:</b> www.joacp.org
	<b>DOI:</b> 10.4103/joacp.JOACP_143_18

**How to cite this article:** Luthra N, Namrata, Grewal A. Air embolism following hysteroscopy. *J Anaesthesiol Clin Pharmacol* 2019;35:416-7.

© 2019 Journal of Anaesthesiology Clinical Pharmacology | Published by Wolters Kluwer - Medknow