



ROYAL NORTH SHORE HOSPITAL





Air embolism, a case report on the uncommon but dangerous complication during a routine hysteroscopy.

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BACKGROUND

Air embolism is a rare but potentially catastrophic complication of any surgical procedure. It occurs when there is entrapment of gas (either from ambient air or products of combustion from intra-operative ablation) into the pulmonary circulation.¹

The venous air embolism leads to physiological effects of ventilation/perfusion mismatch, increased alveolar dead space, intrapulmonary shunting and elevated right ventricular pressure. This results in hypoxia and hypercapnia and can quickly deteriorate into right heart failure, decreased cardiac output, cardiorespiratory collapse and death.^{2,3} Clinicians should be aware of this potentially fatal iatrogenic complication and the immediate management required.

CASE

A 56-year-old female underwent a routine hysteroscopy under general anaesthesia for post-menopausal bleeding and ultrasound findings suggestive of cystic endometrial hyperplasia and fibroids. Whilst performing the myomectomy with the MyoSure device with Normal Saline, a small amount of bleeding started.

Almost immediately after, the patient desaturated to SaO₂ 65% and expired CO₂ 5mmHg with unchanged heart rate and blood pressure. Bleeding inside the uterus had already ceased. The procedure was abandoned and resuscitation efforts were conducted by the anaesthetics team. The patient was placed in steep head-down Trendelenburg position and there was almost immediate improvement of SaO₂ 96%, consistent with a retrospective clinical diagnosis of air embolism.

The patient was transferred to ICU for post-operative monitoring and was extubated uneventfully. Investigations including CTPA were negative for pulmonary embolism, but she was found to have iatrogenic fluid overload as part of the resuscitation effort. She remained clinically well and was discharged from ICU.

DISCUSSION

Despite being a rare occurrence, clinicians should be aware of this dangerous complication while performing routine procedures. The earliest sign of air embolism intra-operatively is decreased oxygen saturations, bradycardia, acute decrease in expired CO_2 and presence of "millwheel" murmur.^{1,2} A large air embolism can sometimes be seen on chest x-ray (Fig 1) or can be definitively detected with a transoesophageal echocardiograph.²

Keen vigilance of the operating surgeon and awareness of the signs and symptoms will lead to timely first-line management. This includes stopping the procedure and further air entry into the system, repositioning the patient into a steep Trendelenburg (Fig 2) and left lateral decubitus position known as Durant's manoeuvre (Fig 3) to allow the trapped air to be stabilised to the right ventricular apex and relieve obstruction of pulmonary circulation. Additionally, ventilation with 100% oxygen helps to correct the hypoxaemia and increases the diffusion gradient. Hypovolaemia should be corrected with intravenous fluids, and inotropes and vasopressors used to maintain end organ perfusion. Rapid initiation of cardiopulmonary resuscitation should occur as necessary.^{1,2,3}

Figure 1: Large air embolism in main pulmonary artery ³



CONCLUSION

Early recognition of air embolism and its management is critical to preventing adverse outcomes. **SIGNS**: $\downarrow O_2$ saturations, Bradycardia, \downarrow expired CO₂, "Millwheel" murmur

Prompt management:

STOP: The procedure and entry of further air
START: By repositioning of patient – Trendelenburg or
Durant's manoeuvre, ventilation with 100% oxygen,
IV fluids, ionotropic support and vasopressors
CONTINUE: Cardiopulmonary resuscitation

Figure 2: Trendelenburg position ⁴



Figure 3: Durant's manoeuvre ⁵



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- 4. Trendelenburg position https://www.bbraunforsafety.com/en/air-embolism.html#preventive-strategies [Accessed 10th August 2019]
- 5. Durant's manoeuvre https://coreem.net/core/air-embolism/ [Accessed 19th August 2019]