

Toh H, Tan T

Kk Women's and Children's Hospital , Singapore , Singapore, Singapore

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We report a case of a 21 month old boy with relapsed acute myeloid leukaemia (AML) scheduled for an elective Hickman line insertion under general anesthesia (GA) during which he had persistent hypoxia refractory to conventional corrective measures.

He was diagnosed with acute AML six months ago and was in remission until he presented with vomiting this admission.

Preoperatively, he maintained saturations of 97-100% on room air, and had a leukocyte count of  $116 \times 10^9/L$ . Two days prior, he had undergone a bronchoalveolar lavage under GA uneventfully.

During this procedure, he desaturated immediately after intravenous induction and his saturations hovered around 88-90% despite intubation and ventilation with 100% oxygen. His blood pressure post induction was 70/30 mmHg. Lung auscultation and the chest x-ray were unremarkable. A bedside echocardiography showed right heart strain and dilatation, with right to left shunting across a small patent foramen ovale. After 20 minutes of lung recruitment, his saturation improved to 95% but efforts to wean inspired oxygen to less than 60% were futile. The line insertion proceeded, after which he was transferred to the children's ICU.

A diagnosis of pulmonary leukostasis was made in the ICU. His ventilatory requirements decreased in parallel with his white cell count after commencing chemotherapy (Table 1). He was extubated after four days of uneventful stay in the ICU.

Leukostasis syndrome results in the occlusion of small blood vessels, such as the pulmonary, coronary, renal and cerebral circulation due to abnormally high leukocyte count. In addition, decreased deformity of the abnormal leucocytes results in clumping and stasis in the micro-circulation. This typically occurs when the leukocyte count exceeds  $100 \times 10^9/L$  and is associated with leukaemias and their relapses.

In our patient, it is likely that there was pre-existing ventilation-perfusion (VQ) mismatch resulting from sluggish pulmonary blood flow due to hyperleucocytosis. In addition, the leucocytes had increased metabolic oxygen demand, which also contributed to the hypoxemia. With systemic hypotension from general anesthesia and vasodilatation leading to reduced preload, pulmonary blood flow was further compromised. This worsened the VQ mismatch and contributed to the desaturation post induction. The right heart strain seen on the echocardiography likely resulted from the increased pulmonary vascular pressures. Leukocytoreduction either via chemotherapy or leukapheresis remains the mainstay of management for leukostasis.

This case highlights an unusual cause of post-intubation desaturation and offers a differential diagnosis to pulmonary embolism in leukemic patients. It also serves to alert practitioners to the risks of hyperleucocytosis which can be compounded by the effects of general anesthesia.

#### References:

1. C. Fong et al: *Ped Anes* 2009 19: 1191-1198
2. D.A. Kaminsky et al: *Leukemia Research* 24 (2000) 175–178

Day	Procedure day (under GA)	Upon reaching ICU	Day 2 ICU stay (post chemotherapy)	Day 3 ICU stay	Day 4 ICU stay	Day 5 (transfer to general ward)
<b>FiO<sub>2</sub> requirements</b>	1.0, then weaned to 0.6	0.6	0.35	0.4	Nasal prongs 2L/min	Nasal prongs 1L/min
<b>Leucocyte count (x10<sup>9</sup>/L)</b>	116	154	31.15	1.98	134	0.11

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