



## CASE REPORT

# Primary oxygen embolism after hydrogen peroxide irrigation of a large wound

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## Case report

Mrs PB; an overweight 72-year-old lady (ASA 2) underwent a total knee replacement and required a manipulation under anaesthesia (MUA) for stiffness within 2 weeks of surgery. Following the MUA she developed a large haematoma in the lateral thigh compartment, which was evacuated. However, the haematoma recurred, requiring re-evacuation. Clinically there was no sign of infection and the CRP was normal. She was thoroughly investigated for any bleeding disorder but all clotting factors and the bleeding time were normal.

Re-evacuation was performed without a tourniquet. The clot (600 ml) was removed and the serous membrane lining the cavity was excised. Haemostasis was achieved with diathermy before 50 ml of 3% hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) soaked swabs were packed into the cavity ( $20\text{ cm} \times 15\text{ cm} \times 7\text{ cm}$ ). After 2 min the oxygen saturation decreased from 97% to 83%; the patient became tachycardic, hypotensive and the end tidal  $\text{CO}_2$  dropped from 4.4 kPa to 3.2 kPa. A central venous line was placed and air bubbles at insertion noted. The ECG showed a right ventricular strain pattern. Surgery was completed swiftly, the swabs were removed and the wound

closed. The patient was stabilised and became less tachycardic and less hypotensive and transferred to ITU for invasive monitoring. D-Dimers and cardiac enzymes were negative making the diagnosis of a thrombotic embolus and myocardial infarction highly unlikely. Thus, by exclusion a pulmonary oxygen embolism was diagnosed. The patient made a full recovery on ITU and was returned to the ward at 24 h.

## Discussion

Signs and symptoms of oxygen embolism include cardiovascular collapse, sudden hypoxia<sup>4</sup>, and central line insertion associated with aspiration of air bubbles<sup>1</sup>. The mechanism leading to oxygen embolus formation from  $\text{H}_2\text{O}_2$  is the generation of an abnormal oxygen pressure gradient, created by the biochemical reaction of  $\text{H}_2\text{O}_2$  to  $\text{H}_2\text{O}$  and  $\text{O}_2$  potentiated by tissue catalases and membrane peroxidases acting on  $\text{H}_2\text{O}_2$ <sup>3</sup>.

The use of hydrogen peroxide in patients with a large wound surface area should be considered carefully as a large volume of oxygen of  $\text{H}_2\text{O}_2$  absorbed quickly might lead to pulmonary embolism. Our case demonstrates this complication where serious cardio-respiratory compromise followed the use of hydrogen peroxide.

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