

Loss of End Tidal CO2 during Laparoscopy - When is it a Venous Air Embolism?

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BACKGROUND

Venous air embolism (VAE) results from entry of gas into the venous system causing obstruction of right heart outflow and reduced cardiac output.

Occurs when venous pressure is lower than insufflation or ambient gas pressure. Additionally, there must be a violation of the vasculature.

CASE DESCRIPTION

37-year-old woman with no significant history underwent laparoscopic cholecystectomy after bowel prep. After uneventful induction, trocars were placed and abdomen insufflated with CO₂.

During steep reverse Trendelenburg, ETCO₂ dropped from 40→12 mmHg with hypotension and hypoxemia.

After patient was returned to supine position, vitals normalized. Despite confirmation of ETT positioning and 1 L fluid bolus, two further attempts reproduced same findings.

Procedure completed supine; patient discharged without complication.

TEE post-op revealed no intracardiac air and normal cardiac function.

FIGURES

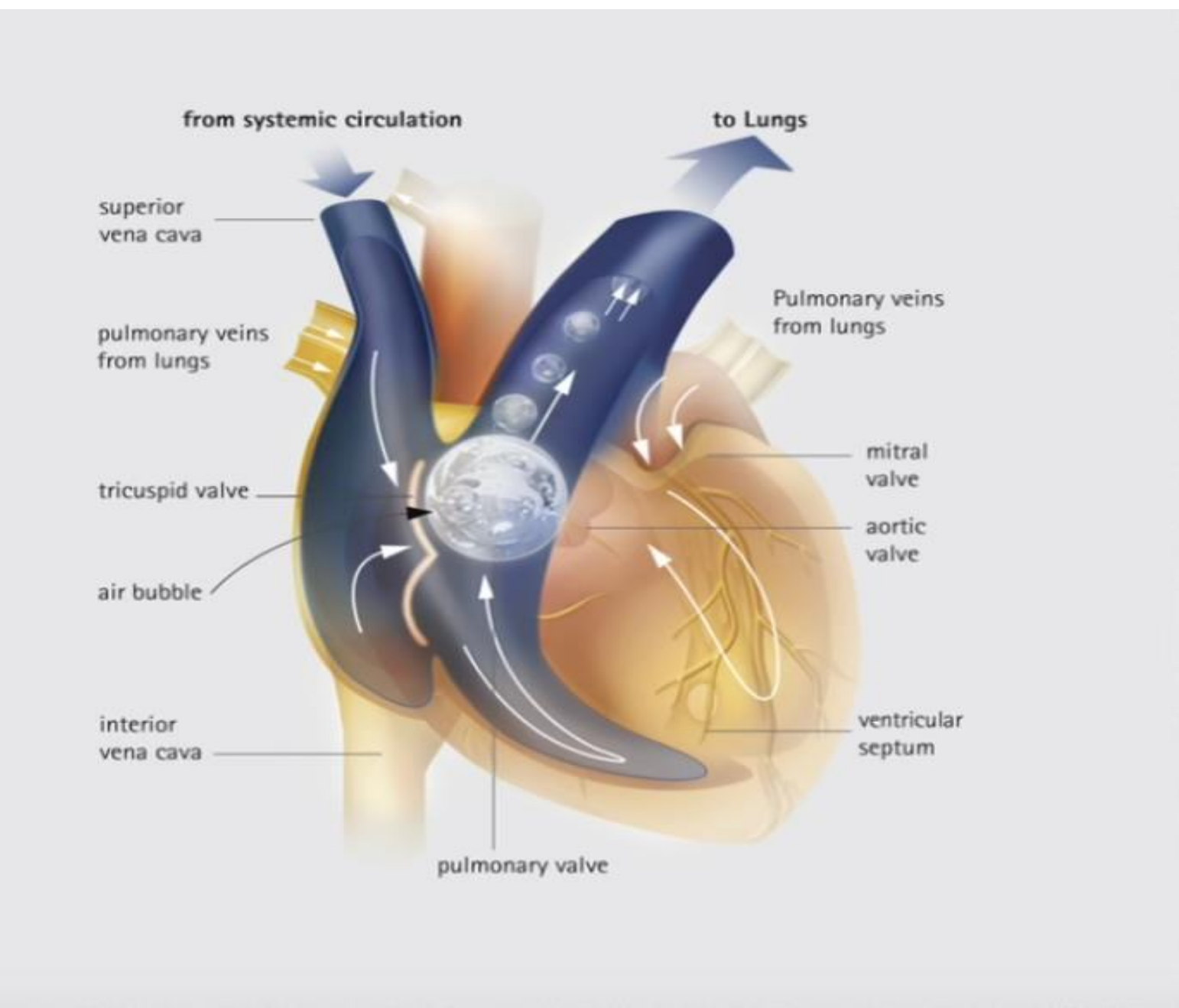


Figure 1. Representation of Venous Air Embolism in the Right Ventricle of the heart obstructing the Right Ventricular Outflow Tract

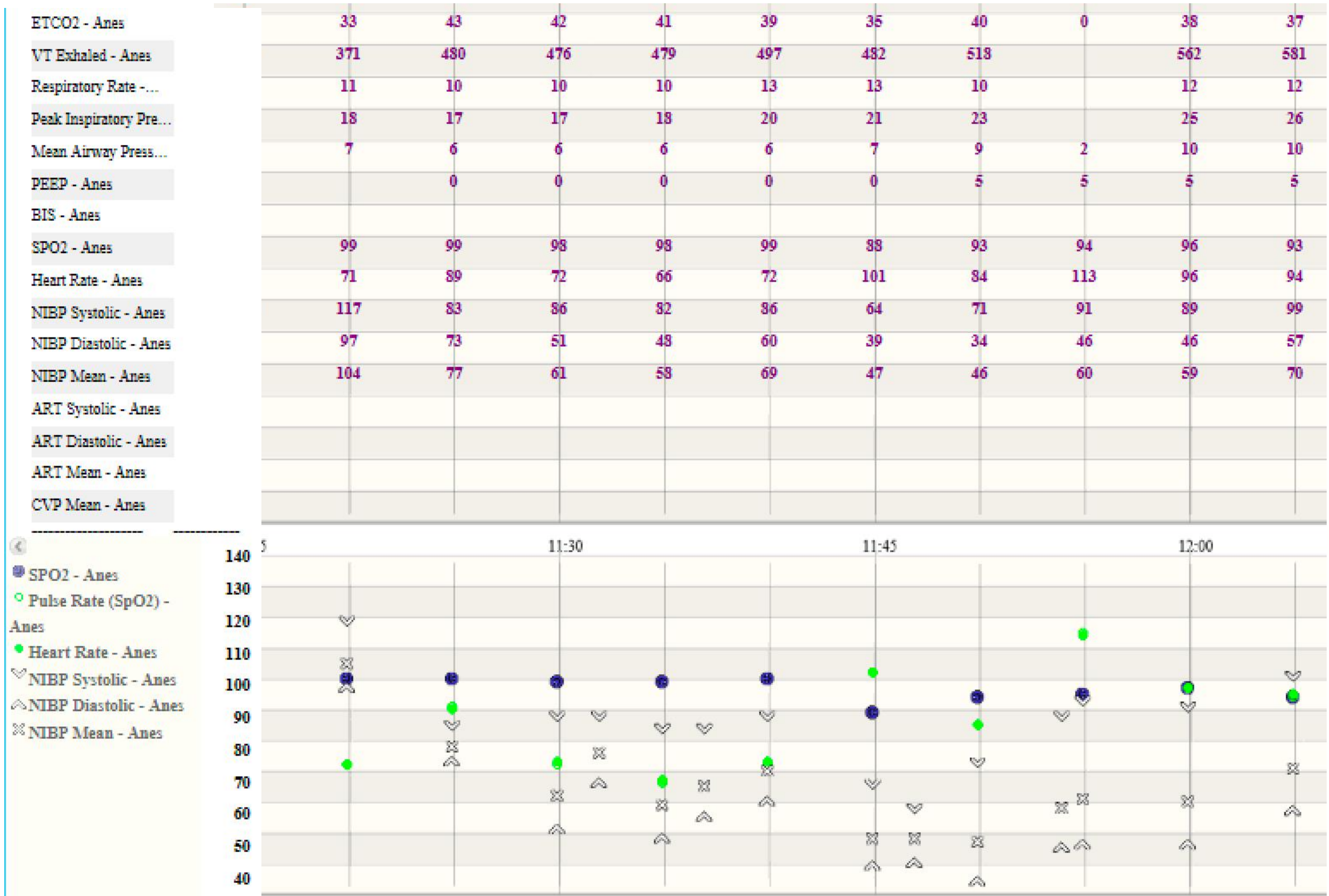


Fig 2. Anesthesia Record of patient depicting drop in ETCO2 as well as BP and SPO2. Surgery Start Time 11:39

DISCUSSION

VAE occurs when air pressure exceeds venous pressure with vascular entry.

Clinically significant VAE is rare (<0.001%)(1), but subclinical cases under TEE vary from 6–100%(2,3).

Rapid ETCO₂ decline may mimic hypovolemia but persistence despite fluids should raise suspicion for VAE.

Positioning patient supine from reverse Trendelenburg would both improve venous return and potentially displace an air embolism from the Right Ventricular Outflow Tract. Difficult to conclude diagnosis from resolution of symptoms. TEE considered more definitive.

CONCLUSIONS

Rapid ETCO₂ decline during laparoscopy should prompt consideration of VAE when hypovolemia and equipment issues are excluded.

Use of TEE should be considered for diagnostic purposes in laparoscopic procedures with high suspicion for VAE.

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