

Mixed Venous Oxygen Saturation Measurements

Anesthetic Pearls: Anesthetic Management and Implications of MVO₂

I. What is mixed venous oxygen saturation?

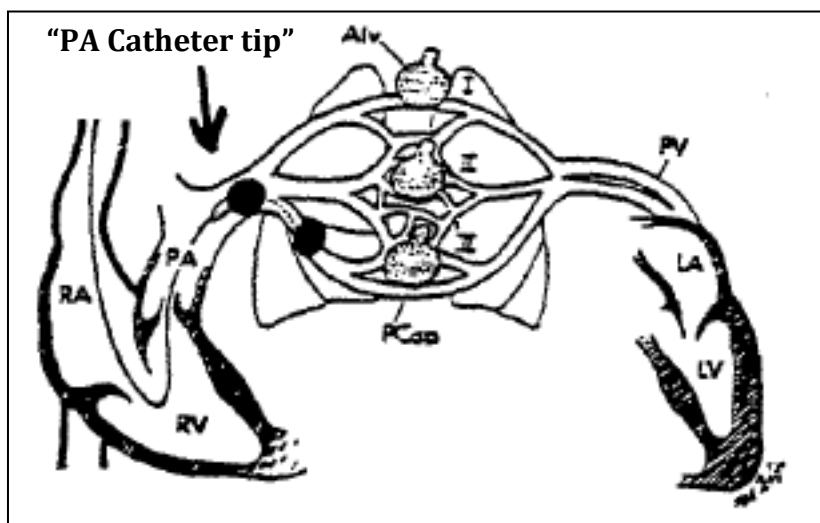
Mixed venous oxygen saturation (SVO₂), is a measurement of the oxygen saturation (by a blood gas machine) of a specimen of venous blood obtained from the pulmonary artery. A single sample may be obtained from the tip of the pulmonary artery catheter. There are also oximetric pulmonary artery catheters (oximetric Swan-Ganz cath) that sit in the pulmonary artery and using technology like the pulse oximeter to provide a continuous measurement of SVO₂.

II. What is SVO₂ a measure of?

SVO₂ is a measure of global (body) oxygenation. The blood that comes back to the pulmonary artery, just before the alveolus, is desaturated. The more oxygen the body and organs require, the more oxygen it extracts from the perfused arterial blood (hemoglobin). Normal SVO₂ is about 68-77%

III. Where is a SVO₂ sample obtained?

It is measured in the pulmonary artery. Sample is taken from the pulmonary artery via the distal lumen (tip) of a pulmonary artery catheter and a blood gas is performed on the specimen.



IV. What factors affect SVO₂?

$$SVO_2 = SaO_2 - [VO_2 / (CO \times Hgb)]$$

-Cardiac Output (CO)

-Hemoglobin (Hgb)

-VO₂ (oxygen usage by body metabolism)

-SaO₂ (arterial oxygen saturation)

-CaO₂ (arterial content of oxygen) = (1.38 x Hb x SaO₂) + (.003 x PaO₂)

V. Summary of Factors/Clinical Scenarios Affecting SV02

Increased SVO₂

Low VO₂----- cyanide, carbon monoxide, sepsis, hypothermia

High CO----- sepsis, L to R shunts, AV fistulas, liver disease

Decreased SV02

Decreased Hb----- bleeding, hemolysis

Increased VO₂----- fever, shivering, exercise

Decreased SaO₂----- hypoxia, RDS

Low CO----- MI, CHF, hypovolemia

- **Important:** A decrease in SVO₂ may be the result of decreased cardiac output if all other factors are stable (Hb, oxygen use by the body, arterial oxygen content of blood and oxygen saturation).