

Jugular Venous Oxygen Saturation (SjvO2)

Measured continuously with a special fiberoptic catheter. Normal SjvO2: $\geq 60\%$. Desaturations to $< 50\%$ suggest ischemia. Multiple desaturations ($< 50\%$) or sustained (≥ 10 minutes) or profound desaturation episodes are associated with poor outcomes ^{1) 2)}

Similar to measuring Mixed Venous Oxygen Saturation (SjvO2), Jugular Venous Oxygen Saturation (SjvO2) is a measurement of the amount of oxygen in the venous blood taken from a catheter inserted into the [jugular venous bulb](#).

The SjvO2 reflects the amount of oxygen left over after the brain has used what it needs.

SjvO2 is the percentage of oxygen bound to hemoglobin (oxygen saturation). Normal is 55-75%.

If the SjvO2 falls below 55-75%, it suggests that the blood flow to the brain is not enough to meet the brain's oxygen requirements, causing the brain to EXTRACT a greater percentage of oxygen from the blood. A rise in SjvO2 can also be important. If the brain injury becomes so severe that the brain is unable to extract oxygen, the SjvO2 will rise. In brain death, when the brain is no longer capable of extracting any oxygen, the SjvO2 will equal the SaO2. How do I use this information clinically? When a patient has raised intracranial pressure (ICP), the goal of therapy is geared to decreasing the volume inside the cranial compartment. If the volume is reduced, the pressure is lowered. In order to perfuse the brain, an adequate Cerebral Perfusion Pressure (CPP) must be maintained. $CPP = \text{Mean Arterial BP} - \text{ICP}$ The three components inside the cranial compartment that make up most of the volume include: 1) tissue (80%) 2) CSF (5-10%) 3) blood (5-10%). Interventions that lower the tissue, CSF or blood volume are often introduced in an effort to lower ICP. If BP remains constant, a lowered ICP should improve cerebral perfusion. If the brain is being perfused adequately, the SjvO2 should remain within the normal range. If the SjvO2 falls, it suggests that the Cerebral Blood Flow is inadequate. Interventions to reduce ICP or to increase the systemic blood pressure should be considered. The SjvO2 can be used to evaluate whether the intervention helped (the SjvO2 returned to normal) or worsened the patient condition (the SjvO2 fell even lower). A rise in SjvO2 above normal can be a grave finding. It suggests that the brain is unable to extract. In brain death, the SaO2 becomes equal to the SjvO2. Limitation One limitation of SjvO2 monitoring is that it may only reflect the ability to extract oxygen from one side of the brain. The trend is an important consideration. What type of catheter is used? A double or triple lumen catheter can be used for monitoring SjvO2. It should be connected to a pressurized system to maintain patency. Sampling Draw SjvO2 from the distal catheter port. Use a heparinized syringe, and send the sample to the lab for analysis like any other blood gas sample. Flush catheter slowly and gently after blood drawing to prevent retrograde flow towards the head.

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Cruz J. On-Line Monitoring of Global Cerebral Hypoxia in Acute Brain Injury. Relationship to Intracranial Hypertension. J Neurosurg. 1993; 79: 228-233

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Sheinberg M, Kanter MJ, Robertson CS, et al. Continuous Monitoring of Jugular Venous Oxygen Saturation in Head-Injured Patients. J Neurosurg. 1992; 76:212-217

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