Sodium Nitroprusside (Nitropress)

Sodium nitroprusside (Nitropress) is used to treat hypertensive emergencies because of its profound effects, leading to venous and arterial dilation. This medication should be used cautiously, as it can lead to cyanide and thiocyanate poisoning and a severe drop in blood pressure. Thus, patients should have continuous blood pressure monitoring during IV drug infusion. The drug should be placed in light-shielding containers, and use the lowest effective infusion rate for the shortest necessary duration, often less than 2 to 3 days, due to the toxicity profile.



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Mechanism

Venous and Arterial Dilation
Vines and Artery-archer Dyed-dilation
Sodium nitroprusside breaks down in the blood to release nitric oxide, leading to vascular smooth muscle relaxation and blood vessel dilation. It causes both venous and arterial dilation, lowering blood pressure with venodilation decreasing preload and arteriolar dilation decreasing systemic vascular resistance and afterload. This short-acting vasodilator has a rapid onset of about 2 minutes and its hypotensive effects can be seen for roughly 10 minutes.

Indications

Hypertensive Crisis
Hiker-BP Crying
This drug is infused intravenously in cases of acute hypertensive emergencies or in cases of malignant hypertension. Nitroprusside's rapid acting properties make it especially useful in emergent hypertensive situations requiring immediate intervention.

Side Effects

Cyanide Toxicity
Sai with Toxic-green-glow
The most serious potential side effect of sodium nitroprusside is cyanide poisoning. The conversion of sodium nitroprusside to nitric oxide produces cyanide as a byproduct which is normally buffered and converted to thiocyanate. The liver can metabolize cyanide in small amounts, but its metabolic capacity can be overwhelmed by high infusion rates or prolonged use, leading to cyanide poisoning. This drug should be used cautiously in those with liver disease and hepatic dysfunction. Manifestations may include metabolic acidosis, hypoxemia, bradycardia, altered mental status, and convulsions.

Thiocyanate Toxicity
Thigh-O-sia with Toxic-green-glow
Thiocyanate toxicity can also occur with sodium nitroprusside administration because thiocyanate is produced during cyanide metabolism. It has a slower onset than cyanide toxicity and may accumulate during prolonged or high cumulative dosing, particularly in patients with renal impairment. Manifestations of thiocyanate toxicity may include tinnitus, abdominal pain, weakness, and altered mental status. If unrecognized, it may progress to seizure, lethargy, and possibly coma.

Hypotension
Hippo-BP
Due to the potent decrease in total peripheral resistance, this drug can lead to the side effect of severe hypotension. Because of this rapid and profound decrease in blood pressure, patients need continuous blood pressure monitoring for hypotension.

Considerations

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Short Term Administration

Nurse-in-Shorts Administering

Due to the risk of cyanide and thiocyanate toxicity, sodium nitroprusside should be administered at the lowest effective infusion rate for the shortest necessary duration. At the maximum infusion rate of 10 mcg/kg/min for no more than 10 minutes at a time, cyanide-buffering capacity may be exceeded in less than one hour.

Light Sensitive, Use Container

Container

Sodium nitroprusside is light sensitive and should be protected from light according to the product's instructions. A faint brown or red-brown color may be normal; discard solutions that are blue, green, bright red, markedly discolored, or contain visible particles.

Continuous BP Monitoring

Infinity BP and Montior

Patients may need an arterial line, or a monitoring device to check their blood pressure while sodium nitroprusside is infusing. Because of the hypotensive effects, patients need continuous blood pressure monitoring.

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