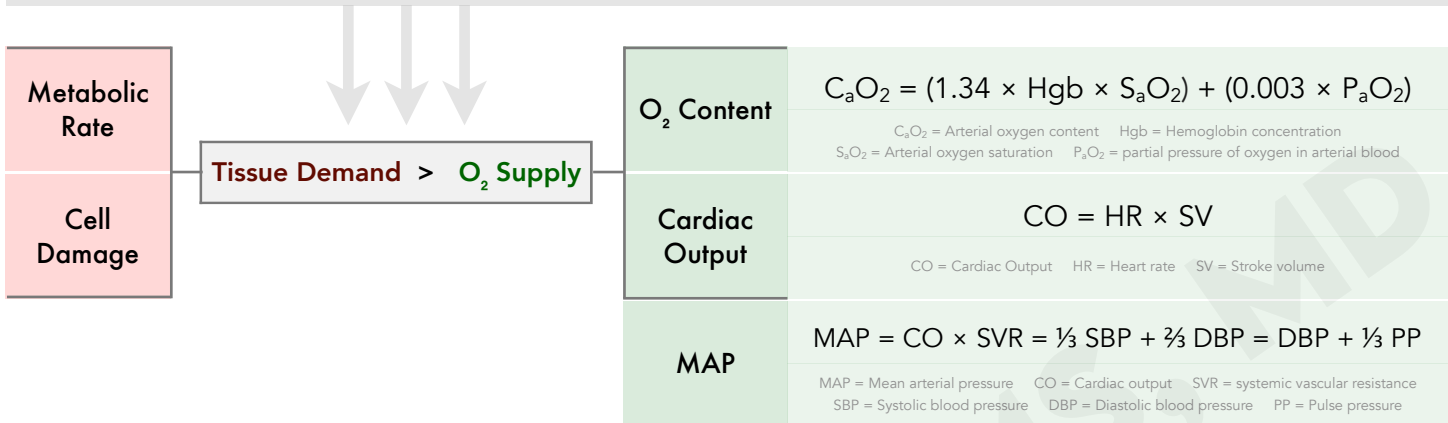


SHOCK

A state of **tissue hypoxia** due to decreased/dysregulated oxygen delivery and/or extraction

Initially reversible, but rapidly progresses: cell death → end-organ dysfunction → multi-organ failure → death

Shock can develop in the setting of **increased tissue demand, decreased oxygen supply, or both**



Clinical Manifestations

- Neuro:** Altered mental status
- CVS:** Hypotension (SBP <90 mmHg or ↓SBP >40 mmHg)
- Renal:** Metabolic acidosis (↑ lactate), Oliguria (<0.5 cc/kg/hr for 12 hours or <0.3 cc/kg/hr for 24 hours)
- Ext:** Cool/Clammy vs. Warm/Flushed

Management Considerations

- Resp:** Intubate if needed, but have pressors available as intubation can worsen hypotension. SpO₂ often unreliable due to peripheral vasoconstriction; may require frequent ABGs
- ID:** If septic shock is on differential → blood cultures & start broad spectrum antibiotics within 1 hour
- CVS:** Titrate to MAP >65 mmHg; If cardiogenic titrate to MAP >60 mmHg
- Fluids:** Give as boluses (not infusion) for quick response; If sepsis, give 30 mL/kg within first 3 hours; Approximation of fluid responsiveness: improvement in BP, ↑ Urine output, ↓ Lactate

	Distributive	Hypovolemic	Cardiogenic	Obstructive
Pathophys	↓ SVR, Altered O ₂ extraction <i>[except neurogenic]</i>		↓ CO → Inadequate O ₂ delivery	
Extremities	Warm & Dry	Cold & Dry	Cold & Wet	Cold & Dry
CVP/PCWP	↓	↓	↑	↓ or ↑
CO or CVO₂	↑ or Normal	↓	↓↓	↓
S_vO₂	↓ <i>[early septic, neurogenic]</i> ↑ <i>[late septic]</i>	↓	↓	↓ or Normal
SVR	↓↓	↑	↑	↑
Examples	<ul style="list-style-type: none"> •Inflammatory: Infectious (sepsis), Non-infectious (pancreatitis, post-arrest) •Reactionary: Anaphylaxis, Toxins/Meds •Other: Adrenal insufficiency (AI), Thyroid disease, Liver failure, Neurogenic/spinal 	<ul style="list-style-type: none"> •Hemorrhagic: GI, Retroperitoneal, Postpartum, Trauma, Hemothorax •Hypovolemic: Vomiting/diarrhea, Over-diuresis/Dialysis, Burns, Drains, Open wound/abdomen 	<ul style="list-style-type: none"> • Myocardial infarction (MI) • Heart failure (HF) • Severe valve disease • Myocarditis • Arrhythmias 	<ul style="list-style-type: none"> • Pulmonary embolus (PE) • Tension pneumothorax • Cardiac tamponade
Management	<ul style="list-style-type: none"> •All causes: IVF, Vasopressors •Sepsis: Antibiotics, Source control •Adrenal: Steroids (hydrocortisone ± fludricortisone) •Anaphylaxis: Epinephrine 0.3-0.5mg IM q5-10min •Toxins: Reversal agents, Dialysis 	<ul style="list-style-type: none"> •Ensure adequate access: ≥ 2 large bore IVs •Most cases: Crystalloid fluid •Hemorrhagic: Transfuse, Control bleed (IR/Surgery) •Cirrhotic (HRS): Albumin, Octreotide, Midodrine 	<ul style="list-style-type: none"> • Diuresis • Vasopressors • Inotropes 	<ul style="list-style-type: none"> •PE: Heparin/Fibrinolytics/Thrombectomy •PTX: Chest tube vs. Needle decompression •Tamponade: Pericardiocentesis