Primary Injury

Abdominal incisions

Direct Injury

Organ removal

Bowel manipulation

Tissue dissection

Blood loss

↓ Hgb to transport O_2

Indirect Injury

↓ O_2 to transport

Deranged tissue perfusion

Compression from retractors

Clamping / dividing blood vessels

Difficulty ventilating

Pneumoperitoneum

↓ venous return + ↑ ♡ afterload

Anesthesia (general and regional)

↓ vasomotor tone → ↓ SVR

+

Vasopressors used to treat resultant hypotension → vasoconstriction of all blood vessels

Pain

Opioids

Activation of afferent noxious neurosignaling

Release of IL-1, IL-6, IL-8, TNF-α, CRP, COX-2 Prostaglandins

Secondary Injury

Gut dysmotility

Leukocyte infiltration of intestinal muscularis layer (even non-manipulated segments)

Bowel wall edema

Fasting

Excess IVF

Catabolism

↓ Cell function + healing

Insulin resistance → ↓ glucose brought into cells

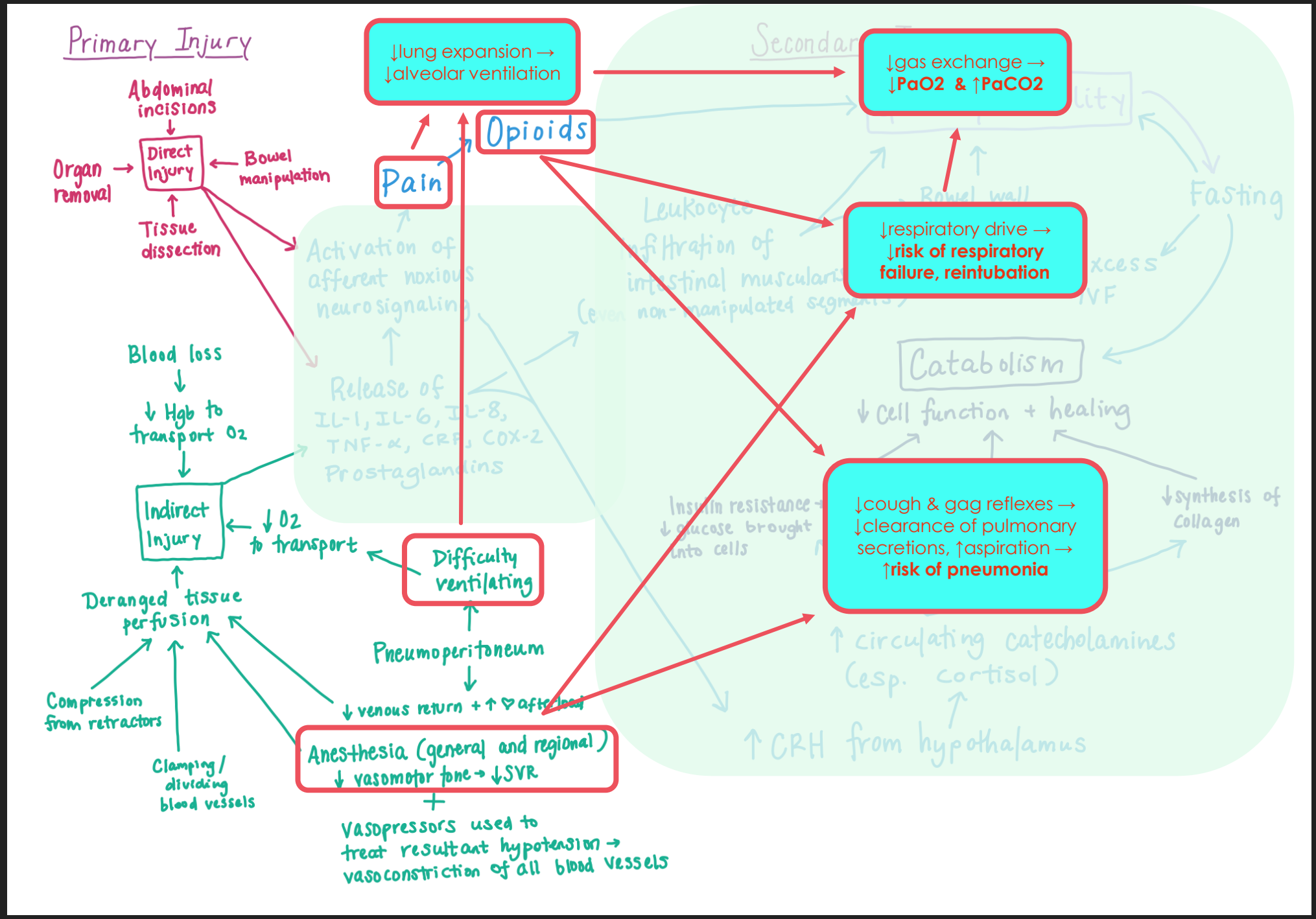
↑ proteolysis to fuel gluconeogenesis

↓ synthesis of collagen

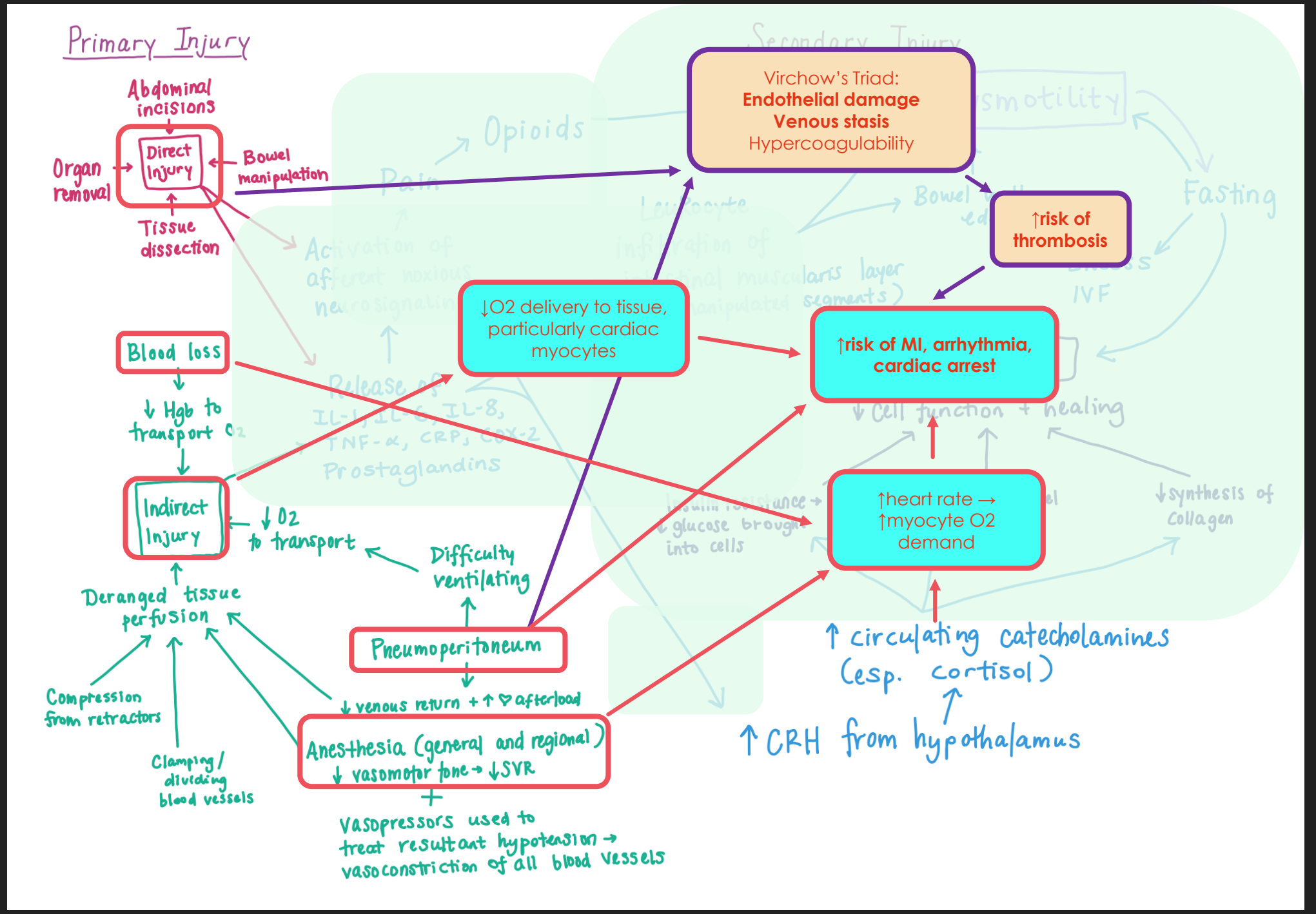
↑ circulating catecholamines (esp. cortisol)

↑ CRH from hypothalamus

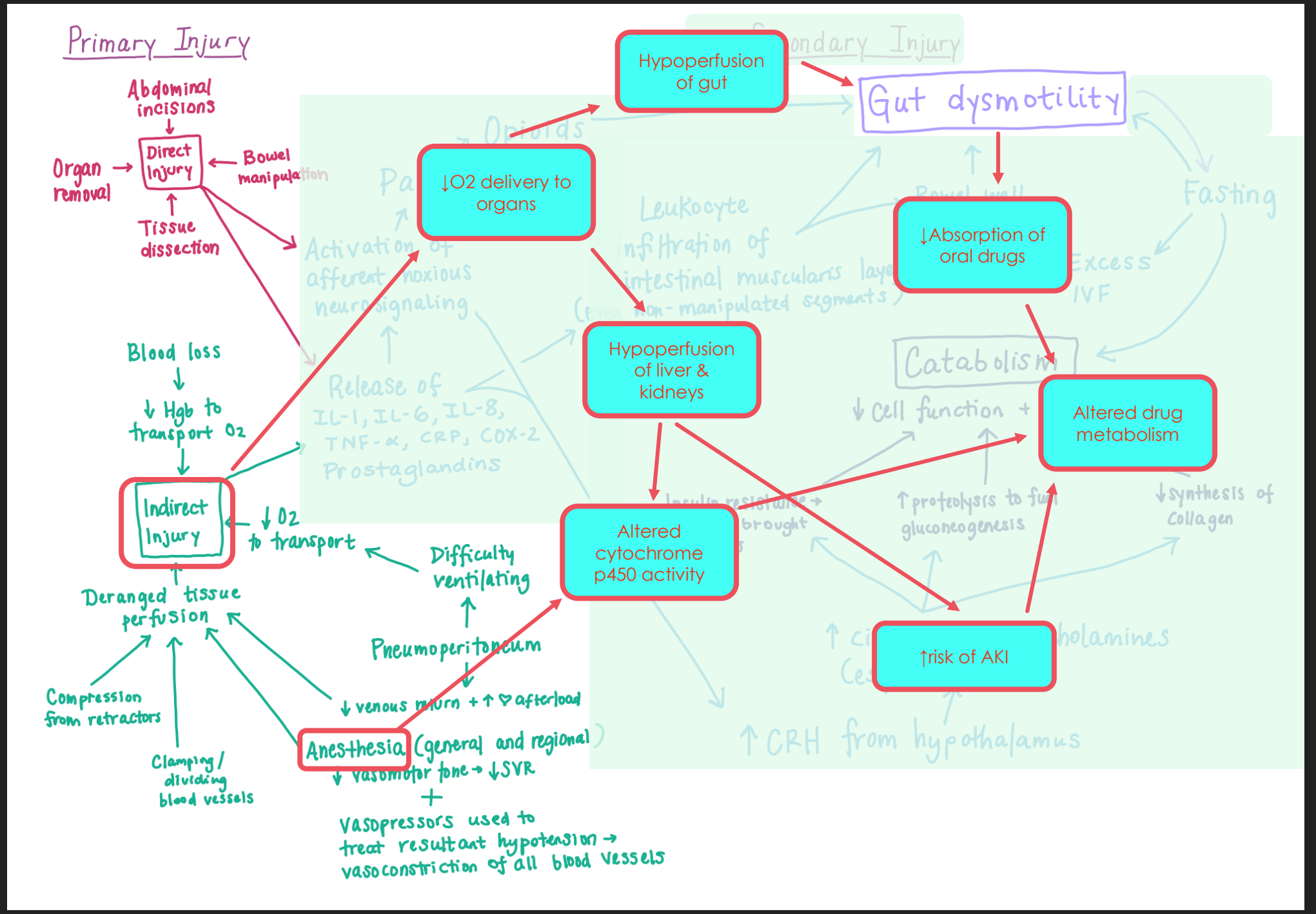
PULMONARY COMPLICATIONS



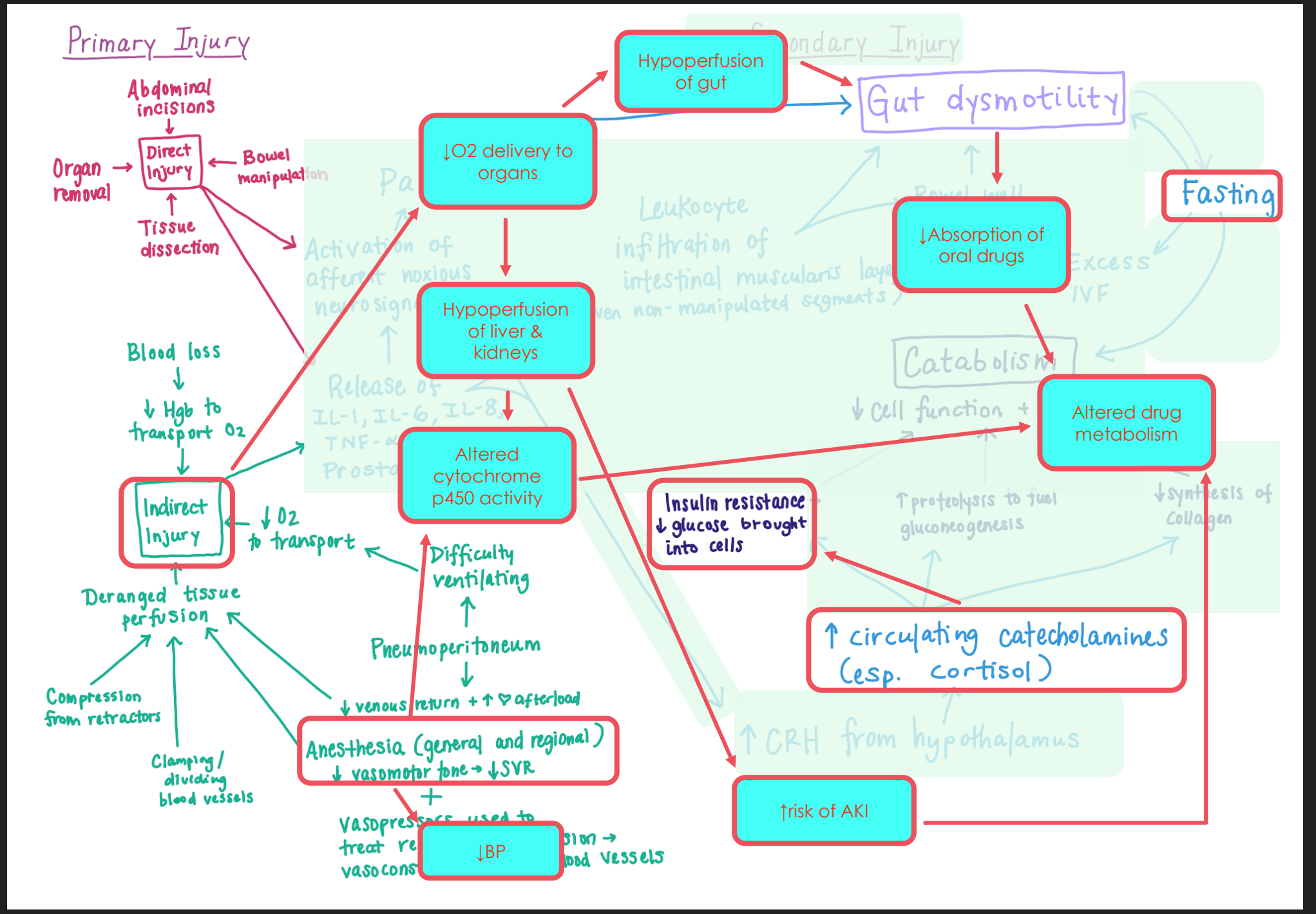
CARDIOVASCULAR COMPLICATIONS



OTHER VISCERAL COMPLICATIONS



EFFECTS ON MEDICATIONS



HYPERTENSION

Blood pressure medications:

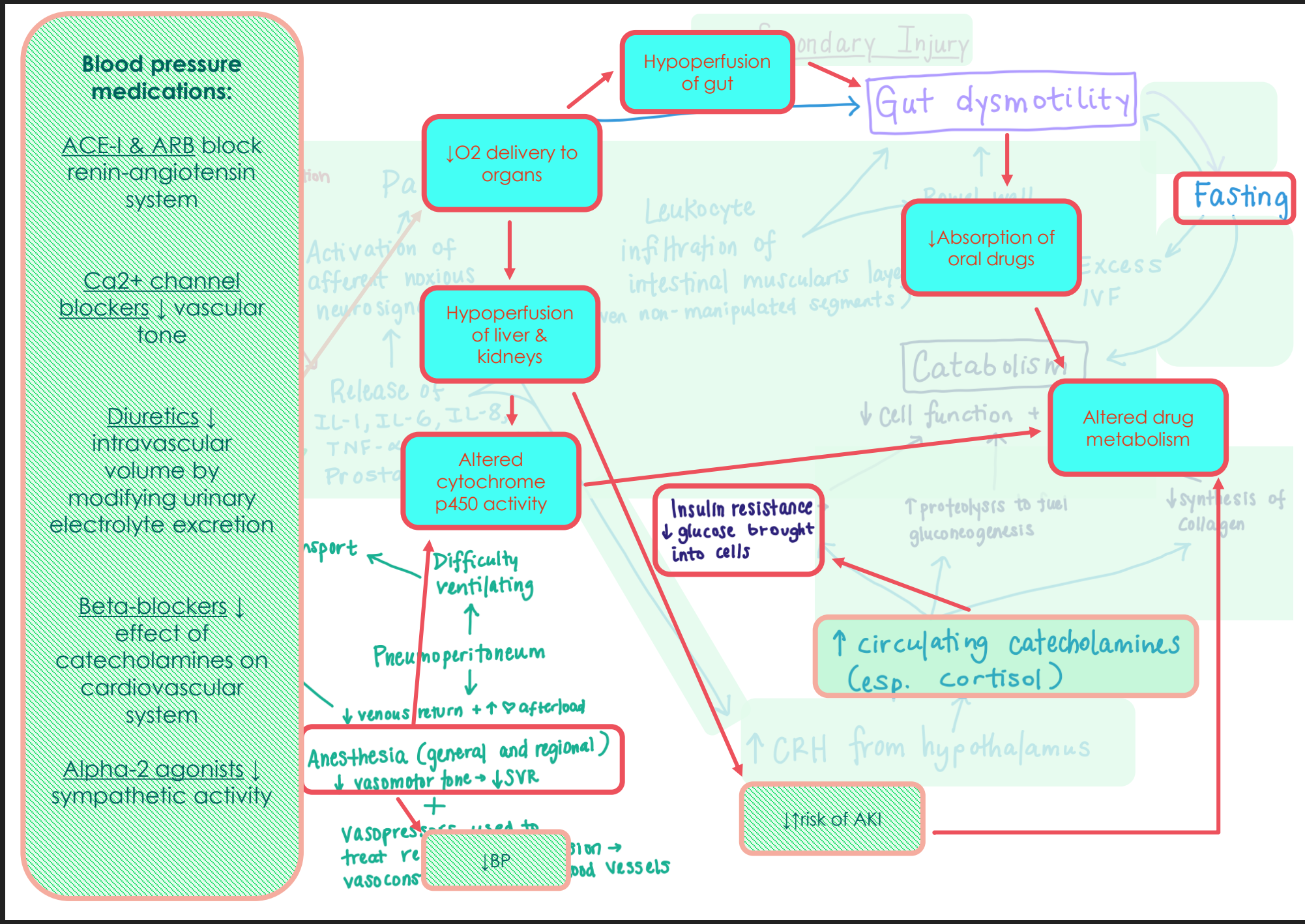
ACE-I & ARB block renin-angiotensin system

Ca2+ channel blockers ↓ vascular tone

Diuretics ↓ intravascular volume by modifying urinary electrolyte excretion

Beta-blockers ↓ effect of catecholamines on cardiovascular system

Alpha-2 agonists ↓ sympathetic activity



HYPERTENSION

BP <180/110 mmHg not independent risk factor for perioperative complications

No benefit to holding surgery if BP >180/110 mmHg as long as treated with IV antihypertensives

Blood pressure medications:

ACE-I & ARB block renin-angiotensin system

Ca2+ channel blockers ↓vascular tone

Diuretics ↓intravascular volume by modifying urinary electrolyte excretion

Beta-blockers ↓effect of catecholamines on cardiovascular system

Alpha-2 agonists ↓sympathetic activity

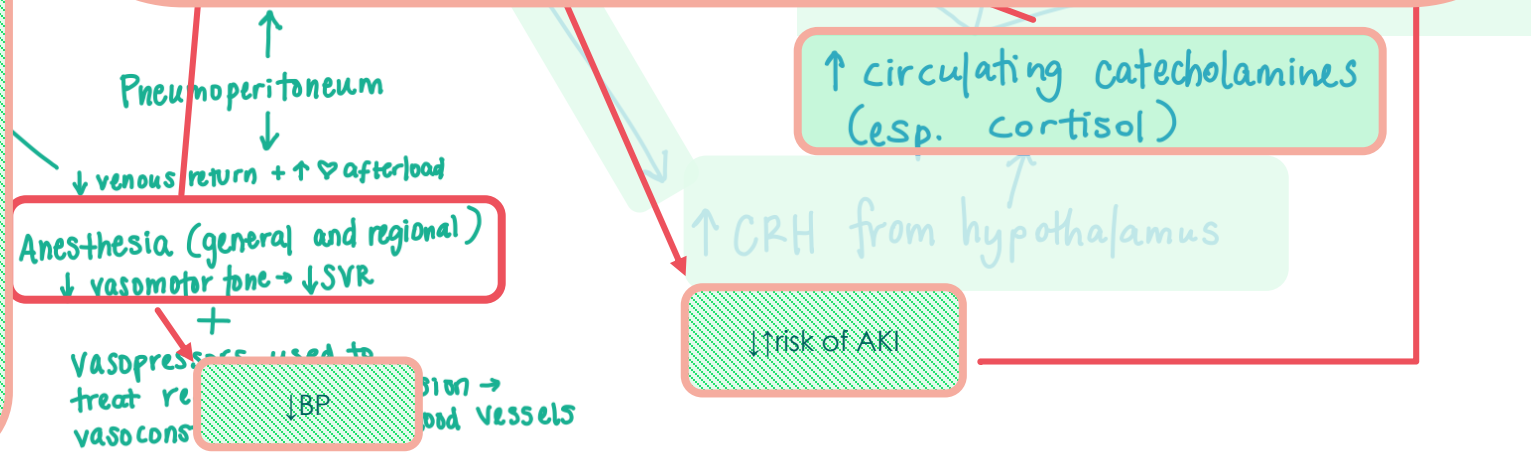
Blood pressure medications:

ACE-I, ARB, Ca2+ channel blockers, diuretics → +/- hold DOS, resume POD#1

Resume ARB by 48 hours if at all possible

Beta-blockers & alpha-2 agonists → continue

* IV if can't take po*



DIABETES

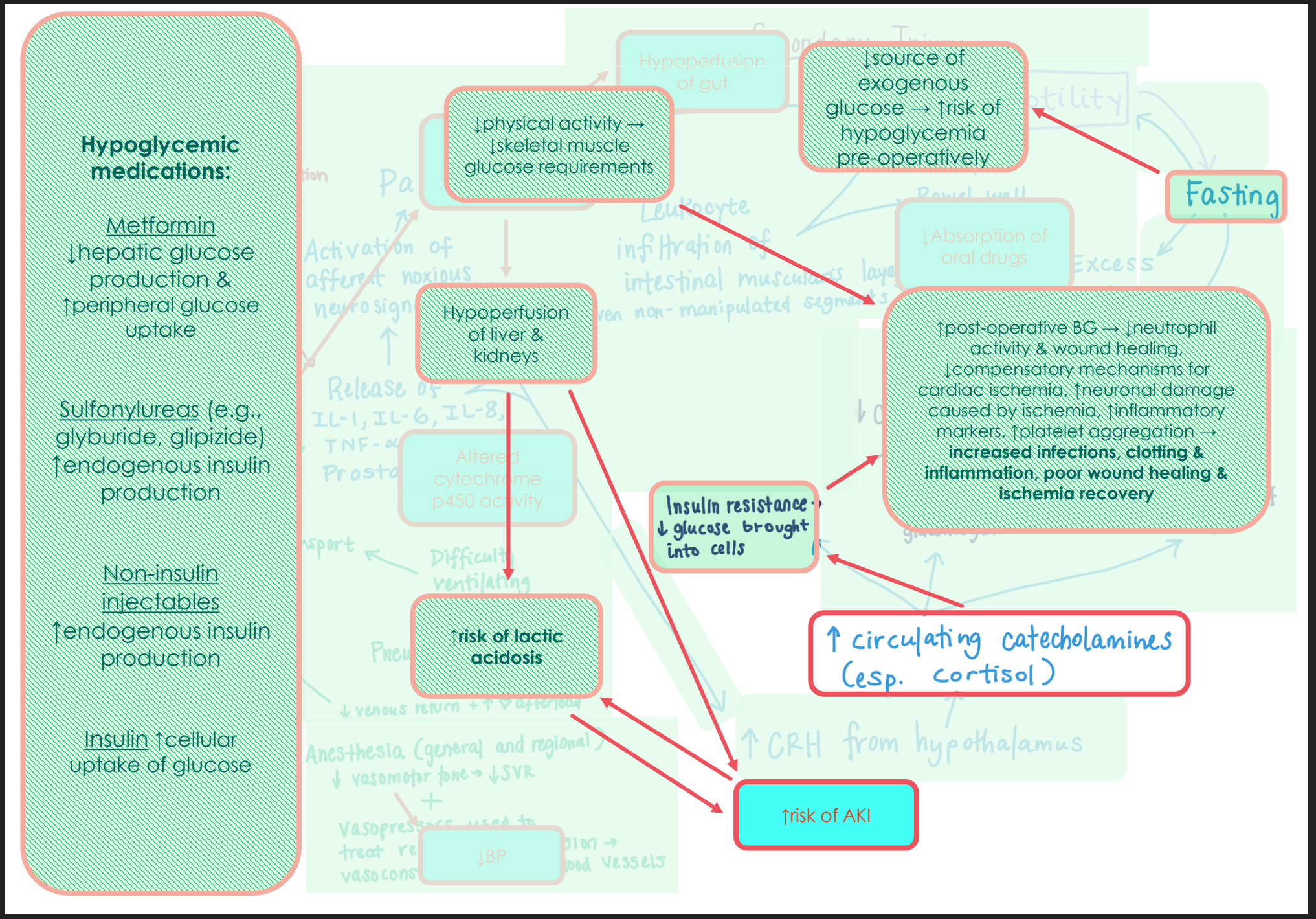
Hypoglycemic medications:

Metformin
↓hepatic glucose production & ↑peripheral glucose uptake

Sulfonylureas (e.g., glyburide, glipizide)
↑endogenous insulin production

Non-insulin injectables
↑endogenous insulin production

Insulin ↑cellular uptake of glucose



DIABETES

ADA guidelines for critical care patients:

pre-prandial BG <140

random BG <180

Hypoglycemic medications:

Metformin
↓hepatic glucose production & ↑peripheral glucose production

Sulfonylureas (e.g., glyburide, glipizide)
↑endogenous insulin production

Non-insulin injectables
↑endogenous insulin production

Insulin ↑cellular uptake of glucose

Hypoglycemic medications:

Metformin → hold DOS, resume when renal function normalizes

Other non-insulins → hold DOS, resume with normal po intake

Use SSI until normal po intake, but need to consider basal insulin to avoid fluctuations

(0.3 - 0.6units/kg/day total insulin → half as long-acting)

Insulin → general rule: half of long-acting & hold short-acting DOS, basal + SSI until normal po intake, then add nutritional

What about all of the other medications?

Statins ↓ perioperative vascular events

↓

Continue

Herbal supplements: ↑bleeding risk, ↑risk MI/stroke, ↓effect of other drugs

↓

Hold 5-7 days

QT-prolonging meds ↑risk of arrhythmia when coupled with anesthesia / nausea meds

↓

Use with caution

Low-dose ASA not associated with bleeding risk in GYN surgery + discontinuation associated with ↑risk of perioperative cardiac events

↓

Continue low-dose ASA, especially if above-average CV risk

Most NSAIDs ↑risk of bleeding for 3 days

↓

Hold 3 days

SSRIs ↑risk of bleeding but have withdrawal symptoms

↓

Usually continue

Theophylline (used for COPD) ↑risk of arrhythmia & metabolism is deranged by anesthesia meds

↓

Hold 24 hours