

Blood Chem Other Metabolic Patterns Review

GOUT

- Type of inflammatory arthritis caused by elevated levels of uric acid in the blood, forming crystal deposits in the joints, tendons, and surrounding tissue.
 - Typically affects the feet, specifically the big toe joint.
 - Causes severe pain and swelling.
- Uric acid is a byproduct of purine metabolism.
- Purines are higher in many Paleo friendly foods, such as red meat, turkey, organ meats, and certain types of fish and seafood. Patients with gout are often advised to reduce or eliminate these purine-rich foods with the goal of preventing excess uric acid production and thereby reducing the symptoms of gout.
- Purine intake alone is not enough to trigger these attacks.
- Systemic inflammation is likely also a key factor affecting the likelihood of developing gout flares.
 - Western diet is high in pro-inflammatory compounds such as sugar, refined grains, industrial seed oils, and other processed foods.
- Studies have shown that purine restriction doesn't improve gout.
- Studies have also shown that consumption of both dietary purines and protein increases the excretion of uric acid.

OTHER RISK FACTORS FOR GOUT

- Excess fructose intake
- Insulin resistance
 - Elevated insulin levels reduce the excretion of uric acid, and gout patients often have diabetes, vascular disease, and poor glucose tolerance.
- Dehydration
- Vitamin C deficiency
- Increased alcohol intake
- Iron overload

TREATMENT OF GOUT PRIMARILY INVOLVES REDUCING INFLAMMATION.

1. Start with a Paleo template diet with plenty of antioxidant-rich fruits and vegetables, avoiding excess liquid fructose and industrial seed oils.

2. Address any underlying pathologies that can promote inflammation.
3. Consider high-dose vitamin C, which is nontoxic, cheap, and has little downside.
4. Abstain from alcohol, especially during a gout attack.
5. Blood donation, even in people with borderline high iron levels, may help.
6. Make sure the patient is adequately hydrated.
 - a. It is difficult to estimate the exact amount of water needed for each individual, so thirst should be used as a general guideline for most people.
 - b. Especially encourage the following individuals to stay hydrated.
 - i. Those who engage in strenuous physical activity
 1. Consider adding electrolytes to their water
 2. Options include bone broth, coconut water, fermented pickle or sauerkraut juice.
 3. Sodium should be added to water for persons doing moderate exercise lasting longer than two hours.
 - ii. People with frequent diarrhea
 - iii. People with health conditions that affect their thirst, such as diabetes or kidney disease.

MARKERS TO CONSIDER FOR DEHYDRATION

Marker	Level
BUN	High
Carbon dioxide	High
RBC	High
HGB	High
HCT	High
Sodium	High
Potassium	Low

These markers may not be out of the lab range but only out of the functional range.

MUSCLE MASS

Decreased muscle mass can happen in cases of physical inactivity, aging, sarcopenia, fasting, malnutrition, IBD, and some chronic disease states such as diabetes, Cushing’s syndrome, and renal or cardiac failure.

MARKERS TO CONSIDER FOR DECREASED MUSCLE MASS

Marker	Level
Creatinine	Low
Total protein	Low
Albumin	Low
Albumin-to-globulin ratio	Low

Increased muscle mass can occur in some patients who do CrossFit or intense exercise.

MARKERS TO CONSIDER FOR INCREASED MUSCLE MASS

Marker	Level
Creatinine	High
BUN	High

RHABDOMYOLYSIS

- Involves a rapid breakdown of skeletal muscle tissue.
- May see elevated LDH, AST, ALT, and potassium as well as low serum calcium.
- Primary diagnostic marker is creatine kinase, which may be five times above the normal upper limit.
- Possible symptoms include muscle pain, tenderness, weakness, swelling of the affected muscles, and tea-colored (brownish) urine, caused by the myoglobin in urine.
- Uncommon but documented side effect of statin drugs.
- Refer to a nephrologist immediately, as this can cause irreversible kidney damage.

RHABDOMYOLYSIS MARKERS

Marker	Level
Creatine kinase (CK)	5x + higher than upper limit
LDH	High
ALT	High
AST	High
Potassium	High
Calcium	Low