Nutrient/Drug Interactions in Autoimmune Disorders

Fern Leaf, NE

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Autoimmune Disorders

- Multiple Sclerosis (MS)
- Systemic Lupus Erythematosus (Lupus)
- Rheumatoid Arthritis (RA)

Autoimmune Disorders

- Multiple Sclerosis (MS)
  - Muscle weakness, difficulty walking
  - Loss of coordination or balance
  - Numbness, “pins and needles,” etc
  - Visual disturbances, blurred or double vision

Autoimmune Disorders

- Systemic Lupus Erythematosus (Lupus)
  - Blood disorder, hemolytic anemia, Leukopenia, Thrombocytopenia
  - Tissue inflammation across multiple organs, systems
    - CNS seizures
    - Skin rash
    - Heart endocarditis, myocarditis
    - Kidney glomerulonephritis
    - Lungs Pleuritis, pericarditis
    - Joints-Lupus arthritis

Autoimmune Disorders

- Rheumatoid Arthritis (RA)
  - Pain, swelling, stiffness in joints
    - Hands, feet, wrist, elbows, ankles
    - Symmetrical onset
    - Over time the joints become deformed
    - Rheumatoid nodules
  - Fatigue
  - Appetite, weight loss
  - Fever

Autoimmune & Inflammation

- NSAIDs, aspirin
- Corticosteroids
  - Predizone, cortisone
- Anti-malarials (Placquenil)
- Sulfasalazine

- ↓ inflammation, pain
- Manage symptoms, slow progress
- Joint pain, skin rashes, mouth ulcers

Autoimmune Immunosuppression

When corticosteroids fail to mitigate symptoms stronger chemotherapy is often prescribed

- Methotrexate used to suppress immune response in RA
- Azathioprine and cyclosphosphamide in Lupus

How Does It Work? Prednisone

- Anti-inflammatory effect is due to its ability to inhibit the accumulation of white bloods cells at site
- Immunosuppressant effect is due to a reduced production of lymphocytes and antibodies

How Does It Work? Steroids

- Inhibits early and late stage inflammation
- Reduces vasodilation, which ↓ swelling and redness (*erythema*)
- Stops the formation of certain eicosanoids, including *prostaglandins*
- Stops histamine release

How Does It Work? Steroids

- Fibroblasts (collagen producer cells) are less active in presence of steroids, slowing tissue healing
- Osteoblast production is inhibited, thus long term use leads to thinning bones *(osteoporosis)*

Risk Factors
Prednisone

- Altered mood and personality
- Cataracts, glaucoma
- Hypertension
- **Osteoporosis**
- Aseptic bone necrosis
- **Increased susceptibility to infections**

Side Effects Prednisone

- Increased appetite, weight gain
- Salt and water retention
  - (↑ blood pressure)
- Potassium excretion
- Mood swings, mild euphoria

Adverse Effects (Mild) Prednisone

- Acne, excessive growth of facial hair
- Headache, dizziness
- Acid indigestion, abdominal distention
- Blue toe syndrome
- Muscle cramping and weakness
- Elevated intra-cranial pressure
- Allergic reaction: skin rash

Adverse Effects (Serious) Prednisone

- Extreme mental or emotional disturbance
- Reactivation of latent tuberculosis, diabetes
- Peptic ulcers (more likely with history)
- Pancreatic inflammation (rare)
- Growth retardation (long term use w/ children)
- Cushing's syndrome
- Plumonary embolism

Drug Nutrient Interaction Prednisone

- Decreases action of:
  - ↓ Insulin
  - ↓ Salicylates (aspirin etc)
  - ↓ Vaccines (i.e. flu) - blunts the immune response
- Increases effect of Prednisone:
  - Cyclosporine
  - Macrolide antibiotics (erythromycin etc)
  - Birth control pills

Nutrient Loss and Symptoms Prednisone

- Calcium
  - Osteoporosis, heart & blood pressure irregularities, tooth decay
- Vitamin D
  - Osteoporosis, muscle weakness, hearing loss
- Potassium
  - Irregular heartbeat, muscle weakness, fatigue, edema

Nutrient Loss and Symptoms Prednisone

- Magnesium
  - Cardiovascular problems, asthma, osteoporosis, cramps, PMS
- Zinc
  - Weak immunity, poor wound healing, sense of smell/taste and sexual dysfunction
- Vitamin C
  - ↓ immune system, easy bruising, poor wound healing

Nutrient Loss and Symptoms Prednisone

- Vitamin B_6
  - Depression, sleep disturbance, ↑ cardio. risk
- Vitamin B_{12}
  - Anemia, tiredness, weakness, ↑cardio. risk
- Folic Acid
  - Birth defects, cervical dysplasia, anemia, cardio. disease

Nutrient Loss and Symptoms Prednisone

- Selenium
  - ↓ immunity, reduced antioxidant protection
- Chromium
  - ↑ blood sugar, cholesterol and triglycerides, increasing risk of diabetes
- DHEA and Melatonin
  - Disruption of production likely

Herbal Interactions
Prednisone

- Licorice (*Glycyrrhiza glabra*)
  - apparently impairs the immunosuppressive actions of cortisone and
  - may prolong the time it takes cortisone to clear the liver
- Ephedra (Ephedrine)
  - May ↑ clearance rate, ↓ drug activity

Food and Other Interactions
Prednisone

- Can cause stomach upset, take after meals and before 9 AM
  - Avoid alcohol as it is also a stomach irritant
- Can cause protein wasting, high protein diet sometimes recommended
  - Lupus/Kidney complication suggests caution

Bibliography

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