Nutrition and Myositis

What we know

(and don't)

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Talk Outline

- Eating healthy in general
- Nutritional abnormalities in chronic disease
- Specific supplements and diets related to myositis

“It’s not rocket science”

- Eat healthy foods
- Eat moderate portion sizes
- Eat a varied diet
- Enjoy your meals
- Involve yourself in meal preparation

We are so much more than our myositis

- We are what we are thanks to our genes and our environment
- We do have control over some things
- We unfortunately can also get:
  - Diabetes
  - Heart disease
  - Cancer
  - Alzheimer’s

Anti-oxidants

- Decrease oxidative stress, especially in heart disease and cancer
- Water-soluble, e.g. vitamin C
- Fat-soluble, e.g. carotene, vitamin E, CoQ10
- Found in vegetables, fruits, beans, nuts, herbs and spices
- Supplements are not as effective as whole foods (? fiber, other compounds)

Anti-oxidants

- Foods richest in antioxidants:
  - Beans, like red, kidney and pinto
  - Artichoke hearts
  - Berries
  - Apples and plums
  - Green tea
  - Dark chocolate!!
- Balance!!
  - Over-eating of one type can result in mineral binding, e.g. calcium, zinc, iron
  - Oxalates (cocoa, spinach), phytates (legumes, whole grains), tannins (tea, beans, cabbage)

Eat Your Veggies (and Fruits)

- All vegetables provide good nutrients and fiber with some exceptions:
- Corn and white potatoes have a high-glycemic index
- Other veggies can nearly be eaten in unlimited quantities with a healthy preparation
- Fruit: “One is a serving; two or more is dessert”
- Juice: how many apples or oranges would you eat?

Carbohydrates: Our love-hate relationship

- Sugar really can be addictive; eliminating it causes decreased desire
- Learn to lower your glycemic load
- Avoid all processed foods
- “Fight the white”: Grains should be whole-grain, such as bulgur wheat, brown rice, quinoa
- No high-fructose corn syrup!!
- Avoid soda: sugary ones are worse, but diet ones still contain phosphoric acid

And then there are the fats…

- Our society has an imbalance of omega-6 and omega-3 fatty acids, also called PUFAs
- Major factor responsible for obesity epidemic
- Omega-3 = anti-inflammatory
- Omega-6 (in excess) = pro-inflammatory
- Early human diet was 1:1 of 6:3 PUFAs; now it is 10:1 -15:1 or higher

Fatty Acids: Omega-6

- Food sources: linoleic acid (LA)
  - Soy, safflower, corn, sunflower, grapeseed
  - May be more pro-inflammatory than helpful
- GLA (*gammalinolenic acid*)
  - May be anti-inflammatory and helpful for autoimmune disorders
  - Found in black currant, borage and evening primrose oils
  - Avoid doses of borage oil over 2 grams/day, unless free of pyrrolizidine alkaloids, which may damage the liver

Fatty Acids: Omega-3

- Alpha-linolenic acid (ALA): flaxseeds and walnuts richest sources as well as canola; ALA $\rightarrow$ EPA $\rightarrow$ DHA
- EPA and DHA: oily fish major sources as well as enriched eggs
- Supplements: fish oil has EPA and DHA; algal and fungal sources have DHA

Fatty Acids: Omega-3

- Can decrease production of inflammatory molecules, including TNF-alpha
- May increase the efficacy of anti-TNF-alpha therapy
- Eating oily (wild-caught) fish 1-3 times a week may be enough
- EPA 2-3 grams per day as supplement

What fats to eat?

- Cooking oils: olive (extra-virgin), walnut, flaxseed, coconut (medium chain saturated fat), expeller-pressed organic canola, sunflower or safflower
- Food sources: fish (salmon, sardines, herring), omega-3 fortified eggs, hemp, chia seeds and flaxseeds
- Nuts, especially walnuts, cashews, almonds
- And….a weed??

Purslane

- You probably have it in your yard
- More Ω-3 fatty acids (ALA□) than any other leafy plant
- Use as you would spinach
- Can be eaten raw, stir-fried, in soups

What fats not to eat?

- Simple: Avoid any partially hydrogenated fats
- Avoid corn, cottonseed, safflower, vegetable, and sunflower oils*
- Avoid fried foods: potential for *trans*-fats or toxic compounds with high heat

*unless expeller-pressed, organic

Anti-Inflammatory Diet

- Avoid processed foods: eat “whole foods”, the way nature intended it
- Avoid sugar, high-fructose corn syrup
- Eat lean protein, more fish and whole soy products, less animal protein

Anti-Inflammatory Diet

- Remember those vegetables
- Broth-based soups
- Green, white or oolong tea
- Chocolate! (at least 70% cocoa)
- Consider eating organically

Positive Effects of Anti-Inflammatory Diet

- In a 2007 study, Rose Mary Istre found those with myositis who followed an AID over 12 weeks had improved:
  - Ease of routine activities
  - Severity of depression
  - Grip, arm and leg strength measurements

Consider Eating Organic

- Unclear if pesticides, etc. are harmful for (or trigger??) autoimmune disease
- Organic foods are also non-genetically-modified (non-GMO)
- GMO foods can have animal genes inserted into fruit/vegetable genes

The “Dirty Dozen”: “Buy organic or not at all”

- Peaches
- Apples
- Bell peppers
- Celery
- Nectarines
- Strawberries
- Carrots
- (Lettuce)
- Cherries
- Kale
- Grapes
- Blueberries
- Spinach
- Potatoes
- Grapes (imported)

www.thedailygreen.com

The “Clean Fifteen”: Lowest in Pesticides

- Onions
- Avocados
- Sweet corn
- Pineapple
- Mango
- Asparagus
- Sweet peas
- Sweet potato
- Kiwi
- Cabbage
- Eggplant
- Papaya
- Watermelon
- Broccoli
- Tomatoes

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So remember…

- Eat the rainbow!
  - Include lots of foods - *<u>whole and fresh</u>* - that are red, orange, green, blue and yellow
- "Fight the white": Avoid…
  - White sugar (or too much of any kind, really)
  - White potatoes
  - White rice
  - White bread (or maybe all wheat bread….)

Curcumin

- Active ingredient in turmeric (think curry and mustard)
- Inhibits inflammation with interest in cancer, inflammatory disease and Alzheimer's
- 2007 study in mice: blunting of CK increase with exercise-induced muscle damage

  Davis J. Am J Physiol Integr Physiol 2007;292:R2168
- 2008 study in mice improvement with muscular dystrophy

  Pan Y. Mol Cells. 2008;25(4):531

Curcumin

- Seems to accumulate best in colon
- Holds promise for GI-related conditions
- Curcumin is very poorly absorbed
- Doses less than 4 grams per day were not detected in serum in human clinical studies
- New formulations, such as nanoparticles are being investigated to increase its availability

Curcumin

- Need to combine with piperines (black pepper extract) to improve absorption
- May increase bleeding in those taking drugs like coumadin
- Because of its inhibitory effect on COX-1 and COX-2, might increase risk of cardiac disease
- Have a good lipid profile as safeguard

Coenzyme Q10 (ubiquinone)

- Reduction in CoQ10 could cause abnormal mitochondrial dysfunction
- Statins lower CoQ10, but studies have not shown that supplements increase levels
- “The present evidence does not support [its] supplementation in statin-induced myopathy.”

  Schaars C and Stalenhoef, 2008 Current Opinion in Lipidology

The problem with CoQ10

- No great data for its use in myositis (IIM)
- As we age, CoQ10's absorption, biosynthesis and conversion to ubiquinol decreases
- Ubiquinol form is better absorbed and probably more effective
- Does it matter? (Serum vs. tissue levels)
- Interest in cardiac, neurologic and **periodontal** diseases
- 150 mg daily of ubiquinol used in studies
- Avoid if on coumadin

Boswellia

- May have positive effects on the immune system
- Clinical studies suggest efficacy in some autoimmune diseases including rheumatoid arthritis, Crohn's disease, ulcerative colitis and bronchial asthma

Vitamin D

- Clearly seems to have a role in *preventing* autoimmune disease (patients with DM/PM, RA, SLE, etc. found deficient)
- Its role in *treatment* less clear
- However, supplementation in statin-induced myositis patients reversed symptoms in 87% of the 150 patients studied

Glueck C. Current Med Res Opin 2011;27:1683

Vitamin D

- Important to support bone health, mental health and especially those avoiding the sun
- Blood levels above 30 considered adequate
- Treatment for deficiency: 2000 IU/day of vitamin D_3 or 50,000 IU/week of vitamin D_2
- Decreased by steroid use

Folate (folic acid or B9)

- A must for anyone taking methotrexate to decrease its side effects:
  - Decreased white blood cells, GI symptoms, hair loss, liver and lung toxicity
- One should also ensure adequate vitamin B_{12} intake since its deficiency can be masked by folate deficiency

Probiotics

- Observed increase in autoimmune disease with decrease in beneficial bacteria
- Autoimmunity associated with “leaky gut”, allowing antigens to enter and stimulate the immune system
- In many autoimmune conditions, improving intestinal inflammation improves symptoms

Probiotics

- Use of probiotics in mice: improvements or prevention of RA, MS and type-1 diabetes
- Improvement seen with **periodontitis**
- Dietary sources: yogurt, kefir or lassi with live cultures, aged cheese, fermented foods (brine-cured, non-vinegar pickles, sauerkraut, kimchi, miso)

Probiotics

- Bacterial supplements should have billions of cultures and include Bifidobacterium, lactobacilli (casei, rhamnosus)
- Caution in those immune-suppressed:
  - Bacterial infections may result; rare cases of sepsis reported in infants and adults with malignancy, cardiac (valve) disease, diabetes or advanced age
  - Rare fungal infections reported in those taking the probiotic yeast, Saccharomyces boulardii (Florastor)

Other supplements

- Vitamins C and E: no good data
- L-carnitine: no good data
- Glutamine:
  - Because it inhibits muscle wasting and preserves muscle protein, it may help myotonic muscular dystrophy
  - Can raise methotrexate levels; no good data on myositis

Supplements that may do more harm than good

- Spirulina (*S. platensis)* and blue-green algae (*Aphanizomenon flos-aquae)*
  - At least two patients with DM had a flare or onset of their disease after taking these
    - Lee A. *Arch Dermatol* 2004;140:723
    - Konno T. *Rinsho Shinkeigaku* 2011;51:330
- Echinacea (purple coneflower)
  - Has produced flares of lupus, including kidney-related complications
- Alfalfa
  - Has caused lupus-like symptoms in animals
  - Sprouts and tablets have been linked to lupus in humans

There is hope…

Diets and supplements with some evidence regarding myositis

Gluten Sensitivity

- Association of myositis with gluten sensitivity described since at least 1976
- There have been reports of clinical improvement following a gluten-free diet in **PM, DM and IBM**
- Not all patients will have positive antibodies (anti-glutaminase/gliadin/ endomysial, etc.)

Gluten Sensitivity

- Symptoms can range from none to:
  - Weight loss
  - Abdominal cramping
  - Bloating
  - Loose stools
  - Anemia
  - Evidence of bone loss
  - Vitamin E deficiency

Gluten sensitivity: Substitutions

- Brown rice
- Quinoa
- Buckwheat
- Millet
- Sorghum
- Teff
- Amaranth
- Tapioca

Many available as:

- Breads
- Pasta
- Cereals
- Flours

Creatine: Definitions and clarifications

- Creatinine: metabolized end-product of creatine, found in blood, muscle and urine; *measured to assess renal function*
- Creatine kinase (CK) or creatine phosphokinase (CPK): muscle enzyme involved in energy production; *measured to assess skeletal muscle inflammation or damage*, as well as in brain and heart muscle

Supplements: Creatine

- Taken as a daily *supplement* to improve muscle strength and/or mass
- A 2011 Cochrane review deemed it a worthwhile supplement with few side effects for those with DM and PM
- Most data was taken from a 2007 study done in the UK and Sweden (Dr. Ingrid Lundberg was a co-author)
  - Chung et al. *Arthr Rheum* 2007;57:694-702

Supplements: Creatine

- Dosage used in the 2007 study:
  - Start with 20 grams per day for 8 days (loading dose)
  - Continue with 3 grams per day (maintenance dose)
- Noted improved performance, ability to undertake high-intensity exercise and endurance work
- Effect maintained over 5 months

Supplements: Creatine

- Safety: there were no side effects noted
- Previous concerns about renal (kidney) toxicity do not seem warranted, as long as there is no underlying renal disease
- Unfortunately, this does not seem to be effective for inclusion-body myositis (IBM)

Summary

- Eat a varied diet of mainly fresh plant-based foods, lean (wild, organic?) protein, good fats, avoiding bad fats processed and high-glycemic foods
- Focus on whole foods rather than supplements
- For all: consider probiotics (especially if antibiotics used frequently)
- Probably avoid spirulina and blue-green algae, possibly alfalfa, echinacea

Summary

- For all, but DM especially: check vitamin D level
- For anyone on MTX: take folic acid
- For PM, DM, IBM: consider gluten-free trial
- For PM, DM: consider creatine
- Stay hopeful for more data on coenzyme Q10 and curcumin-piperine, but worth a try

Resources: General

- Center for Science in the Public Interest
  - www.cspinet.org
- American Society for Nutrition
  - www.nutrition.org
- Tufts University Healthletter
  - Healthletter.tufts.edu

Resources: Drug interactions

- http://drugs.com/drug_interactions
- http://reference.medscape.com/drug-interactionchecker
- http://www.doctoroz.com/videos/drug-interaction-checker
  - Very detailed with options for interactions between drug, herbs and supplements, and labs, some as positive interactions

Resources: Supplements

- Office of Dietary Supplements
  - Dietary-supplements.info.nih.gov
- Linus Pauling Institute (Oregon State U.)
  - http://lpi.oregonstate.edu/
- National Center for Complementary and Alternative Medicine (NIH)
  - nccam.nih.gov
- www.consumerlab.com

  (Reports on independent supplement testing)

Resources: Books

- *Wheat Belly* by William Davis, MD
  (gluten sensitivity); www.wheatbellyblog.com
- *Eat to Live* and *Super Immunity* by Joel Fuhrman, MD
  (general healthy eating); www.drfuhrman.com
- *The Probiotics Revolution* by Gary Huffnagle, PhD
- *Integrative Rheumatology* by Randy Horwitz, M.D. and David Muller, M.D.
- *Nutrition and Rheumatic Disease*, edited by Laura Coleman, PhD, RD (textbook)