

FODMAPs and Trendy Diets

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Objectives

- Describe evidence for the FODMAP diet in Irritable Bowel Syndrome
- Describe the role of gluten intolerance in IBS
- Develop an awareness of popular fad diets

Food and IBS

- Increased reported food intolerance in IBS vs. general population
 - Not often due to actual food allergy
- 60% of IBS patients report worsening of symptoms after meals
 - Symptoms often resolve with fasting
- 70% IBS patients limit or exclude foods due to the belief the exacerbate symptoms
- Patient frustration
 - Follow non-validated diets
 - Restrictive diets can lead to malnutrition

Locke Am J Gastro 2000;95:157

Kanazawa Int J Behav Med 2006;12:214
Monsbakken Eur J Clin Nutr 2006;60:667

Food and IBS

- Visceral hypersensitivity (ENS)
 - Mechanoreceptors
 - Gas production → increased stretch
 - Chemoreceptors
 - Plant chemicals can directly stimulate transient receptor potential (TRP) cation channels
 - Increased TRP expression correlates with visceral hypersensitivity
- Increased afferent activity
- Increased efferent motility response

Vriens Curr Neuropharmacol 2008;6:79

Winston Gastroenterology 2007;132:615

What is a FODMAP?

- Fermentable oligo-, di-, and mono-saccharides, and polyols
- Small molecules- osmotically active
- Short chain carbohydrates
 - Poorly or slowly absorbed in small intestine
 - Readily fermentable by bacteria
- Increased gas formation, fluid load → distension
- Increased IBS symptoms
- Possible effects on gut microbiome, intestinal barrier function
- FODMAPs are not the Cause of IBS, but may exacerbate symptoms

Eliminate foods containing fodmaps

excess fructose	lactose	fructans	galactans	polyols
fruit apple, mango, nashi, pear, tinned fruit, in natural juice, watermelon sweeteners fructose, high fructose corn syrup large total fructose dose concentrated fruit sources, large serves of fruit, dried fruit, fruit juice honey corn syrup, fructose	milk milk from cows, goats or sheep, custard, ice cream, yoghurt cheeses soft unripened cheeses eg. cottage, cream, mascarpone, ricotta	vegetables asparagus, beetroot, broccoli, brussels sprouts, cabbage, eggplant, fennel, garlic, leek, okra, onion (all), shallots, spring onion cereals wheat and rye, in large amounts eg. bread, crackers, cookies, couscous, pasta fruit custard apple, persimmon, watermelon miscellaneous chicory, dandelion, inulin	legumes baked beans, chickpeas, kidney beans, lentils	fruit apple, apricot, avocado, blackberry, cherry, lychee, nashi, nectarine, peach, pear, plum, prune, watermelon vegetables cauliflower, green capsicum (bell pepper), mushroom, sweet corn sweeteners sorbitol (420) mannitol (421) xylitol (967)

Foods suitable on a low-fodmap diet

fruit	vegetables	grain foods	milk products	other
fruit banana, blueberry, boysenberry, cantaloupe, cranberry, durian, grape, grapefruit, honeydew, melon, kiwifruit, lemon, lime, mandarin, orange, passionfruit, pawpaw, raspberry, rhubarb, rockmelon, star anise, strawberry, tangelo <small>Note: if real or dried eat in small quantities</small>	vegetables alfalfa, artichoke, bamboo shoots, bean shoots, bok choy, carrot, celery, choko, choy sum, endive, ginger, green beans, lettuce, olives, parsnip, potato, pumpkin, red capsicum (bell pepper), silver beet, spinach, summer squash (yellow), swede, sweet potato, taro, tomato, turnip, yam, zucchini herbs basil, chili, coriander, ginger, lemongrass, marjoram, mint, oregano, parsley, rosemary, thyme	cereals gluten-free bread or cereal products bread 100% spelt bread rice oats polenta other arrowroot, millet, psyllium, quinoa, sorghum, tapioca	milk lactose-free milk, oat milk*, rice milk, soy milk* <small>*some tea additives</small> cheeses hard cheeses, and brie and camembert yoghurt lactose-free varieties ice-cream substitutes gelati, sorbet butter substitutes olive oil	sweeteners sugar* (sucrose), glucose, artificial sweeteners not ending in "-ol" honey substitutes golden syrup*, maple syrup*, molasses, treacle <small>*small quantities</small>

www.lowfodmapdiet.com

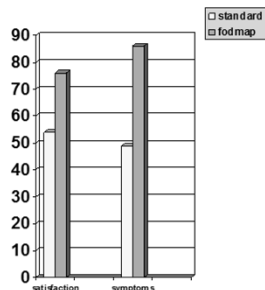
FODMAPs RCT

- 15 IBS patients, 15 healthy controls
 - Single blind, crossover intervention
- High vs low FODMAP diet (2 days, with washout)
- Breath hydrogen levels increased on high FODMAP diets in both groups
 - Indicates relative malabsorption and bacterial fermentation of carbohydrates
 - Breath hydrogen higher in IBS patients vs controls regardless of diet
- Symptoms (GI and lethargy) increased in high FODMAP diet in IBS patients only

Ong J Gastro Hepatol 2010;25:1366

How about in real life?

- 82 patients seen in dietetic clinic for IBS management
- "standard dietary advice" vs low FODMAP diet
- Baseline Sx not significantly different
- Global and individual symptom scores lower on low FODMAP diet
- Observational studies show Sx response in about 75% of IBS patients



Staudacher J Human Nutr Dietetics 2011;24:487

Shepherd J Am Diet Assoc 2006;106:1631

Is it feasible?

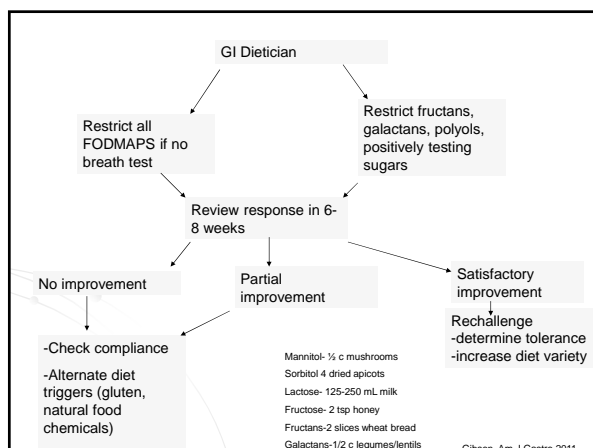
- Adherence 70% over 17 months
- Compliance increased with
 - Post-secondary education
 - Working less than 35 hours per week
 - Directed to specific cookbooks/recipes
- Only evaluated as a dietician directed diet
 - Diet sheets likely to be less effective

Geary J Crohns Colitis 2009;3:8

Use in practice

- No attempt is made to identify specific food triggers
- Food diary/questionnaire to identify frequent exposures in patient's diet
 - Validated FODMAP food frequency questionnaire
- Role of breath hydrogen testing?
 - Lactose, fructose
 - May be able to reduce the breadth of dietary restriction
- Strict low FODMAP trial for 6-8 weeks
 - Try to rechallenge with one component at a time to liberalize diet

Gibson J Gastro and Hepatol 2010;25:252





Non-celiac gluten sensitivity

- Gluten free products \$2.5 billion dollar industry
 - Far more than just celiac patients
- Intestinal or extraintestinal symptoms related to gluten ingestion
 - +/- HLA DQ2/8
 - +/- celiac serology
 - Normal duodenal biopsy



Non-celiac gluten sensitivity

- RCT 34 IBS-D patients
 - All had previously had improvement on GFD
- 6 weeks diet gluten free muffin/bread vs gluten containing muffin/bread
- Inadequate symptom control 40% gluten free, 68% standard diet ($p=0.001$)
- Gluten free diet improved pain, bloating, stool consistency, fatigue
- HLA status and celiac antibodies did not predict responders

Biesiekierski et al *Am J Gastro* 2011;106:508-14

Mechanism of Gluten Induced Symptoms in IBS

- Some patients may be early celiac disease
- Wheat contains fructans, galactans
- Gluten increases intestinal permeability in celiac disease
 - Increased access to food antigens which then cause low grade inflammatory response?
 - Dr. Oz "Leaky Gut Syndrome"
 - No increased permeability or stool inflammatory markers documented in gluten responders
- Don't know → but provides another treatment avenue for IBS

Biesiekierski *Am J Gastro* 2011

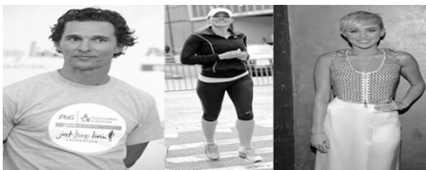
Sapone *BMC Med* 2011;9:23

Caveat!!

- Must do serologic testing prior to starting on gluten free diet
- Hard to convince patients to re-introduce gluten
- Unclear how long/how much gluten they must ingest for testing to be reliable
- Anyone starting a GFD should see a dietician at least once

Paleolithic Diet

- Theory: human bodies adapted in Paleolithic era to conserve nutrients and store energy
 - Thrifty gene hypothesis
- Maladaptive in the setting of industrialization
- Leading to obesity, metabolic syndrome, diabetes
 - "Diseases of Civilization"




Eaton et al. *Am J Med* 1988

Paleolithic Diet

- 30% protein
- High intake mono & polyunsaturated fats
- No dairy, grains, salt, refined fats, sugar
- RCT compared with low fat diet in post-menopausal women (n=70)
 - Fat mass at 6 months -6.5kg PD, -2.6kg LF (p>0.001)
 - Fat mass at 2 years -4.6kg PD, -2.9kg LF (NS)
 - TG levels lower in patients on PD (p=0.004)
 - Adherence to high protein diet was poor
- No studies looking at IBS Sx



Mellberg et al. *Eur J Clin Nutr* 2014;68:350-57



Alkaline Diet

- Modern diet has lower K⁺ intake and higher Na⁺ intake than pre-industrialization
 - Increased Cl:HCO₃ ratio
 - Induce metabolic acidosis
 - Buffered by calcium salts in bone
- No protective role for osteoporosis in systematic review
- No evidence for control of GI symptoms
 - Crohn's blogs

High Potential Renal Acid Load	Low Potential Renal Acid Load
Meat	Fruits
Dairy	Vegetables
Fish	Potatoes
Grains	Wine
Beer Chocolate	Mineral water

Fenton Nutrition Journal 2011, Schwalkenberg J Environmental and Public Health 2012

Conclusions

- In motivated patients there is a role for diet therapy in IBS
 - FODMAP diet
 - Gluten free diet
- Need the guidance of a dietician
- Be aware of trendy/fad diets
 - No evidence for paleo diet or alkaline diet in controlling GI symptoms

Questions?