

Faecal Incontinence with IBS: The Role of Food Sensitivities

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How of the Role of Food Sensitivities in IBS










Definition of IBS

Rome III Criteria

At least 12 weeks (which need not be consecutive) in the preceding 12 months of:

- Abdominal discomfort or Pain with two out of three of the following features:
 1. Relieved with defecation and/or:
 - 2a) Onset associated with a change in frequency of stool; and/or
 - b) Onset associated with a change in form (appearance) of stool.

BRISTOL STOOL FORM SCALE

Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on its surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges (passed easily)
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces ENTIRELY LIQUID

IBS Features

- Visceral hypersensitivity (Cash et al 2006)
- Abnormal gut motility (Cash et al 2006)
- Psychological interplay with the above factors (Cash et al 2006)
- Post-infectious immune activation (Cash et al 2006)
- Overactivation of HPA axis and increased inflammatory cytokines (Dinan et al 2006)
- Increased gut permeability (Dunlop et al 2006)
- Small intestinal bacterial overgrowth (Simren et al 2007)
- Increased risk migraine(60%), fibromyalgia (80%), depression (40%) (Cole et al 2006) generalised anxiety disorder (Lee et al 2009) but possibly only in subset of IBS (William et al 2007)

Fundamental Concepts

1. IBS as inflammatory disorder
2. Intestinal hyperpermeability
3. IgE vs IgG immune activation
4. Fructose malabsorption

is displaying intestinal permeability

- SIRS, IBD, autism, Type I diabetes, asthma, allergy (Liu et al 2005)
- Chronic bowel disorders, any disorder of metabolic depletion, enterocyte ATP-depletion, stimulation of GIT pro-inflammatory cytokine production, disturbances of normal GI flora (Vijoen et al 2003)
- Probably underestimated (Vijoen et al 2003)

Central Concepts: IBS as inflammatory disorder

- Low-grade mucosal inflammation in a subset of IBS
- Close proximity of immunocytes to gut nerves supplying mucosa may provide basis for neuro-immune cross-talk, leading to gut sensori-motor dysfunction in IBS

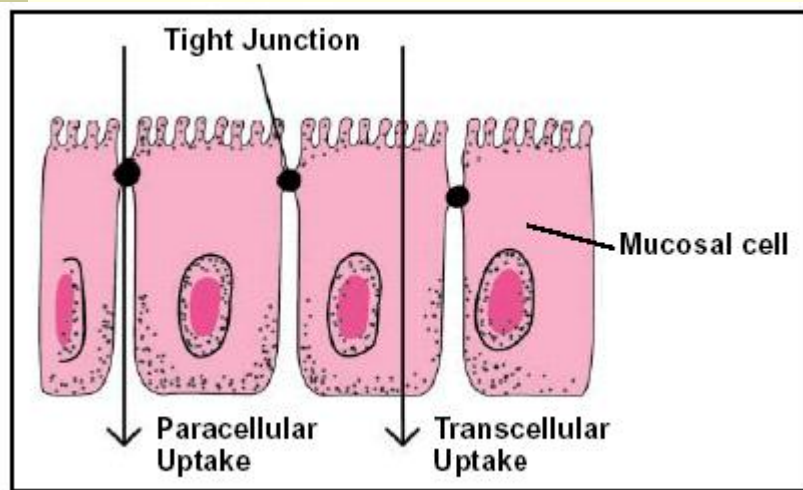
Intestinal Concepts: Intestinal Hyperpermeability

The dilemma of the mucosal surface of the intestine is to fend off the constant challenge from antigens, such as microorganisms, in mounting a brisk response to pathogens, and to enable assimilation of innocuous antigens derived from food. In order to perform these opposing functions, the intestine is in a state of continuous immune responsiveness, and a delicate balance is generated and maintained between concomitant facilitation and suppression of inflammatory responses. (Isolauri et al 2004)

Central Concepts: Intestinal

Hyperpermeability

- This is an established physiological process
- Studies show increased I.H in
- DIARRHOEA-PREDOMINANT IBS, POST-INFECTIOUS IBS and IBS with ATOPY (Simon et al 2006)
- So-called "leaky gut"



and intestinal hyperpermeability induce IBS symptoms?

- alterations of the intestinal epithelial barrier integrity, in particular increased permeability, could modify the cross-talk between bacterial microflora and the host, leading to persistent "low-grade" inflammation and altered GI motility and sensitivity.

(Piche et al 2009)

Central Concepts: IgE vs IgG

reactions

- IgE = % immediate allergy+ . immediate onset, may involve anaphylaxis 4% (Sampson et al 2004)
- IgG = % delayed onset hypersensitivity+; involved in food sensitivities, not allergies . may affect much higher percentage of population - >20% (Young et al 1994)

Food Sensitivities

May be due to:

- enzyme deficiency, e.g. lactose intolerance
- Specific food components e.g. lectins in legumes causing agglutination, vasoactive amines causing migraines, food additives (Worm et al 2001), salicylates

IgE food reactions in IBS

- Most (96%) patients with self-reported food sensitivities had IBS and over half had atopy (hayfever) (Lillestol 2010)
- Correlation b/n IgE levels higher in atopic patients
- Atopic patients had increased intestinal permeability Skin-prick tests positive more often in IBS than asymptomatic controls (Jun et al 2006, Dainese 1999)
- Skin-prick tests positive more often in IBS than both functional dyspepsia and asymptomatic controls (Soares et al 2004)
- In another study, 35% of IBS had IgE positive reactions, in decreasing order of frequency milk protein, soybean, tomato, peanut, egg white (Mekkel et al 2005)
- 55% of IBS-D had +ve skin prick; randomised to exclusion or exclusion +sodium cromoglycate; 60% vs 89% improvement (Leri et al 1997); this is a mast-cell stabiliser inhibiting histamine production

IgG food reactions in IBS

- IBS had significantly higher IgG4 titers (mug/L) to wheat, beef, pork, and lamb compared to controls (Zar et al 2005a)
- IBS had elevated IgG4 to milk, eggs, beef, wheat, pork and lamb; excluding these foods led to improvements in pain frequency and severity, satisfaction with bowel habits, bloating severity, effects on life in general AND an increase in rectal compliance (Zar et al 2005b)
- IBS had signif higher IgG (ELISA) to crab, egg, shrimp, soybean, wheat, not correlated with severity (Zuo 2007)

Randomized controlled trial study on IgG+ve food exclusion in IBS (Drisko et al 2006)

- N=20 with Rome II IBS ***who had failed standard medical therapies in GI clinic***
- Had IgE and IgG food tests and mould tests and complete stool analysis
- Elimination and rotation diets based on tests, probiotics administered
- 100% of group had +ve food tests
- 100% had abnormal flora on CSA
- Significant improvement in stool frequency, pain and IBS-QOL scores
- Improvement in beneficial flora but no change in dysbiotic flora
- At one year, significant continued adherence to diet, minimal IBS symptomatology

IgG+ve food exclusion in IBS (Atkinson et al 2004)

- n=150 IBS randomised to receive
 - Diet with ELISA IgG+ve foods removed
 - Diet w same no. of foods but also IgG+ve foods
- After 12/52, test diet- 10% reduction in symptoms compared to sham diet . this increased to 26% reduction if fully compliant
- Relaxing diet led to deterioration

Testing for Food Sensitivities

- ELISA IgG-based tests . production of IgG in response to foods e.g PathLab, Healthscope Pathology, US Biotek, OR
- Tests based on observation of WBC changes in response to foods e.g. ALCAT, ?Allergy Services

Testing for Food Sensitivities

- In vitro activation of basophils by food allergens (found 20% cows milk protein sensitivity); more likely to have food sens if self-report, had as child, longer clinical Hx (Carroccio et al 2010)
- Studies by Atkinson et al, Zuo et al and Zar et al cited in this presentation were based on IgG food sensitivity testing

ALCAT

- Detects change in size and number of leucocytes (WBCs) in response to foods/chemicals
- Uses whole blood (not serum) . apparently tests against various pathways including IgG, complement activation, cytotoxic, lectins (***n.b. but not IgE***)
- Whether reaction is immune or non-immune, final common pathway is production of inflammatory mediators (e.g. histamine, cytokines) which alter activity of WBCs, detected by this test
- Aims to detect changes in phagocytic WBCs (i.e. innate immunity) plus cytotoxic effects of food

ty of ALCAT (Fell PJ et al 1998+1991)

- Patients with IBS, eczema, rhinitis, migraines
- Removed 3 ALCAT+ve and -ve foods from diet for 2/52 then re-introduced for 1/52
- >75% of +ve foods produced increase in symptoms
- 12-30% of . ve foods produced increase in symptoms
- This finding reproduced in study with IBS only; higher medication use in week foods were re-introduced; with 6/52 exclusion, two-thirds reported improvement
- Non-Medline indexed journal

Disadvantages and Arguments Against

- No gold standard has been developed
- Dependent on quality of food sample used; contamination with bacteria/fungi, pesticides, organic solvents . could the reaction be against this?
- Dependent on quality of food reagent used
- Validity drops if offending foods are not frequently consumed leading up to test
- Samples unstable . need to get to lab rapidly
- Cost

ion of short-chain carbohydrates:

FODMAPs (Gibson & Shepherd 2010)

- Fructose, lactose, fructans, galactans, polyols
- Rapidly fermentable, can produce small intestinal luminal distension + gut symptoms
- Fructans not hydrolysed/absorbed in small intestine; malabsorption and fermentation leads to gut motility changes, bacterial profile changes (Gibson et al 2007)
- Malabsorption of fructose usually only occurs if more fructose than glucose present (Gaby 2005)
- RCT shows improvement in symptoms and recurrence when foods reintroduced to diet
- Fructose and lactose malabsorption more common in Crohn's Disease (Shepherd et al 2009)
- Apple, pear, mango, peach, watermelon, wheat, garlic, artichoke, shallot, leek, onions are high

of Potential Role of Food in IBS (Morcos 2009)

Symptoms could be provoked due to:

- “ Physiological response to food ingestion itself
- “ Allergy or intolerance to specific foods
- “ Foods altering composition of internal milieu, directly, or indirectly, via effects on bacterial metabolism
- “ Exposure to food-borne pathogens

Potential Role of Probiotics

- May counter low-grade inflammation of IBS
- By absorbing bile acids, lacto/bifido may reduce colonic mucosal secretion of fluids/mucim that may lead to diarrhoea, esp VSL#3 (Camilleri 2006)
- Lactobacillus plantarum colonisation decreases that of more gas-forming bacteria such as Clostridia and Veillonella spp (Bixquert 2009)
- L.plantarum may reduce pain, distension and flatulence in IBS and improve HRQOL (Bixquert 2009)

1 and the role of prebiotics

- Bifidobacteria colonies are promoted through dietary inulin and fructo-oligo-saccharides (FOS) (Bosscher et al 2009)
- Fermentation of the FOS produces short-chain fatty acids (SCFAs), the major fuel source for the enterocyte (Roy et al 2006)
- Changes on intestinal mucosa include higher villi, deeper crypts, increased goblet cells, thicker mucus layer; protective against enteric infections (Guarner 2007)
- FOS are mildly laxative but can produce abdominal distension and gas at high doses
- May be more effective as synbiotic (i.e. in combination with a probiotic) (MacFarlane et al 200)
- Prebiotics such as inulin (from chicory root) can cause abdominal symptoms such as bloating even in %normal+ population . can only tolerate 10g of native inulin and 5g of %sweet+short-chain FOS (Slavin et al 2010)

Incontinence and Relationship to Stool Form

- If faecal incontinence occurs with normal stool Type 3-4 and there is good sensation, less likely to be associated with IBS/food sensitivities
- If faecal incontinence occurs with looser stools Type 5-7 and there is urgency, decreased awareness of rectal urge, it seems more likely to be associated with IBS/food sensitivities

What does all this mean clinically?

- If a person presents with FI, *determine stool form*; if Type 5-7 at all, suspect IBS if not already diagnosed, and consider food sensitivities, especially if person self-reports
- If Type 5-7, unlikely that pelvic floor muscle training (PFMT) alone will correct the FI, regardless of anorectal manometry and physiology

FI associated with loose stools

1. Determine cause
2. Achieve stool type 3-4
3. Ensure tonic activation of PFM, not just % sphincter squeezes+

Determining the cause of loose stools

- Ideal first step, but will require liaison with GP
- Medication e.g. antibiotics
- Coeliac Screen (1 in 100)
 - IgA transglutaminase antibody
 - IgA antigliadin
 - Tests may need repeating if never had tGt, but only EMA (endomysial antibody)
 - Include IgG antigliadin if possible, to confirm clinical suspicion of non-coeliac gluten intolerance
- Endoscopy? Biopsy for CD? Lactose intolerance (presence of adequate lactase enzyme?)
- FODMAPs Malabsorption?

Achieve stool type 3-4

- The easy way: psyllium husk 1tsp . 2tb on breakfast cereal, graduated increase; ground linseed or LSA can work as well
- OR
- The hard way: food sensitivity testing via functional pathology laboratories or refer to practitioner with special interest in food sensitivities

ACHIEVE stool type 3-4 cont.

- Other options:
 - Slippery elm powder
 - Probiotics, especially if history of antibiotics; lactobacillus plantarum is one of the most anti-inflammatory types available

Common Irritants: sulphite additives

- May cause, among other reactions, abdominal pain and diarrhoea in sensitive individuals (Vally et al 2009)
- Up to 10% of asthmatics
- Identified as E220-228
- Added to dried fruit, lemon soft drink, mince, sausages, pre-prepared potatoes, bottled tomatoes/olives/etc . very widespread in processed foods as a preservative

Case Study: Mrs C aged 64

- BM immediately upon rising Type 5-6 then another after veggie juice, 3-4/day
- Increases with spicy foods (explosive), onions, juice; fat OK, fruit by itself OK.
- Cholecystectomy 30 yr before, problems started 8 yr before, stool tests NAD, coeliac NAD, gastroscopy + colonoscopy showed polyps only
- Diet: veggie juice, yoghurt/porridge/rice milk, muffin, tinned fish/salad sandwich, Caro, meat and veggies
- What does this tell us so far?

IVMS Cys IgG ELISA test results

- **H**ighly reactive+to almond, cow's milk and cheese, yoghurt and whey, egg, soybeans, kidney + pinto beans, sesame + sunflower seed, garlic and casein
- **M**oderately reactive+to goat's milk, oyster, spelt, wheat, sugar cane, gluten and gliadin

RESULTS

- Initially, started psyllium and lactobacillus plantarum - no BM before breakfast, but still explosive after, usually 1-3 BMs/day
- Then largely removed IgG +ve foods
- By week 4 . 1 BM per day, Type 4, not explosive
- When had a bit of flour, plum pudding . felt %a bit off+, had 2xBMs and some abdo pain

MRS D, aged 55

- Referred by colorectal surgeon for passive anal incontinence (smear), occ urge FI
- Hx fissure repair, haemorrhoid repair, anal dilatation, pain with BM, TAH, episiotomy
- Anorectal manometry and physiology NAD
- Flicker of PFM only
- Stool Form type 5-6
- Did not return . e-mailed 3 months later

A Quick-Fixö for Mrs B

- Gave exercise program to retrain tonic PF support, psyllium up to 1tb/day + dietary advice
- I suspected food sensitivities and recommended coeliac screening
- Coeliac screening was negative
- Within 6 weeks, no anal leakage, awareness had returned, stool form Type 3-4

MRS K, aged 52

- Referred for stress urinary incontinence but constant low abdominal pain, IBS, bouts of diarrhoea
- IgG +ve foods were wheat, oat, barley, malt, coffee, lentil, capsicum, mango, erythrosine and sulphites
- Within 3 weeks of changing diet, no diarrhoea episodes, sleeping much better (not waking at 2:30am), pain changed from constant non-varying to varying described this as "amazing" instant change after 15 years of IBS+

IVIS IX aged 30: an ongoing challenge

- BM 1-3x/day (after each meal), Type 5-6
- Visible foods in stool
- Biggest concern %heaps of embarrassing gas+with bowel motions; lots of abdominal bloating and borborygmi
- Identifies numerous problematic foods: apple/pear, oranges, cabbage, spinach, lactose give pain and bloating; bananas cause constipation; beetroot reappears in 2 hours
- Gets full quickly, burps after eating
- Hx surgery for Hirschsprung's disease as a baby but %stormy recovery+

Reverse-order management of Ms K

- Provided digestive enzymes, which led to some improvement (in nausea, complete digestion, gas)
- Recommended trying apple-cider vinegar . mixed results (sometimes helped, sometimes not)
- Provided betaine hydrochloride to boost gastric acid production, recommended sulphite avoidance
- Noticed that high-sulphite foods made wind very forceful
- Added lactobacillus plantarum . felt that this in combination with betain HCl and LSA improved things, as long as avoided sulphites . but not satisfied
- Referred for complete digestive stool analysis

CDSA results and ongoing Mx

- Total short-chain fatty acids was high, suggesting high CHO diet or insufficient breakdown
- Candida albicans was isolated - ? Clinical relevance
- Good levels of all beneficial bacteria (including Lactobacilli) but no colonies of Bifidobacteria identified (as limiting fructose on the whole!)
- Plan: restore bifidobacteria colonies, ?trial low-fructose diet, ?test food sensitivities.
- Currently trialling molybdenum (mineral) supplementation, along with vitamin B12, as these are both involved in metabolising sulphites

Results cont ó hot off the press

- Ms K feels that the molybdenum supplementation has helped reduce the extent and volume of the wind (but still unable to tolerate foods with added sulphites, e.g. mince)
- Borborygmi has reduced, and in turn, noisy wind with BM . very happy about this
- BM still Type 5, 1-2 per day

Discussion and Questions

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