DIETARY MANAGEMENT OF IRRITABLE BOWEL SYNDROME AND CHRONIC IDIOPATHIC CONSTIPATION

EFSTATHIA PAPADA
Dietitian-Nutritionist, MSc, PhD (cand)
Harokopio University of Athens
Irritable Bowel Syndrome (IBS)
Dietary management

- Lactose
- Dietary fibre
- FODMAPs
- Probiotics
- Elimination diets
- Food allergens
Lactose intolerance and IBS

- IBS and lactose intolerance share similar characteristics (bloating, distention, diarrhoea).
- Self-reported milk intolerance does not help in identifying lactose intolerance in IBS patients.
- Weak evidence of increased incidence of lactose intolerance in IBS patients.

Cuomo et al, 2014
Practical considerations

- Detailed dietary assessment
- Lactose hydrogen test may be useful
- Restriction and gradual reintroduction of lactose
- Other milk components may be responsible (e.g. cow proteins)
- Non-mammalian milk (e.g. soya, oat) may be useful to maintain nutritional adequacy

McKenzie et al, 2012
Soluble Vs. Insoluble fibre

Soluble fiber can be found in foods such as oat bran, barley, nuts, seeds, beans, lentils, fruits (citrus, apples), strawberries and many vegetables.

Insoluble fiber is found in foods such as whole wheat and whole grain products, vegetables, and wheat bran.

Soluble fiber sources

Insoluble fiber sources
Soluble or insoluble fibre in irritable bowel syndrome in primary care? Randomised placebo controlled trial

Bijkerk et al, 2009
**Practical considerations**

- Dietary assessment of dietary fibre intake from all sources including fruits, vegetables, nuts and seeds.

- Avoid wheat bran.

- Gradual increase of dietary fibre.

- Addition of ground linseeds should start with one teaspoon to one tablespoon per day and to a maximum of four tablespoons (24 g) per day taken with a drink (150 mL of fluid per tablespoon).

  McKenzie et al, 2012
## Fermentable Carbohydrates (FODMAPs)

<table>
<thead>
<tr>
<th>Class</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fructo-oligosaccharides (FOS)</td>
<td>e.g. Fructans in wheat and onion</td>
</tr>
<tr>
<td>Galacto-oligosaccharides (GOS)</td>
<td>e.g. in beans and pulses</td>
</tr>
<tr>
<td>Disaccharides</td>
<td>e.g. Lactose in milk and dairy products</td>
</tr>
<tr>
<td>Monosaccharides</td>
<td>e.g. Fructose in excess of glucose in mango, honey</td>
</tr>
<tr>
<td></td>
<td>High fructose load in fruit juice, Fructose ingredients in processed</td>
</tr>
<tr>
<td></td>
<td>foods and drinks</td>
</tr>
<tr>
<td>Polyols</td>
<td>e.g. Sorbitol in various fruit and vegetables</td>
</tr>
<tr>
<td></td>
<td>Polyol sweetened sugar-free manufactured foods and medicines</td>
</tr>
</tbody>
</table>

McKenzie et al, 2012
A Diet Low in FODMAPs Reduces Symptoms of Irritable Bowel Syndrome

A

IBS

Baseline
Typical Aust.
Low FODMAP

Day

Healthy controls

Halmos et al, 2014
Practical considerations

✓ Low FODMAPs diet requires specialist dietetic knowledge in order to be nutritionally adequate.

✓ Education about high-FODMAPs sources is necessary.

✓ After symptoms resolution gradual re-introduction of FODMAPs is required to evaluate individual tolerance.

McKenzie et al, 2012
Probiotics and IBS

Lactobacillus and Bifidobacterium in Irritable Bowel Syndrome: Symptom Responses and Relationship to Cytokine Profiles

O’Mahony et al, 2005
Lactobacillus and Bifidobacterium in Irritable Bowel Syndrome: Symptom Responses and Relationship to Cytokine Profiles

O’Mahony et al, 2005
Randomised clinical trial: Effect of Lactobacillus plantarum 299 v on symptoms of irritable bowel syndrome

Stevenson et al, 2014
Practical considerations

- Probiotic may be used as secondary to other dietary interventions.
- Try a different product if one probiotic does not improve symptoms.
- Some products may be high in FODMAPs.

McKenzie et al, 2012
Elimination or empirical diets

• **Elimination diet**: includes a selection of low allergen foods, usually one type of meat, one cereal, two fruit and vegetables, a milk substitute and a fat source.

• **Empirical diet**: excludes common food allergens associated with a specific condition when a dietary source is suspected but cannot be identified.

British Nutrition Foundation, 2001
Food elimination based on IgG antibodies in irritable bowel syndrome: a randomised controlled trial

![Graph showing mean change in symptom severity scores at 12 weeks according to degree of adherence. Difference between the groups with high adherence: 101 (95% confidence interval 54, 147); ***p<0.001.](image)

Atkinson et al, 2004
The Value of Eliminating Foods According to Food-specific Immunoglobulin G Antibodies in Irritable Bowel Syndrome with Diarrhoea

**TABLE 2:**
Comparison of median symptom scores before (baseline) and at 4, 8 and 12 weeks after initiation of dietary restriction treatment in patients with diarrhoea-predominant irritable bowel syndrome (n = 35)

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Baseline score</th>
<th>4 weeks</th>
<th>8 weeks</th>
<th>12 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Score</td>
<td>Z-value, Statistical significance</td>
<td>Score, Z-value, Statistical significance</td>
<td>Score, Z-value, Statistical significance</td>
</tr>
<tr>
<td>Abdominal pain - bloating level</td>
<td>1.57</td>
<td>1.09, -2.246, P = 0.025</td>
<td>0.78, -4.274, P &lt; 0.001</td>
<td>0.63, -4.335, P &lt; 0.001</td>
</tr>
<tr>
<td>Abdominal pain - frequency</td>
<td>1.43</td>
<td>1.17, -1.536, NS</td>
<td>0.86, -2.996, P = 0.003</td>
<td>0.54, -3.992, P &lt; 0.001</td>
</tr>
<tr>
<td>Frequency of diarrhoea</td>
<td>1.14</td>
<td>0.83, -1.772, NS</td>
<td>0.57, -2.891, P = 0.004</td>
<td>0.40, -3.981, P &lt; 0.001</td>
</tr>
<tr>
<td>Abdominal distension</td>
<td>1.46</td>
<td>0.77, -3.453, P = 0.001</td>
<td>0.40, -3.992, P &lt; 0.001</td>
<td>0.40, -3.992, P &lt; 0.001</td>
</tr>
<tr>
<td>Stool shape</td>
<td>1.60</td>
<td>1.20, -2.952, P = 0.003</td>
<td>1.06, -3.649, P &lt; 0.001</td>
<td>1.00, -3.871, P &lt; 0.001</td>
</tr>
<tr>
<td>General feelings of distress</td>
<td>1.80</td>
<td>1.31, -3.038, P = 0.002</td>
<td>0.89, -4.197, P &lt; 0.001</td>
<td>0.60, -4.287, P &lt; 0.001</td>
</tr>
</tbody>
</table>

Data presented as medians.

*Compared with the baseline score.

Symptom scores before and after treatment compared using the Wilcoxon rank-sum test. NS, not statistically significant (P > 0.05).

Guo et al, 2012
Chronic Idiopathic Constipation (CIC)
Dietary & Lifestyle Modifications

? Dietary fibre

? Liquid intake

? Probiotics

? Physical activity

? Defecation habits
# Dietary fibre and CIC

## Table 2 | Summary of results of individual randomised controlled trials of fibre vs. placebo in the treatment of CIC

<table>
<thead>
<tr>
<th>Study</th>
<th>Active intervention</th>
<th>Criteria used to define response to therapy</th>
<th>Number in fibre arm</th>
<th>Treatment effect in fibre arm</th>
<th>Number in placebo/no therapy arm</th>
<th>Treatment effect in placebo/no therapy arm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fenn et al.(^{20})</td>
<td>Psyllium</td>
<td>Proportion with an improvement in global symptoms</td>
<td>104</td>
<td>86.5%</td>
<td>97</td>
<td>47.4%</td>
</tr>
<tr>
<td>Ashraf et al.(^{19})</td>
<td>Psyllium</td>
<td>Increase in mean stool frequency per week</td>
<td>11</td>
<td>0.9</td>
<td>11</td>
<td>0.2</td>
</tr>
<tr>
<td>Nunes et al.(^{23})</td>
<td>Psyllium</td>
<td>Proportion with normalisation of evacuation</td>
<td>30</td>
<td>86.7%</td>
<td>30</td>
<td>30.0%</td>
</tr>
<tr>
<td>Lopez Roman et al.(^{22})</td>
<td>Inulin and maltodextrin</td>
<td>Proportion with straining during defaecation</td>
<td>15</td>
<td>35.7%</td>
<td>17</td>
<td>78.6%</td>
</tr>
<tr>
<td>Badiali et al.(^{18})</td>
<td>Bran</td>
<td>Proportion with no straining during defaecation</td>
<td>9*</td>
<td>55.6%</td>
<td>7*</td>
<td>28.6%</td>
</tr>
<tr>
<td>Hongisto et al.(^{21})</td>
<td>Fibre-rich rye bread</td>
<td>Mean number of stools per day</td>
<td>15</td>
<td>1.3</td>
<td>14</td>
<td>0.9</td>
</tr>
</tbody>
</table>

* 24 patients were randomised, but only 16 reported straining at baseline.

Suares & Ford, 2011
Practical considerations

• Fibre, dietary or supplementary, remain a first-line and low-cost treatment.

• Soluble fibre may be more effective.

• Gradual increase of 3g fibre/week to reach the goal of 20-35g/day.

• A sudden increase in fibre intake may cause bloating and abdominal pain.

• Adequate hydration is crucial.

Suares & Ford, 2011
Liquid intake and CIC

Association between dietary fiber, water and magnesium intake and functional constipation among young Japanese women

• Neither dietary intakes of fiber nor total water or water from liquids were associated with increased prevalence of CIC.

• On the contrary, low intakes of water from foods and magnesium were associated with increased prevalence of CIC.

• Several limitations (e.g. health consciousness, self-reported dietary assessment)

Murakami et al, 2007
National Health and Nutrition Examination Survey (NHANES)

• Significantly higher rates of constipation were seen within both genders at the lowest quartile of intake of dietary fiber ( < 10.1 g/ day) and dietary liquid ( < 1,882 mg / day).

• Low liquid intake increased the odds of having constipation.

• Low dietary fibre consumption is not a predictor of constipation.

Markland et al, 2014
Probiotics and CIC

Probiotic beverage containing *Lactobacillus casei* Shirota improves gastrointestinal symptoms in patients with CIC.

- Significant improvement in self-reported constipation severity, stool consistency and defecation frequency.
- Lower occurrence of moderate and severe constipation.

Koebnick et al, 2003
Effect of the consumption of a cheese enriched with probiotic organisms (Bifidobacterium lactis Bi-07) in improving symptoms of constipation.

Improvement in

- Bowel movement frequency
- Stool consistency
- Sensation of incomplete evacuation
- Effort to evacuate
Effect of yogurt containing polydextrose, Lactobacillus acidophilus NCFM and Bifidobacterium lactis HN019: a randomized, double-blind, controlled study in chronic constipation

Table 4 Colonic transit time (hours) as evaluated by abdominal X-ray of consumed radio-opaque markers

<table>
<thead>
<tr>
<th>Group</th>
<th>N.</th>
<th>Initial</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG</td>
<td>21</td>
<td>37.8±15.2</td>
<td>33.9±12.45</td>
</tr>
<tr>
<td>TG</td>
<td>26</td>
<td>35.0±15.4*</td>
<td>24.6±12.8*5</td>
</tr>
</tbody>
</table>

Comparison of data with the same symbol; *p = 0.001, 5p = 0.01.

Magro et al, 2014
Lifestyle changes

Physical activity

• No confirmed causal association between physical activity and CIC.

• However, there may be a benefit in adolescents, adults and elderly with sedentary lifestyle and CIC.

Defecation habits

• Holding stools leads to the vicious cycle of constipation.

• Morning defecation may be easier.

• Defecation posture may play a role.

Hsieh, 2005; Huang et al, 2014; Park et al, 2012; Schryver et al, 2005
Workgroup for Gastrointestinal Health

Hellenic Foundation of Gastroenterology and Nutrition

Members

- Georgios Papatheodoridis, Assoc. Professor, Gastroenterologist
- Iliana Iliopoulou, Dietitian-Nutritionist, MSc
- Nana Kalafati, Dietitian-Nutritionist, MSc, PhD (Cand)
- Efstathia Papada, Dietitian-Nutritionist, MSc, PhD (Cand)
Workgroup for Gastrointestinal Health

Hellenic Foundation of Gastroenterology and Nutrition

GOALS

– Educate people of all age groups about the digestive system and its functions through well understood tools

– Help people prevent, identify symptoms and manage gastrointestinal disorders (e.g. CIC, IBS, GERD)

– Provide appropriate tools for specialists (e.g. gastroenterologists, dietitians) to help their patients.
Workgroup for Gastrointestinal Health

UNTIL NOW…

– Information about CIC, IBS, GERD, GI cancer, IBD and Diverticulosis through articles in the website of the Hellenic Foundation of Gastroenterology and Nutrition (www.eligast.gr)

– Design, editing and distribution of 2 educational tools.
  • A poster about the physiology of the digestive tract and answers to common questions regarding the management of CIC.
  • An educational brochure with advice about the management of CIC.

– Design and editing of 3 infographics about CIC, IBS and GERD.
THANK YOU
References

• Favretto DC, Pontin B, Moreira TR. Effect of the consumption of a cheese enriched with probiotic organisms (Bifidobacterium lactis bi-07) in improving symptoms of constipation. Arq Gastroenterol. 2013 Jul-Sep;50(3):196-201
References


<table>
<thead>
<tr>
<th>High FODMAP food source</th>
<th>Low-FODMAP food source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Excess fructose</strong></td>
<td>Fruit (banana, blueberry, carambola, durian, grapefruit, grape, honeydew melon, kiwifruit, lemon, lime, mandarin, orange, passionfruit, paw paw, raspberry, rockmelon, strawberry, tangelo) Honey substitutes (maple syrup, golden syrup) Sweeteners (any except polyols)</td>
</tr>
<tr>
<td>Lactose oligosaccharides</td>
<td>Milk (lactose-free, rice milk) Cheese (hard cheeses, camembert) Yoghurt (lactose-free) Ice cream substitutes (gelati, sorbet) Butter</td>
</tr>
<tr>
<td>Polyols</td>
<td>Vegetables (bamboo shoots, bokchoy, carrot, celery, capsicum, choko, choy sum, corn, eggplant, green beans, lettuce, chives, parsnip, pumpkin, silverbeet, spring onion, tomato) Onion/garlic substitutes (garlic-infused oil) Cereals (gluten-free and spelt bread/cereal products)</td>
</tr>
<tr>
<td></td>
<td>Fruits (watermelon, custard apple, white peaches, rambutan, persimmon)</td>
</tr>
<tr>
<td></td>
<td>Vegetables (artichokes, asparagus, beetroot, Brussels sprout, broccoli, cabbage, fennel, garlic, leeks, okra, onions, peas, shallots) Cereals (wheat and rye when eaten in large amounts) Legumes (chickpeas, lentils, red kidney beans, baked beans) Fruits (watermelon, custard apple, white peaches, rambutan, persimmon)</td>
</tr>
<tr>
<td>Fructans and/or galactans</td>
<td>Fruits (apples, apricots, cherries, longon, lychee, nashi pears, nectarine, pears, peaches, plums, prunes, watermelon) Vegetables (avocado, cauliflower, mushrooms, snow peas) Sweeteners (sorbitol, mannitol, xylitol, maltitol, isomalt)</td>
</tr>
<tr>
<td></td>
<td>Fruits (banana, blueberry, carambola, durian, grapefruit, grape, honeydew melon, kiwifruit, lemon, lime, mandarin, orange, passionfruit, paw paw, raspberry, rockmelon) Sweeteners (sucrose, glucose)</td>
</tr>
<tr>
<td>Study</td>
<td>Study design and N</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Hawthorne et al., 1991</td>
<td>Intervention 38 IBS</td>
</tr>
<tr>
<td>Nanda et al., 1989</td>
<td>Intervention 189 IBS</td>
</tr>
<tr>
<td>Parker et al., 1995</td>
<td>Intervention 253 IBS</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Pettipierre et al., 1985</td>
<td>Intervention 24 IBS</td>
</tr>
<tr>
<td>Piccinini et al., 1990</td>
<td>RCT CO 42 IBS-D</td>
</tr>
<tr>
<td>Stefanini et al., 1995</td>
<td>RCT 409 IBS-D</td>
</tr>
</tbody>
</table>

McKenzie et al, 2012
Practical considerations

• Elimination and empirical diets usually last 3-4 months including the reintroduction phase.

• If there is no symptom improvement within 2–4 weeks of the initial phase, remove other potential dietary triggers before a decision that food intolerance is not causative.

• After the initial exclusion period, a period of 48 h should be left between food challenges.

• If an IBS symptom develops, the trigger food should be removed and no challenge with a new food should be made until the symptoms have resolved.

• Assessment of nutrition adequacy is necessary.

McKenzie et al, 2012
## Dietary fibre and CIC

### Table 1 | Characteristics of randomised controlled trials of fibre vs. placebo in the treatment of CIC

<table>
<thead>
<tr>
<th>Study</th>
<th>Country, setting, and number of centres</th>
<th>Criteria used to define CIC</th>
<th>Number of participants (% female)</th>
<th>Duration of therapy</th>
<th>Active intervention</th>
<th>Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fenn et al.(^{20})</td>
<td>UK, primary care, 17 sites</td>
<td>Clinical diagnosis</td>
<td>201 (75.1)</td>
<td>2 weeks</td>
<td>Psyllium 3.6 g t.d.s.</td>
<td>Randomisation and concealment unclear, single-blind</td>
</tr>
<tr>
<td>Ashraf et al.(^{19})</td>
<td>USA, tertiary care, 1 site</td>
<td>3 or less stools per week</td>
<td>22 (63.6)</td>
<td>8 weeks</td>
<td>Psyllium 5 g b.d.</td>
<td>Randomisation and concealment unclear, double-blind</td>
</tr>
<tr>
<td>Nunes et al.(^{23})</td>
<td>Brazil, tertiary care, number of sites not reported</td>
<td>Less than 3 stools per week</td>
<td>60 (65.0)</td>
<td>2 weeks</td>
<td>Psyllium 10 g/day</td>
<td>Randomisation and concealment unclear, double-blind</td>
</tr>
<tr>
<td>Lopez Roman et al.(^{22})</td>
<td>Spain, tertiary care, 3 sites</td>
<td>Rome II criteria</td>
<td>32 (87.5)</td>
<td>20 days</td>
<td>Inulin and maltodextrin 20 g/day</td>
<td>Randomisation and concealment unclear, double-blind</td>
</tr>
<tr>
<td>Badiali et al.(^{18})</td>
<td>Italy, tertiary care, 1 site</td>
<td>Clinical diagnosis and negative investigations</td>
<td>24 (91.7)</td>
<td>4 weeks</td>
<td>Bran 6.6 g t.d.s.</td>
<td>Randomisation and concealment unclear, double-blind</td>
</tr>
<tr>
<td>Hongisto et al.(^{21})</td>
<td>Finland, tertiary care, 1 site</td>
<td>Clinical diagnosis</td>
<td>29 (100)</td>
<td>3 weeks</td>
<td>320 g fibre-rich rye bread</td>
<td>Randomisation, concealment, and blinding unclear</td>
</tr>
</tbody>
</table>

CIC, chronic idiopathic constipation; t.d.s., thrice daily; b.d., twice daily.

Suares & Ford, 2011
Water supplementation enhances the effect of high-fiber diet on stool frequency and laxative consumption in adult patients with functional constipation

<table>
<thead>
<tr>
<th></th>
<th>Stool frequency (no/week)</th>
<th>Laxative use (doses/week)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-trial</td>
<td>Post-trial</td>
</tr>
<tr>
<td>Group 1</td>
<td>2.0±1.5</td>
<td>3.3±1.8*</td>
</tr>
<tr>
<td>Group 2</td>
<td>1.8±1.5</td>
<td>4.2±1.3*</td>
</tr>
</tbody>
</table>

Group 1: no water supplemented
Group 2: water supplemented
Δ: changes between pre- and post-trial values
* p<0.001 when compared to pre-trial levels
# p<0.001 when compared to Group 1

Anti et al, 1998