ESPEN Congress Lisbon 2004

Report from ESPEN working group

Effects and Benefits of Fibre in Clinical Practice: A Consensus recommendations

Remy Meier
Effects and Benefits of Fibre in Clinical Practice

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R. Meier, M.D.
University Hospital
Liestal, Switzerland
Background

• A large number of articles on fibre were published in different areas of diseases but the benefits are still widely discussed.

• Different definitions are used which makes the interpretations often difficult:
  - physiologically
  - chemically
  - solubility
  - dietary fibre / functional fibre

• There is a lack of well performed and sized clinical studies.
Aims

- Critical evaluation of the properties and physiological effects of different fibres
- Assessment of the evidence-based clinical benefits of fibre
- Defining of evidence-based recommendations for the use of fibre in clinical practice
- Identifying areas with lacking evidence for future research
Interests of the Consensus Conference

I. General aspects of fibre
   ↘ John Cummings (UK), Glenn Gibson (UK)

II. Inflammatory bowel disease
   ↘ John Rombeau (US)

III. Constipation, diarrhoea, IBS
    ↘ Ingvar Bosaeus (S)

IV. Prevention of CRC
    ↘ Wolfgang Scheppach (G)

V. The use of fibre in enteral nutrition
   ↘ Eduard Cabré (SP), Heinz Homann (G)

VI. Metabolic effects
    ↘ David Jenkins (Can)
Proceedings of Consensus Conference

• Summary lecture and plenum discussions with a group of international experts in the field (N = 18)

• Discussion of five main topics in five groups
  ➔ Summarizing the rationales and evidences of the topic

• Plenum discussion and defining the recommendation level

• Circulating the consensus recommendations by e-mail until all the participants (N = 28) agreed
<table>
<thead>
<tr>
<th>Level of evidence</th>
<th>Grade of recommendation</th>
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<tbody>
<tr>
<td><strong>Level I:</strong> Randomized trial or meta-analysis with low risk of error</td>
<td><strong>Grade A:</strong> Supported by Level of evidence I</td>
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<tr>
<td><strong>Level II:</strong> Randomized trial or meta-analysis with high risk of error</td>
<td><strong>Grade B:</strong> Supported by at least one Level II study</td>
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<tr>
<td><strong>Level III:</strong> Non-randomized trial or randomized trial of patients other that population of interest or randomized trial of measuring surrogate outcomes</td>
<td><strong>Grade C:</strong> No support from Level I or II studies</td>
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<tr>
<td><strong>Level IV:</strong> Non-randomized trial in patients other than population of interest or animal studies for biological rationale</td>
<td><strong>No recommendation</strong></td>
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Adapted from Heyland and Novak, JPEN, 2001, Sackett, Chest, 1989
Selected 5 topics

• Inflammatory bowel disease
• Constipation, diarrhoea, irritable bowel syndrom
• Prevention of CRC
• The use of fibre in enteral nutrition
• Metabolic effects
Ia. Consensus on inflammatory bowel disease for ulcerative colitis

- **Rationale**
  - Oligo-polysaccharide components of fibre are fermented in the colon
    - pH ↓
    - SCFA’s ↑
  - Butyrate inhibits the activation of the NF-kB
    - pro-inflammatory cytokines ↓ (TNFα, IL₁, IL₆)
  - Butyrate increases the anti-inflammatory cytokine IL₁₀
  - Butyrate oxidation is decreased in ulcerative colitis
• Evidence

Only 4 studies are available using orally administered fibre-polysaccharides

- **Inulin in acute pouchitis**
  - Welters et al, Dis Colon Rectum, 2002

- **Plantago ovata seeds for maintaining remission in ulcerative colitis**
  - Fernandez-Banares et al, Am J Gastroenterol 1999

- **Fermented barley in mild to moderate active ulcerative colitis**
  - Mitsuyama et al, Aliment Pharmacol Ther, 1998
  - Kanauchi et al, J Gastroenterol, 2002
• **Recommendation**
  - **Ulcerative colitis**
    - Fermented barley for active mild to moderate ulcerative colitis
    - Inulin in pouchitis
    - Plantago ovata for maintaining remission are attractive

  → These treatments need further confirmations
Ib. Consensus on inflammatory bowel disease for Crohn‘s disease

- There is no evidence that fibre has any positive effects in Crohn‘s disease
II. Consensus on Constipation, Diarrhea and Irritable Bowel Syndrome

• Rationale

- Some fibre have bulking effects
- Some fibre are fermented
  \( \downarrow \text{SCFA‘s} \uparrow, \text{biomass} \uparrow \)
  \( \downarrow \text{sodium and water absorption} \uparrow \)
• **Evidence**

  Increases of stool weight

  - Resistant starch  \( \sim 1.5 \text{ g/g fed} \)

  - Fruits and vegetables  \( \sim 5.0 \text{ g/g fed} \)

  - Bran  \( \sim 7.2 \text{ g/g fed} \)
• **Recommendation**

  - **Constipation**

    - Fibre results in a modest increase in bowel movement frequency (1.4-1.5 bm/week)  
      Tramonte et al, J Gen Intern Med, 1997

    - Fibre improve symptoms (pain, stool consistency) but there are no long-term data available

    - Dietary fibre (raw bran, fruit and vegetables) are of benefit in some patients, but there is not enough evidence in RCT for recommendation
- **Diarrhea**

  - Partially hydrolized guar gum in ORS reduces diarrhea in children in acute and persistent diarrhea
    
    Alam et al, J Pediatr Gastroenterol Nutr, 2000
    Alam et al, Arch Childhood Disease, 2004

  - Resistant starch in ORS reduces diarrhea in adults with cholera
    
• IBS

- Fibre (high fibre diet, wheat bran, bulk laxatives is generally recommended in IBS but there is little evidence to support its use

- Patients with predominant constipation may have a better benefit mostly on bowel frequency but not on bloating and pain
  There is a lack of long-term data

- PHGG may be better tolerated than others, but the data are insufficient
  Parisi et al, Dig Dis Sci, 2002
III. Consensus on Prevention of CRC

• **Rationale**
  - Fibre increase stool mass and decreases transit time
    ‣ Dilution of carcinogenes
  - Fermentation decreases stool pH and produces SCFA’s
    ‣ Butyrate modulates suppressor genes
      - inhibits NF-kB
      - influences apoptosis
• Evidence

- Meta-analysis of 13 case-control studies showed an inverse correlation of the CRC risk (13 g/d → 31% reduction)  
  Howe et al, J Natl Cancer Inst, 1992

- EPIC-Study: dietary fibre in food are inversely correlated to the incidence of CRC  
  Bingham et al, Lancet 2003

- No effect in polyp-recurrence studies over 3-4 years  
• **Recommendations**

• The role of dietary fibre as an anti-carcinogenic agents is, at best equivocal today but the intake of a high fibre diet (fruit, vegetables, whole grains) is recommended from childhood onwards in the general population.
IV. Consensus on using fibre in enteral nutrition

• Rationale

- Fermentable fibre increase sodium and water absorption
  ↓ Prevention of diarrhoea in acute disease
- Bulking fibre may maintain normal bowel function
  ↓ Prevention of constipation in long-term enteral nutrition
• Evidence

- PHGG reduces enteral nutrition associated diarrhoea in patients after surgery and in critically ill
  • Homann et al, JPEN, 1994
  • Spapen et al, Clin Nutr, 2001

- Soy polysaccharides combined with oat fibre increase daily stool weight and frequency small group of patients, short periods)
  • Zar Ling et al, J Am Coll Nutr 1994

- Soy polysaccharides showed an increase in stool weight during one year (only 11 patients)
  • Liebl et al, JPEN, 1990
• **Recommendation**

- Prevention of diarrhoea in post surgical and critically ill patients supplementing enteral nutrition with PHGG is effective.  

- Short term studies showed that soy polysaccharides combined with oat fibre increase daily stool weight and frequency.
V. Consensus on metabolic effects

• Rationale

- Viscous fibre (guar gum, pectin, psyllium) lower cholesterol levels in healthy and hyperlipidaemic subjects
- Insoluble fibre has no effect
- Soluble fibre reduce blood glucose levels and insulin release
• **Evidence**

  • 1g soluble fibre reduce cholesterol by 0.045 and LDL by 0.057 mmol/l
    - Jenkins et al, Metabolism, 2001
  
  • Meta-analysis of observational studies suggest a protective effect of dietary fibre and/or whole grain cereals against CHD
    - Anderson et al, Proc Nutr Cardiol, 2003
    - Liu et al, J Am Coll Cardiol, 2002
  
  • Guar gum reduce blood glucose levels by 44%, pectin and psyllium by 29%
    - Berger et al, 1992
    - Wolover et al, CRC Press, 1993
  
  • Pooled data suggest that dietary fibre and/or whole grain cereals may have a protective effect against type II diabetes
    - Salmeron et al, Diab Care, 1997
• **Recommendation**

• Regular intake of viscous fibre or psyllium shows beneficial effects on blood cholesterol, LDL-cholesterol and reduces postprandial glucose levels and insulin response. However, there are no data from RCT with hard end points to indicate a clear benefit in terms of prevention of CHD and diabetes.

• Fibre has beneficial effects on CHD but fibre is only factor of dietary components which affect the risk.
Conclusion

• The use of fibre in GI-diseases is fascinating due to the different actions of different fibre

• Although numerous studies are available, there are only few clear benefits demonstrated due to the lack of well designed studies

• May be in the future a combination of different fibre, prebiotics and probiotics will change the situation