Integrating Nutrition into the Care Pathway for Colorectal Cancer Patients

Sorrel Burden
Research Programme

• Systematic review
• Qualitative interviews
• Feasibility study
• Randomised Controlled trial
MRC Guidance

**Feasibility/piloting**
1. Testing procedures
2. Estimating recruitment/retention
3. Determining sample size

**Development**
- Identifying the evidence base
- Identifying/developing theory
- Modelling process and outcomes

**Implementation**
1. Dissemination
2. Surveillance and monitoring
3. Long term follow-up

**Evaluation**
1. Assessing effectiveness
2. Understanding change process
3. Assessing cost-effectiveness
Aims systematic review

• To review the literature on preoperative nutritional support in GI surgical patients.

• To determine if there are any benefits on postoperative complications.

• To determine any benefits on nutritional intake or nutritional status measurements.
Inclusion criteria

- **Studies** – RCT
- **Participants** - All non-emergency GI surgical patients.
- **Intervention** - Nutritional formula delivered by a parenteral, enteral or oral route.
- **Primary outcome** - Postoperative complications & LOS.
- **Secondary outcomes** - nutritional status measurements, QOL, nutritional intake, biochemistry & adverse events.
Search

• Databases including all EBM Reviews MEDLINE, EMBASE, AMED, British Nursing Index Archive using Ovid SP.

• Duplicates were excluded.

• We hand searched the reference lists of the articles selected for the review and contacted authors of any conference abstracts if further data was required.
Method

• 2 review authors assessed the title & abstract to determine eligibility.
• Review authors assessed full text of papers & extracted data from studies that met inclusion criteria.
• Planned to translate any non-English articles.
• 3rd reviewer was available to resolve any conflicts in study selection.
Results of search

9900 titles database search

12 titles from other sources

6433 duplicates excluded

6445 titles screened

6278 excluded on title

167 abstracts screened

134 excluded on abstract

33 of full papers assessed

20 of full text articles excluded

13 of studies included
Results

Trials – total 1192 participants


2 - enteral nutrition with a standard formula involving 120 patients. (Von Meyenfeldt 1992, Gunerhan 2009)

3 - standard supplements involving 263 patients (Burden 2011, Smedley 2004, MacFie)

2 - data more than one analysis. (Braga 2002a, Gunerhan 2009)
## Study details

<table>
<thead>
<tr>
<th>Study &amp; country</th>
<th>Site of surgery</th>
<th>Feed &amp; volume</th>
<th>Route &amp; duration</th>
<th>% of malnourished Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muller 1982 Germany</td>
<td>oesophagus, stomach, Colorectal, Pancreas</td>
<td>parenteral</td>
<td>CVC 10 days</td>
<td>62% controls/59% active weight loss &gt;5% &amp; alb&lt;35d/L</td>
</tr>
<tr>
<td>Smith 1988 Australia</td>
<td>major upper GI colorectal</td>
<td>parenteral</td>
<td>CVC 10 days</td>
<td>all Prognostic nutrition Index &gt;30%</td>
</tr>
<tr>
<td>Von Meyenfeldt 1992 Netherlands</td>
<td>gastric, colorectal</td>
<td>Parenteral and enteral</td>
<td>NG/-CVC minimum 10 days</td>
<td>all depleted (Nutrition Index)</td>
</tr>
<tr>
<td>Braga 2002a Italy</td>
<td>colorectal</td>
<td>1000 IE formula</td>
<td>5 days oral</td>
<td>12% active/8% control (&gt;10% weight loss)</td>
</tr>
<tr>
<td>Braga 2002b Italy</td>
<td>gastric, pancreatic Colorectal, oesophageal</td>
<td>1000mls IE nutrition &amp; standard enteral</td>
<td>7 days Oral</td>
<td>all weight loss &gt;10% previous 6 months</td>
</tr>
<tr>
<td>Gianotti 2002 Italy</td>
<td>Oesophageal, pancreas Colorectal</td>
<td>1000mls IE formula</td>
<td>5 days, oral</td>
<td>excluded weight losing patients</td>
</tr>
<tr>
<td>Guenerhan 2009 Turkey</td>
<td>GI</td>
<td>IE</td>
<td>7 days, oral</td>
<td>all at risk (SGA))</td>
</tr>
<tr>
<td>Mccarther 1998 America</td>
<td>oesophagus stomach, pancreas</td>
<td>750mls supplement with arginine &amp; omega 3</td>
<td>7 days oral</td>
<td>21% active 18% control</td>
</tr>
<tr>
<td>Okamoto 2009 Japan</td>
<td>gastric</td>
<td>750mls IE formula</td>
<td>7 days oral</td>
<td>not reported</td>
</tr>
<tr>
<td>Xu 2006 China</td>
<td>gastric colorectal</td>
<td>IE nutrition &amp; oral diet</td>
<td>7 days nasogastric</td>
<td>not reported</td>
</tr>
<tr>
<td>Burden 2011 UK</td>
<td>colorectal</td>
<td>400mls standard Supplement</td>
<td>oral</td>
<td>46% at risk using subjective global assessment</td>
</tr>
<tr>
<td>Smedley 2004 UK</td>
<td>lower GI</td>
<td>ad libitum standard Supplement</td>
<td>oral</td>
<td>34% at risk (determined by BMI &amp; weight loss)</td>
</tr>
<tr>
<td>MacFie 2000 UK</td>
<td>colorectal, GI</td>
<td>minimum of 2 supplements a day</td>
<td>oral</td>
<td>17% patients lost &gt;10%</td>
</tr>
</tbody>
</table>
Immune-enhancing nutrition compared to no supplements or standard

Total complications

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental</th>
<th>Control</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Events</td>
<td>Total</td>
<td>Events</td>
<td>Total</td>
</tr>
<tr>
<td>Braga 2002a (1)</td>
<td>13</td>
<td>50</td>
<td>24</td>
<td>50</td>
</tr>
<tr>
<td>Braga 2002b</td>
<td>14</td>
<td>50</td>
<td>21</td>
<td>50</td>
</tr>
<tr>
<td>Gianotti 2002</td>
<td>36</td>
<td>102</td>
<td>49</td>
<td>102</td>
</tr>
<tr>
<td>McCarter 1998</td>
<td>7</td>
<td>13</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Okamoto 2009</td>
<td>6</td>
<td>30</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>Xu 2006</td>
<td>2</td>
<td>30</td>
<td>8</td>
<td>30</td>
</tr>
</tbody>
</table>

Total (95% CI)

<table>
<thead>
<tr>
<th>Events</th>
<th>Total</th>
<th>Weight</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>275</td>
<td>273</td>
<td>100.0%</td>
<td>0.67 [0.53, 0.84]</td>
</tr>
</tbody>
</table>

Total events: 78, 116

Heterogeneity: Chi² = 7.73, df = 5 (P = 0.17); I² = 35%

Test for overall effect: Z = 3.42 (P = 0.0006)

(1) Data comparing immune enhancing nutrition to no nutrition is used in the first instance.
Immune-enhancing nutrition compared to no supplements or standard

Infective complications

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental</th>
<th>Control</th>
<th>Weight</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braga 2002a</td>
<td>6</td>
<td>15</td>
<td>22.0%</td>
<td>0.40 [0.17, 0.95]</td>
</tr>
<tr>
<td>Braga 2002b</td>
<td>8</td>
<td>12</td>
<td>17.6%</td>
<td>0.67 [0.30, 1.49]</td>
</tr>
<tr>
<td>Gianotti 2002</td>
<td>14</td>
<td>31</td>
<td>45.5%</td>
<td>0.45 [0.26, 0.80]</td>
</tr>
<tr>
<td>McCarter 1998</td>
<td>5</td>
<td>2</td>
<td>3.2%</td>
<td>2.12 [0.51, 8.84]</td>
</tr>
<tr>
<td>Okamoto 2009 (1)</td>
<td>2</td>
<td>8</td>
<td>11.7%</td>
<td>0.25 [0.06, 1.08]</td>
</tr>
</tbody>
</table>

Total (95% CI) 245 243 100.0% 0.51 [0.35, 0.73]

Total events 35 68

Heterogeneity: Chi² = 5.62, df = 4 (P = 0.23); I² = 29%

Test for overall effect: Z = 3.59 (P = 0.0003)

(1) Xu- not included as infections given as counts not a dichotomous variable
Standard oral supplements compared to no nutrition

Total complications

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental Events</th>
<th>Total</th>
<th>Control Events</th>
<th>Total</th>
<th>Weight</th>
<th>Risk Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burden 2011</td>
<td>33</td>
<td>54</td>
<td>25</td>
<td>62</td>
<td>39.1%</td>
<td>1.52 [1.05, 2.19]</td>
<td></td>
</tr>
<tr>
<td>MacFie 2000</td>
<td>7</td>
<td>24</td>
<td>3</td>
<td>25</td>
<td>4.9%</td>
<td>2.43 [0.71, 8.32]</td>
<td></td>
</tr>
<tr>
<td>Smedley 2004</td>
<td>20</td>
<td>48</td>
<td>34</td>
<td>50</td>
<td>56.0%</td>
<td>0.61 [0.42, 0.90]</td>
<td></td>
</tr>
</tbody>
</table>

**Total (95% CI)**

<table>
<thead>
<tr>
<th>Events</th>
<th>Total</th>
<th>Weight</th>
<th>Risk Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>126</td>
<td>100.0%</td>
<td>1.06</td>
<td>[0.82, 1.36]</td>
<td></td>
</tr>
</tbody>
</table>

Total events 60 62

Heterogeneity: Chi² = 13.10, df = 2 (P = 0.001); I² = 85%

Test for overall effect: Z = 0.41 (P = 0.68)
Parenteral nutrition compared to no nutrition

Total complications

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental</th>
<th>Control</th>
<th>Weight</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muller 1982</td>
<td>11</td>
<td>19</td>
<td>34.4%</td>
<td>0.52 [0.27, 1.00]</td>
</tr>
<tr>
<td>Smith 1988</td>
<td>3</td>
<td>6</td>
<td>10.3%</td>
<td>0.50 [0.15, 1.68]</td>
</tr>
<tr>
<td>Von Meyenfeldt 1992</td>
<td>24</td>
<td>32</td>
<td>55.4%</td>
<td>0.74 [0.51, 1.05]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>134</td>
<td>126</td>
<td>100.0%</td>
<td>0.64 [0.46, 0.87]</td>
</tr>
</tbody>
</table>

Total events: 38 for experimental, 57 for control

Heterogeneity: Chi² = 1.16, df = 2 (P = 0.56); I² = 0%

Test for overall effect: Z = 2.82 (P = 0.005)
Parenteral nutrition compared to no nutrition

**Infective complications**

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental</th>
<th>Control</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Events</td>
<td>Total</td>
<td>Events</td>
<td>Total</td>
</tr>
<tr>
<td>Gunerhan 2009</td>
<td>7</td>
<td>11</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Von Meyenfeldt 1992</td>
<td>23</td>
<td>50</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>61</strong></td>
<td><strong>59</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Total events**: 30 experimental, 29 control
- **Heterogeneity**: Chi² = 0.84, df = 1 (P = 0.36); I² = 0%
- **Test for overall effect**: Z = 0.02 (P = 0.99)
Results of EN

• 2 trials 120 participants (all malnourished)
• absolute risk of total complications 42% (35/59) control group
• 40.7% 28/66 intervention group
• Relative effect was 0.79 (CI 0.56 to 1.10)
• Bias assessment indicated high risk
Conclusions

• IE nutrition beneficial affects on postoperative complications not LoS.
• Administration of PN beneficial, however related to temporal bias.
• Current evidence does not demonstrate any benefits from standard oral supplements or enteral feeding preoperatively in unselected patients.
Qualitative exploration of colorectal cancer patients’ views and experiences of food and nutrition before and after surgical treatment
Overview of project

• Purpose of work was to elicit patients views & experiences of food and nutritional issues

• Look at treatment trajectory & nutritional implications for patients from the point of diagnosis into survivorship
Introduction

- Nutrition support is a fundamental component in perioperative management.
- Surgery is the mainstay of treatment in 70% of those with CRC
- 5 yr survival rate 60-69% (rectal/colon)
- CRC patients’ views and experiences have not been fully investigated.
- Study aims to explore patients’ experiences of nutritional issues during the treatment trajectory for colorectal cancer.
Method

• 39 patients were recruited up to 3 yrs post surgery. 32 were interviewed and 7 included in focus groups.
• Interviews were digitally recorded and transcribed verbatim.
• Data were collected until saturation was achieved, then transcribed and analysed using NVivo.
• Guided by phenomenology.
Data

- Preoperative
- Post-operative
- Cross cutting themes
  - Patients self help strategies
  - Motivation
  - Role of HCP in the community
Preoperative experiences

- Appetite fluctuations
  Third of respondents – nausea, smell of food seeing other eat.
- Weight changes
  Half of respondents reported weight loss (6.3-19kg)

Symptoms incurred
- Rectal bleeding, diarrhoea, weight loss, altered bowel habit
Post-operative experiences

• Weight loss was disclosed by 15 and weight gain by 4 respondents.

• Dietary modification was instigated:

  health care professional’s advice
  observed experience of others
  trial and error
  self help management strategies

• Drivers for change were symptom management, chemotherapy, improving health status & manipulating weight.
Key Themes

- Weight change
- Appetite fluctuations
- Dietary supplements
- Chemo induced dietary change
- Stoma management
- Weight change
- Appetite fluctuations
- Dietary supplements
- Chemo induced dietary change
- Stoma management
- Weight change
- Appetite fluctuations
- Dietary supplements
- Chemo induced dietary change
- Stoma management
Weight Loss

“I lost about two stone didn't I? And, er, he realised then, that, er, he had to start eating” (male, 67yrs rectal cancer).

“So, um, I think it was about four weeks before I started eating a little bit..., Um...Oh aye, yeah, I was shocking. Oh aye, I was like a lad” (male, 64yrs, rectal cancer).

Really shrunk, you know. I said to myself, ‘Well, the best thing to do is to eat,’ (male, 73yrs, colon cancer
Weight Gain

Err but I did put on a lot of weight on weight back on because I couldn't move out of the house for six months with being on the chemo. But I couldn't do any exercise with being stuck in the house. " (male, 47yrs, colon cancer).
Supplements

“I didn’t enjoy it. It was a bit sickly I thought”
(female, 69yrs, colon cancer).

“And I really enjoyed them, but then I had to stop because I was getting I only wanted them and no food which wasn't right”
(female, 81yrs, colon).

“I had them for about two months. And then I said to the doctor I didn't want to get them anymore because I enjoyed them too much”
(female, 81yrs, colon cancer).
Dietary manipulation due to chemotherapy and stoma management

“I would start after my treatment, I’d go off for about two or three days when I didn’t really want a lot of food but, eh, I coped with it, you know, and, eh...” (female, 84yrs, colon cancer)

“I mean I just want to go for a cup of coffee with my daughter in law but, no, I’ve got to be so careful of coffee can trigger it off terrible. Especially in the morning. I think mornings are the worst’ (female, 70yrs, colon cancer).

“So just I’ve got to make sure it’s cooked, well cook...cook it more than I would normally. That’s why I say don’t I, it affects the taste and that” (male, 65yrs, recta cancer)
Conclusions

• Appetite, weight and symptoms influenced dietary intake substantially
• Highlighted as poignant issues affecting individual’s lives.
• Both preop/postop outside ERAS protocols
• Respondents looked to food to assist with symptom management as a means of taking control.
• Weight changes were rationalised by respondents who attributed alterations in weight as a barometer either as response to actions or motivation for change
Future developments

• Feasibility study for RCT preoperative sip feeding
• Definitive trial
• Evaluating nutritional interventions for behaviour change in colorectal cancer patients
Acknowledgements

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