Nutrition and Wound healing
Nutritional aspects in pressure ulcer care; how to come to value based PU care…?

J. Schols
Nutritional aspects in pressure ulcer care; how to come to value based PU care…?

J.M.G.A. Schols  MD, PhD
-Maastricht University; department of General Practice;
Pressure ulcers - PU

- PU are the result of a complex interplay between extrinsic and intrinsic risk factors!

  Extrinsic e.g.: pressure and shear forces
  Intrinsic e.g.: age, morbidity, handicap status, urinal and/or faecal incontinence and also... nutritional status!!
a PU outside is also an exponent of frailty inside...!!
Pressure ulcers are mostly located on sacrum and heel; they are common in:

- Geriatric patients (characterized by frailty, comorbidity and disability)
- Chronic care patients (e.g. in nursing homes)
- Patients with limited mobility
- Patients with malnutrition

Pressure ulcers are associated with:

- Increased morbidity
- Increased mortality
- Local and systemic infections
- Quality of life issues: pain, smell, exudate, body image, healing a.s.o.

Pressure ulcers are associated with:

- Huge health care costs

Essentials of PU care:

Look at the patient in total and look at the patient’s ulcer(s)

Pressure ulcer care is multidisciplinary care

Adequate and total wound care:

**Local wound management:**
- clean and debride the wound:
- cover and protect the wound:

**Support the host:**
- identify and treat cause of wound;
- optimize disease management;

and:
- maximize nutritional status!!

(Kiy e.a. 1997)
Malnutrition

- a common problem in patients with an acute or chronic disease...and with co-morbidity, such as PU!

Malnutrition: prevalence...??

- Home care: 10 - 25%
- Nursing home: 25 - 40%
- Hospital: 25 - 60%

Todorovic V, 2002; Edington J, 1996/1997; Thomas DR et al, 1991; LPZ 2006 and others
PU-development, PU-healing and.. nutrition??

evidence + experience  best practice
EVIDENCE: EPIDEMIOLOGY!

- Protein-calorie malnutrition:
  - risk to develop pressure sores
  - risk to develop chronic wounds
  - rate of wound healing

- chronic wounds and malnutrition are associated with a poor outcome; separately and additionally!!

Nutritional supplements of course may have a role complementary to normal feeding in malnourished patients

↓

But… what’s the evidence about the use of non-specific and PU-specific ONS and ETF in PU care
The hypothesis behind (PU specific-) nutritional supplements in PU-care =

• Several nutrients play a role in wound healing and preserving tissue viability....

• It is a challenge to combine adequate amounts of relevant “wound” nutrients in a PU-specific nutritional supplement....
### Possible “wound” nutrients:

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>Increased requirements</td>
</tr>
<tr>
<td>Protein</td>
<td>Collagen synthesis; wound contraction; scar formation; immune response</td>
</tr>
<tr>
<td>Arginine</td>
<td>Collagen deposition; wound strength; vasodilation; immune response protein retention</td>
</tr>
<tr>
<td>Zinc</td>
<td>Protein synthesis; cellular growth; deficiency impairs healing</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>Collagen synthesis; immune response; wound closure</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>Collagen synthesis; wound strength</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>Wound strength; antioxidant</td>
</tr>
</tbody>
</table>
When is a wound (specific) nutritional supplement of value for the PU (prone) patient?

1. If it prevents the occurrence of PU

2. If it promotes healing of established PU

and

• If it contributes in improving nutritional status;

• If it contributes to an improved functional ability and/or enhanced quality of life.

These outcome variables have to be assessed in scientific research as well as in daily practice!
The Evidence Based Paradigm alone is not enough for that…!

• An RCT, the golden standard in EB research, is not soul-saving in its own!

• To assess the general value of a preventive and therapeutic intervention as successful, we also must take into account the following aspects, above EB-research data:
  - the experiences with and judgement of a therapy by the patient;
  - the experiences with and judgement of a therapy by the HC-professional;
  - and….cost effectiveness
EBP + …… leads to…..?
VALUE BASED MEDICINE / VALUE BASED CARE!

Valuable for the patient, the professional and the society!
The route to a valuable nutritional supplement in PU-care...

We need:

- EB-research data regarding the efficacy of the supplement w.r.t. the outcome data as mentioned before;
- Data about effectiveness of the supplement in daily practice of PU-care;
- Data about the judgement of the supplement by the patient;
- Data about the judgement of the supplement by the HC-professional;
- Cost-effectiveness studies…!
And.. what’s the state of the art?
Cochrane review: nutritional interventions for preventing and treating PU (2003)

• Evidence from only one trial that mixed nutritional supplements reduce the chance of developing PU!

• Follow-up time of most relevant nutritional treatment studies is too short to detect clear positive effects!

• To increase evidence based practice further EB - research on nutrition in PU-(prone) patients is needed!

*Langer et al, The Cochrane Library, Issue 4, 2003*
2005

Review

Enteral nutritional support in prevention and treatment of pressure ulcers: A systematic review and meta-analysis

Rebecca J. Stratton\textsuperscript{a,*}, Anna-Christina Ek\textsuperscript{b}, Meike Engfer\textsuperscript{c}, Zena Moore\textsuperscript{d}, Paul Rigby\textsuperscript{c}, Robert Wolfe\textsuperscript{e}, Marinos Elia\textsuperscript{a}

\textsuperscript{a}Institute of Human Nutrition, University of Southampton, MP 113 F Level, Southampton General Hospital, Tremona Road, Southampton SO16 6YD, UK
\textsuperscript{b}University Hospital, Linköping, Sweden
\textsuperscript{c}Royal Numico, Clinical Nutrition Division, Netherlands
\textsuperscript{d}Royal College of Surgeons in Ireland, Dublin, Ireland
\textsuperscript{e}The University of Texas, TX, USA

Received 23 December 2004; received in revised form 7 March 2005; accepted 11 March 2005
Meta-analysis shows 25% reduction in formation of pressure ulcers

<table>
<thead>
<tr>
<th>Study</th>
<th>Comparison</th>
<th>ONS n/N</th>
<th>Control n/N</th>
<th>OR (95% CI)</th>
<th>Nutritional intervention</th>
<th>Nutritional intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delmi et al 1990</td>
<td>ONS (High protein) vs. no ONS</td>
<td>0/9</td>
<td>3/15</td>
<td>0.19 (0.01 to 4.09)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ek et al 1991</td>
<td>ONS vs. no ONS</td>
<td>21/210</td>
<td>26/215</td>
<td>0.81 (0.44 to 1.49)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bourdel-Marchasson et al 2000</td>
<td>ONS (High protein) vs. no ONS</td>
<td>118/295</td>
<td>181/377</td>
<td>0.72 (0.53 to 0.98)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Houwing et al 2003</td>
<td>ONS (High protein) vs. placebo</td>
<td>27/51</td>
<td>30/52</td>
<td>0.83 (0.38 to 1.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Meta-analysis supplement vs. no supplement</strong> (No sores at baseline)</td>
<td>166/565</td>
<td>240/659</td>
<td><strong>0.75 (0.62 to 0.89)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for heterogeneity Q test 0.953, 3 df, p=0.813</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hartgrink et al 1996</td>
<td>ETF vs. no nutrition support</td>
<td>30/48</td>
<td>37/53</td>
<td>0.72 (0.31 to 1.65)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Meta-analysis nutritional intervention vs. no nutritional intervention (All studies)</strong></td>
<td>196/613</td>
<td>277/712</td>
<td><strong>0.74 (0.62 to 0.88)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for heterogeneity Q test 0.956, 4 df, p=0.916</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Odds Ratio (95% confidence interval)

- EK: Analysis is based on 85.9% of the experimental data without pressure ulcers at baseline. It is assumed that patients with pressure ulcers were evenly distributed at randomisation between ONS and no ONS treatment.
- Hartgrink: Analysis includes patients with grade one pressure ulcers at randomisation.
Evidence shows nutrition support can prevent pressure ulcers in at risk groups:

‘Nutrition support, particularly high protein oral nutritional supplements, can significantly reduce the risk of developing pressure ulcers (by 25%)’

(Stratton et al 2005)

Nutrition may also be vital to enable the healing of pressure ulcers:

A recent systematic review suggests that the healing of pressure ulcers may be improved with nutritional support

(Stratton et al 2005)
But, again…:

- The follow-up time of most relevant nutritional intervention studies is too short to detect clear positive effects!

- To increase *evidence based practice* further EB - research on nutrition in PU-(prone) patients is needed!

*Langer et al, 2003; Stratton et al, 2005.*
And...

- Clear data on patient and doctor’s experience are still lacking as well as cost-effectiveness data…!
Anyway....!

It is clear that:

• nutrition affects total body power!

So.....:

• wound nutrition has to be considered merely as whole body nutrition!!!
Experience: adequate nutritional intake in patients with PU..?

- Schols JMGA et al, 2000
Daily practice: nutritional attention... when?

Schols JMGA et al, 2000
EXPERIENCE:
Nutrition is often too late if you start thinking of it..!

- in daily practice of PU prevention and treatment there often is a lack of nutritional alertness!


Do you think they have forgotten us??
Fatal conclusion:
Malnutrition may act as a silent killer!!

Schols JMG A, 2006
Nutritional policy in PU-care

• to increase *value based practice*, further VB - research is needed!

• to reach *best practice*:
  the PU (prone) patient not only must be given nutritional attention, but he also must be given it in time.....
Wounds like these also cry for nutrition!

What do PU guidelines advise?
2002: Study on nutrition in current PU-guidelines!

Schols JMGA et al, 2004
Results

• Nutrition mentioned in every guideline, but the degree of attention showed a large variation

• The recommendations regarding nutritional assessment, prevention and treatment mainly had a general and often only an intentional character

Schols JMGA et al, 2004
2003: EPUAP working group on nutrition
Michael Clark, Jos Schols, Gero Langer, Denis Colin, Bernie Kerry, Pam Jackson, Giuseppe Benati

• WG developed an EB-guideline on nutrition in pressure ulcer prevention and treatment!

• This guideline was launched in the 2004 WUWHS congress in Paris (-in 8 languages!).
GUIDELINE ON NUTRITION IN PRESSURE ULCER PREVENTION AND TREATMENT COVERS WHOLE NUTRITIONAL CYCLE

Of course, nutritional actions take place in association with all other appropriate PU interventions......!

Guideline and explanation were published in JOW, 2004; see also: www.epuap.org
Developing a well designed protocol is one side of the picture....!
The other side involves implementing and embedding them!!!

Guidelines and protocols often are prone not to be used...!

EPUAP is currently monitoring implementation in different countries and is also working on the development of “global” integral PU-guidelines together with NPUAP (USA)
The message is clear!
We can not simply give a patient with PU or at risk of PU a new and healthy skin!
EPUAP Guideline on Nutrition

Every professional can follow the concrete recommendations of the EPUAP nutritional guideline in daily practice and target nutritional intervention in the right direction!
PU-patients deserve integral treatment

So, besides pressure and shear relief, we have to take care of adequate skin care and in case of established ulcers of adequate woundbed preparation with secondary use of adequate wounddressings to promote woundhealing; and last but not least we have to give the patient adequate nutritional attention.
Greetings from the Netherlands...!
Thank you for your attention!!