

Case Study: Pressure Ulcers



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12-19-2012

Outline



- Patient Profile
- Pressure Ulcer Background
- PU Stages
- Current Research
- Patient Application
- PES
- Conclusion

Patient Profile



- 75 year old
- Caucasian female
- Widowed
- Former Registered Dietitian
- LTC 6-7 years
 - Readmitted 10/03/12 after hospital stay w/ pyelonephritis
- Anthropometrics
 - 61”
 - 146#
 - BMI: 27.7; overweight

Patient Profile



- Dx: Stage II PU
- Hx: HTN, dyslipidemia, DM, morbid obesity, chronic GERD, aortic stenosis, left ventricular hypertrophy, dementia with progressive psychotic features, COPD, CHF, oral motor dysphagia
- Diet
 - Pureed, nectar thick liq
 - ProStat
 - Large protein serving TID

Pressure Ulcer



- Defined as a localized injury or damage to the skin and/or underlying tissue. They usually occur over a boney prominence, such as hips, heels, sacrum, buttocks or coccyx, caused by pressure, shear, friction, or a combination of these factors.

Prevalence



- 80% increase in pressure-ulcer related hospitalizations from 1993-2006.
- Prevalent in all settings
 - 2.3-28% cases in long term care
 - 18% in acute care
 - 0-29% in home care
- 1-3 million people in US with pressure ulcers
 - 60,000 will die from complications of PU

(AHRQ, 2008)

Expenses



- 13-14 day PU related hospitalization
 - \$16-755 - \$20,430
- Estimated future costs for US healthcare facilities as high as \$15.6 billion each year
- Prevention and treatment imperative for reduced costs

(Russo et al., 2008)

Pathophysiology

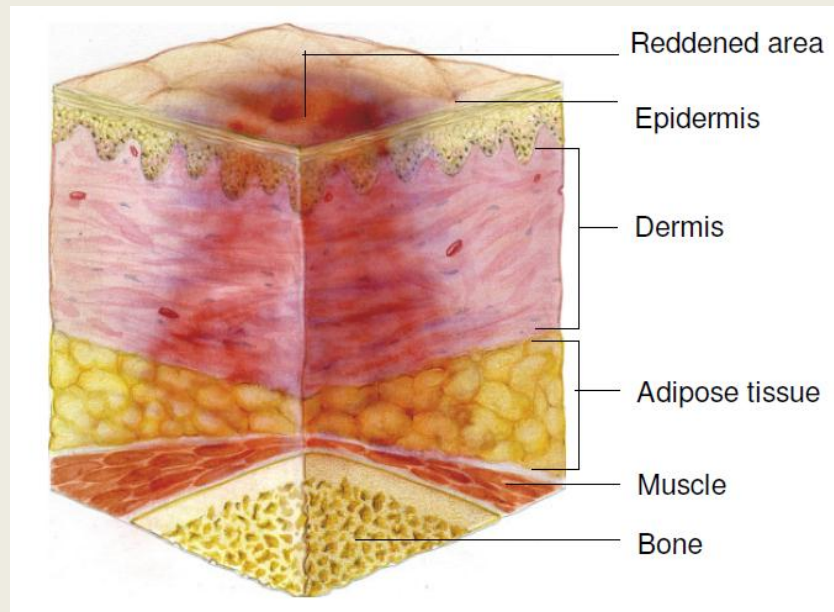


- Result of
 - Pressure
 - Shear force
 - Friction
- Blood vessel occlusion
 - Ischemia, tissue necrosis
- Classified by National Pressure Ulcer Advisory Panel
 - Stage I-IV, unstagable, deep tissue injury

Deep Tissue Injury



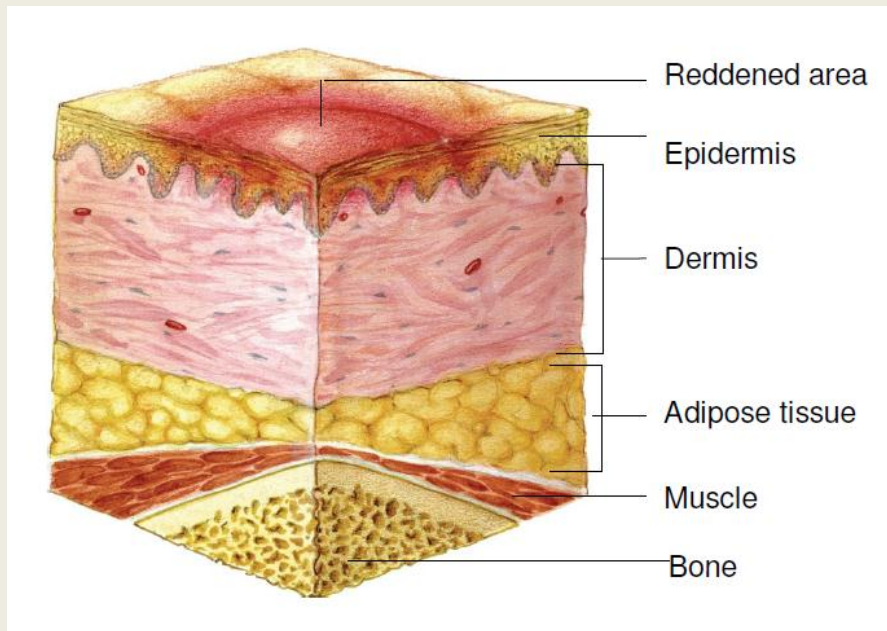
- Purple or maroon localized area of discolored intact skin or blood-filled blister due to underlying soft tissue from pressure or shear.



Stage I



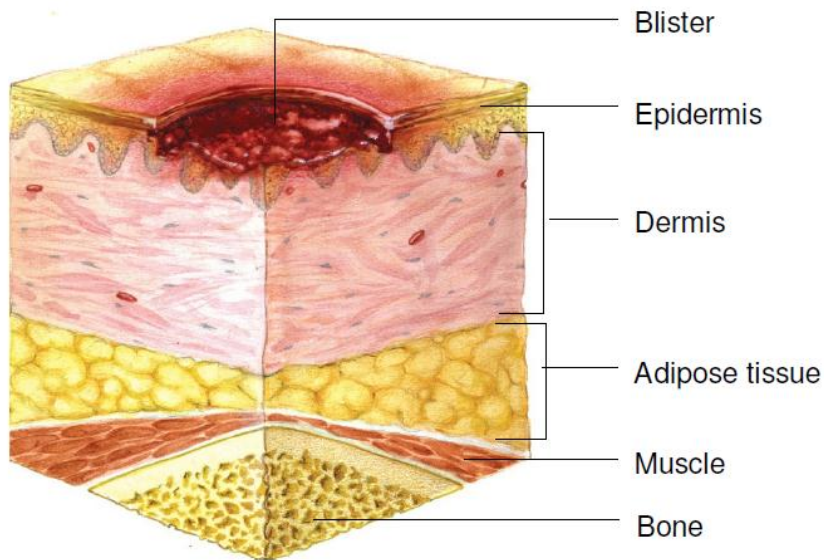
- Skin is intact with non-blanchable redness of a localized area usually over a bony prominence.



Stage II



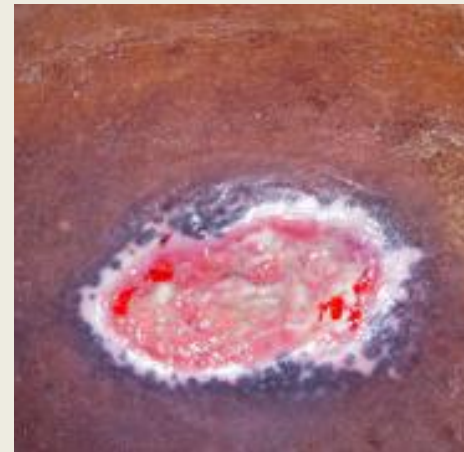
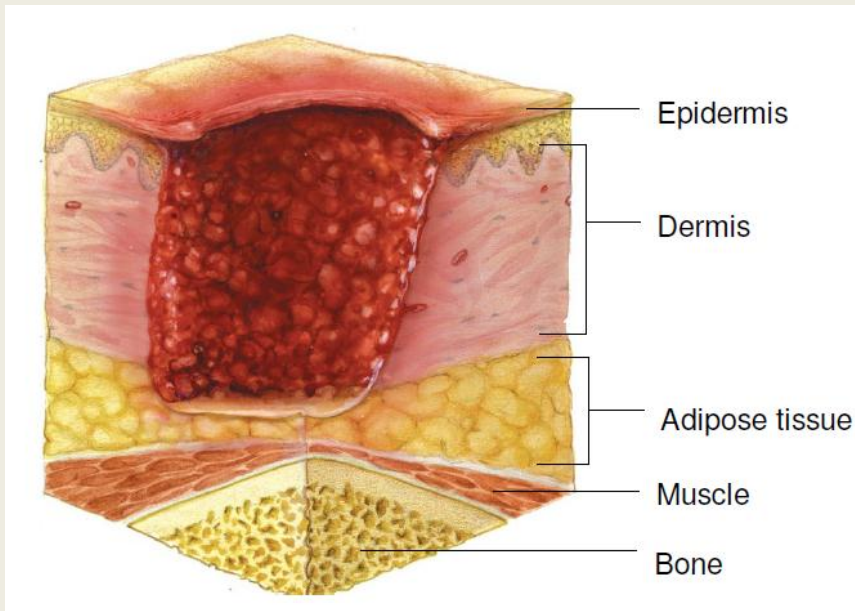
- Partial thickness loss of dermis presenting as a shallow open ulcer with red/pink wound bed, without slough or bruising. Or may present as an intact or open/ruptured serum-filled blister.



Stage III



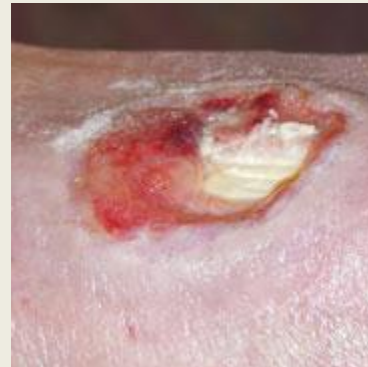
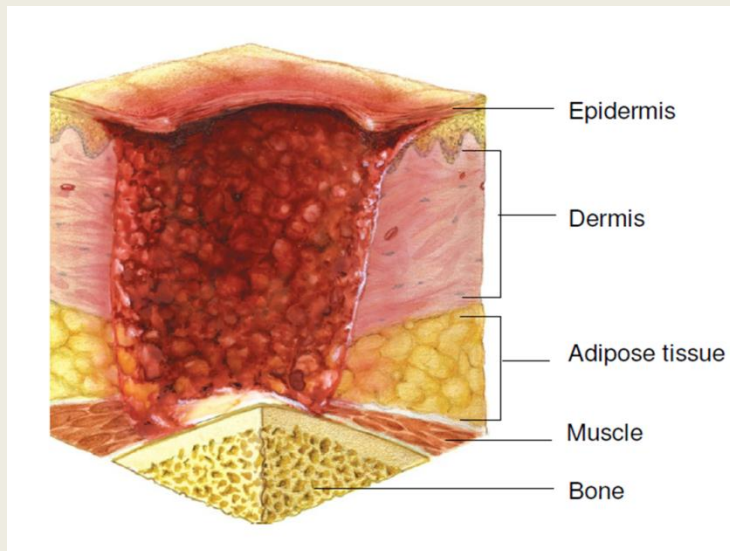
- Full thickness tissue loss with possible subcutaneous fat visible, but no bone, tendon or muscle exposed. Slough may be present and may include undermining or tunneling.



Stage IV



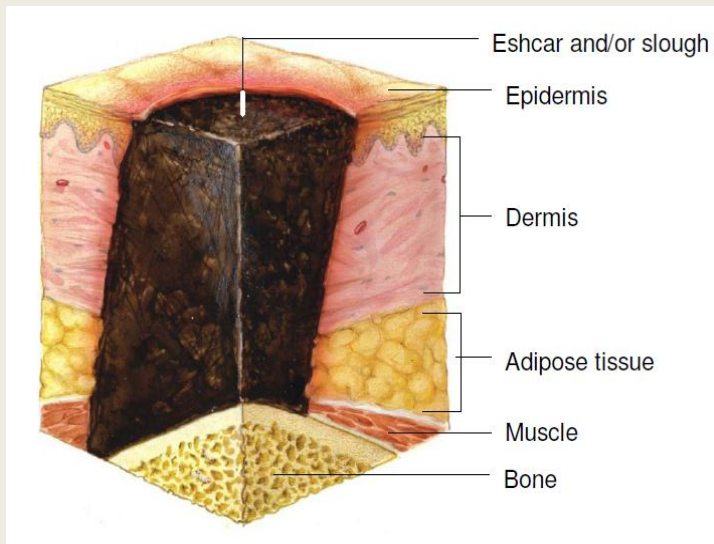
- Full thickness tissue loss with exposed bone, tendon, or muscle with possible slough present on some parts of wound bed. Often has undermining and tunneling. Osteomyelitis possible.



Unstageable



- Full thickness tissue loss with base of ulcer covered by slough and/or eschar in wound bed. Depth cannot be determined until slough or eschar is removed.



Risk for PU Development



- Advanced age
- Immobility
- Stress/Infection
- Compromised nutritional status
 - Unintentional weight loss, malnutrition, PEM, low BMI, reduced food intake, impaired ability to eat
- Braden Scale for Predicting Pressure Ulcer Risk

Nutritional Intervention



- Energy
- Protein
- Fluid
- Vitamin C
- Vitamin A
- Zinc
- Arginine

Research: Nutritional Intervention



- Control group: 30 patients
- Intervention group: 30 patients
 - Basal Energy Expenditure x 1.1 x 1.3-1.5
 - Racol formula
 - ✦ 4.38 g protein, 2.23 g fat, 15.62 g CHO per 100 mL
 - ✦ 1:3 ratio, 125 mcg Cu, 0.64 mg Zn
- Stage III-IV PU
- 12 week duration

(Takehiko et al., 2011)

Research: Nutritional Intervention



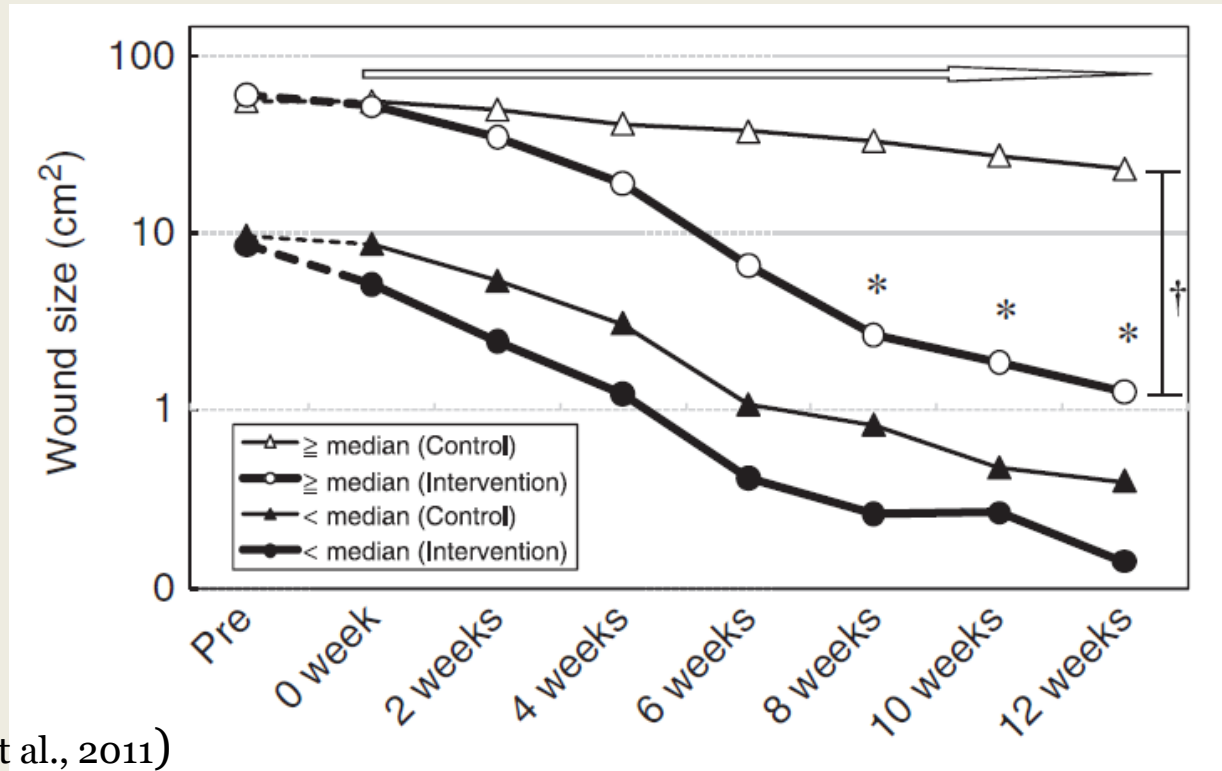
- Control group
 - Mean kcal administered: 29.1 kcal/kg
 - Mean protein administered: 1.24 g/kg
- Intervention group
 - Mean kcal administered: 37.9 kcal/kg
 - Mean protein administered: 1.62 g/kg

(Takehiko et al., 2011)

Research: Nutritional Intervention



- Larger PU receive greater benefits than smaller PU ($p < 0.001$)



(Takehiko et al., 2011)

Research: Nutritional Supplementation



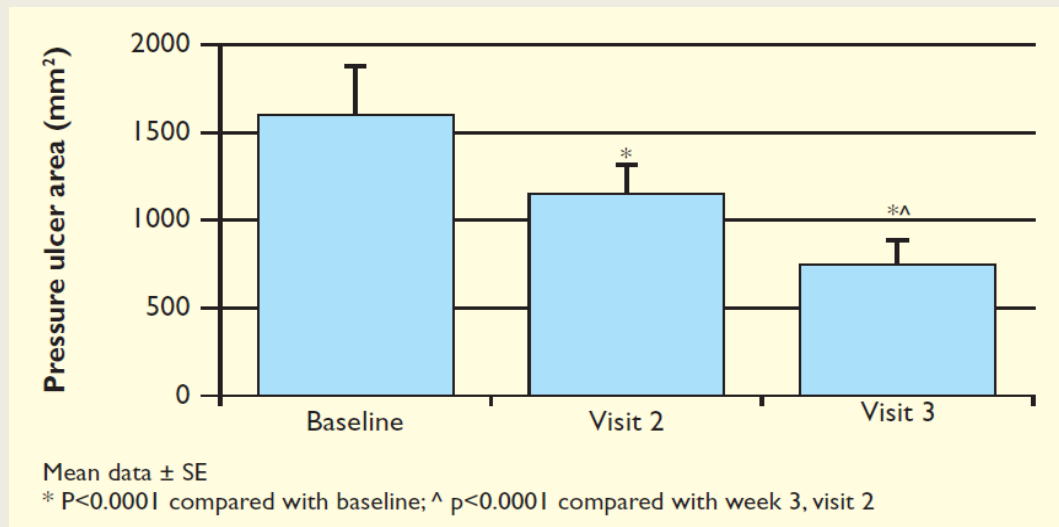
- 245 long term care residents
- Stage II (25%), Stage III (26%), Stage IV (38%)
- Daily ONS for 9 weeks
 - 200 ml: 250 kcal, 20 g pro, 3 g arginine, 250 mg vitamin C, 38 mg vitamin E, 9 mg zinc
 - TID
- Average intake: 2.3 ± 0.56 servings/day
 - 575 kcal, 46 g pro, 6.9 g arginine, 575 mg vitamin C, 87 mg vitamin E, 21 mg zinc

(Heyman et al., 2008)

Research: Nutritional Supplementation



- 3 weeks
 - Reduction: $1580 \pm 3743 \text{ mm}^2$ to $1103 \pm 2999 \text{ mm}^2$ ($p < 0.0001$)
- 9 weeks
 - Reduction: $1580 \pm 3743 \text{ mm}^2$ to $743 \pm 1809 \text{ mm}^2$ ($p < 0.0001$)
 - Reduction of 53% compared with baseline



Research: Nutritional Supplementation



Fig 2.An example of a grade III pressure ulcer in a patient at baseline (a), visit 2 (b) and visit 3 (c)

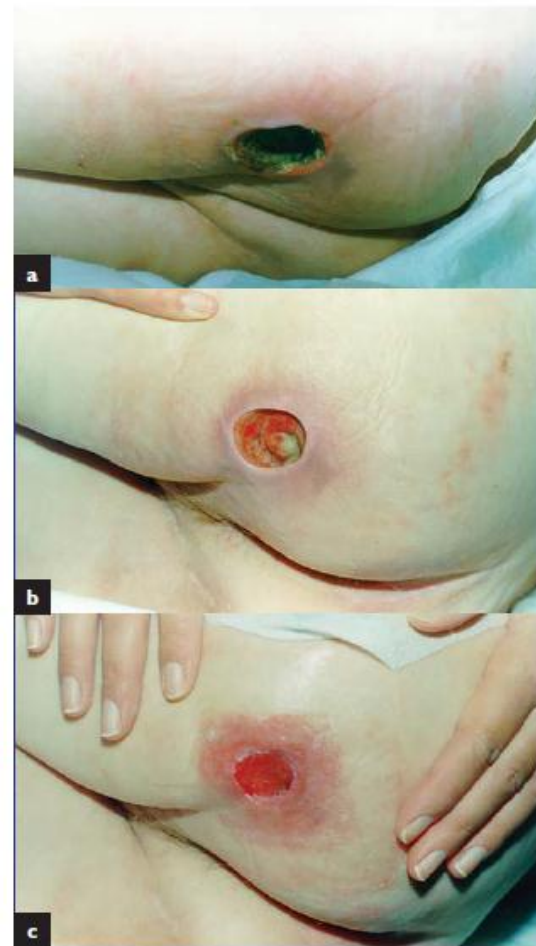


Fig 3.An example of a grade IV pressure ulcer in a patient at baseline (a), visit 2 (b) and visit 3 (c)

Research: Nutritional Supplementation



- **Vitamin C**
 - Hydroxylation of proline and lysine for collagen synthesis
 - Prevent oxidative cell damage
- **Zinc**
 - Collagen formation, protein synthesis, cell growth
- **Arginine**
 - Conditionally essential during stress
 - Promote protein synthesis

(Heyman et al., 2008)

Research: Arginine Supplementation



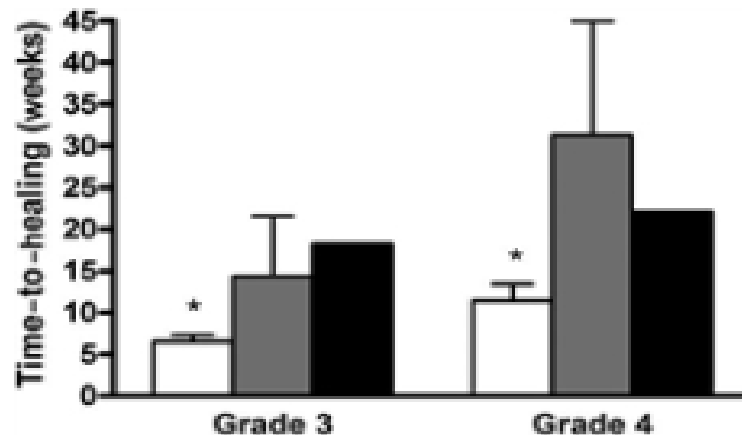
- 34 spinal cord injury patients; Stage II-IV PU
 - 20 consumed supplement until full healing, 14 ceased before full healing
- Supplement: 500 kcal, 18 g pro, 9 g arginine, 500 mg vitamin C, 30 mg zinc.

(Chapman et al., 2011)

Research: Arginine Supplementation



- 2.5 fold greater rate of healing
 - 8.5 ± 1.1 weeks vs. 20.9 ± 7.0 weeks
 - $p < 0.04$
- Compared to medical literature
 - Stage III: 6.5 ± 0.8 weeks vs. 18.2 weeks
 - Stage IV: 11.4 ± 2.0 weeks vs. 21 weeks
 - $p < 0.001$



(Chapman et al., 2011)

Nutrition Recommendations



	At-risk Prevention	STAGE I	STAGE II
Total Calories	25-30 kcal/kg, weekly wts, liberalize diet, pro/kcal supp.	≥25 kcal/kg	30-35 kcal/kg
Protein		1.0-1.2 g/kg	1.25-1.50 g/kg
Fluid		≥30 ml/kg	≥30 ml/kg
MVI		1 MVI w/ mineral	1 MVI w/ mineral
Vitamin C		250 mg/day	500 mg/day
Zinc			220 mg ZnSO ₄ /day x 10 days
Vitamin A			10,000 IU/day x 10 days

Nutrition Recommendations



	STAGE III	STAGE IV	Max Level
Total Calories	30-35 kcal/kg	30-35 kcal/kg	40 kcal/kg
Protein	1.5-1.8 g/kg	1.5-2.0 g/kg	Adjusted dependent on pt.
Fluid	30-35 ml/kg	30-35 ml/kg	As tolerated
MVI	1 MVI w/ mineral	1 MVI w/mineral	1 MVI w/mineral BID
Vitamin C	500 mg/day BID	500 mg/day BID	Ongoing not harmful
Zinc	220 mg ZnSO ₄ /day x 10 days	220 mg ZnSO ₄ /day x 10 days	Discontinue after 10 days
Vitamin A	10,000 IU/day x 10 days	10,000 IU/day x 10 days	Discontinue after 10 days
Arginine	14 g/day	14 g/day	No UL determined yet
Glutamine	14 g/day	14 g/day	0.57 g/kg/day
HMB	2.4 g/day	2.4 g/day	No UL determined yet

Patient Profile



- Female, Caucasian
- Widowed, former Registered Dietitian
- DOB: 9/5/1937; 75 years old
- Nursing home resident past 6-7 years

Patient Profile



- **Readmitted: 10/3/2012**
 - Hospital stay w/ pyelonephritis: 9/27 - 10/2
- **Dx: Stage II PU on coccyx**
 - Bedfast, chronic HTN (50 years), dyslipidemia (50 years), Type 2 Diabetes Mellitus (>20 years), morbid obesity (40 years), obstructive sleep apnea (35 years), osteoarthritis (40 years), chronic GERD, aortic stenosis, left ventricular hypertrophy, iron-deficiency anemia, dementia with progressive psychotic features (>7 years), COPD, CHF, oral motor dysphagia

Patient Profile



- Anthropometrics

- Ht: 61”
- Wt: 146#; 66.4 kg
- BMI: 27.7
- IBW: 105#; 47.7 kg
- Unintentional wt. loss >7.5% in <91 days
 - ✦ 8.2% weight change in 62 days: 159# to 146#

Patient Profile



- LTC Diet
 - Pureed, nectar thick liquids, NAS, LCS
 - Standard diet:
 - ✦ 2100-2300 kcal
 - ✦ 70-80 g protein
 - ✦ 2000 ml fluid

Patient Profile



- Labs: 10/12/2012
 - Alb 1.9 L
 - RBC 2.93 L
 - Hgb 8.6 L

Diagnosis & PES



- Dx: Stage II PU at coccyx
- PES
 - Increased nutrient needs related to wound healing promotion as evidenced by stage II pressure ulcer at coccyx.

Estimated Needs



- Estimated Needs
 - 1990-2250 kcal (30-35 kcal/kg)
 - 81-97 g protein (1.25-.1.50 g/kg)
 - 1900 ml fluid (30 ml/kg)

Intervention



- Nutritional Intervention
 - Pro-Stat 30 cc
 - Large meat portion with meal TID
 - 500 mg vitamin C q day (since May 2012)
 - Niferex 150 mg BID
- 11/19 - RD recommended:
 - Vitamin A 10,000 IU q day x 10 days
 - Zinc 220 mg q day x 10 days
- Diet regimen will provide
 - 2200-2300 kcal
 - 109-119 g protein
 - 2000 ml fluid

Outcome & Follow up



Date	Healing Status
10/22	Stage II – 3.2 x 3, red, scant exudate
10/29	Stage II – 2 x 2, red, scant exudate
11/5	Stage II – 2 x 2, red
11/13	Stage II – 0.5 x 0.5, pink
11/20	Stage II – 0.5 x 0.5, pink
11/27	Healed

Conclusion



- MVI, vitamin A, and zinc was not given
- Increased energy and protein, vitamin C essential
- Niferex – oxygen to wound to repair and build new, healthy tissue
- Personal recommendation for increased healing rate:
 - 1 multivitamin w/ minerals
 - 500 mg vitamin C
 - 220 mg ZnSO₄ x 10 days
 - 10,000 IU vitamin A x 10 days
 - Protein supplement, large portion meat

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Questions?

