Case Study # 25
Alzheimer's Disease

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Dementia

A condition that involve loss of memory and impaired cognition

This condition may include: impairment in language, object recognition, motor skills, abstract thought, and judgement to an extent that interferes with daily life

Alzheimer's Disease

"the most common form of dementia, characterized by formation of amyloid plaques in the brain and neurofibrillary tangles within neurons" (Nelms 610)

Alzheimer's Disease

amyloid plaques - cellular deposits found between nerve cells

neurofibrillary tangles - collections of twisted tau (a protein) found in the cell bodies of neurons

Etiology

"Apolipoprotein E" (APOE), a gene variant, is the risk factor for AD in those aged 65 years and older

- produced in liver

- circulated with the VLDLs in blood

- found in 40% of patients with AD

- only found in 15% of general population

- those with variant: 3-4x increased risk of developing AD

- presence of presenelin 1 (PSEN1), presenelin 2 (PSEN2), and amyloid precursor protein (APP) are linked to early-onset of AD

Etiology, continued

Possible links with development of AD:

CVD, Diabetes, free radical oxidative damage, Down syndrome & previous head injury

Decreased risk of developing AD:

increased intake of fruits, vegetables, fish and omega-3 fish oils

Diagnostic Measures

DSM-IV-TR Diagnostic Criteria for Dementia of the Alzheimer's type:

1. memory impairment

<u>and</u> at least one of:

2. aphasia, apraxia, agnosia, and/or disturbance of executive functioning

Patient Description-Mr. McCormick

- 89 y.o. male
- BMI of 19.3 kg/m^2
- Lost about 30 lbs in 4 yrs
  - % UBW of 81.2%
- MI at ages 45 and 62
- HTN for 44 yrs
- Veteran's Long-Term Care Facility for past 3 yrs
- Family hx of heart disease and AD
- Frail and thin appearance, agitated and confused

Medications

Medication	Function
Furosemide	Causes kidneys to get rid of unneeded water and salt through urine to reduce swelling and fluid retention, also used for high BP
Atenolol	Beta blocker, relaxes the blood vessels and slows the heart rate to improve blood flow, is used to decrease BP
Lisinopril	Treats high BP and improves survival after a heart attack as an ACE inhibitor blocking chemicals that tighten blood vessels
Zocor	A statin that slows the production of cholesterol in the body and the amount of cholesterol that builds up on arteries
Haloperidol	Antipsychotic used to motor and verbal tics and controlling explosive behavior by decreasing abnormal excitement in the brain
Warfarin	Blood thinner and helps reduce blood clots from forming and blocking blood vessels
Donepezil	Treat dementia associated with AD by improving mental function

Biochemical Values - Chemistry

Chemistry	Reference Range	Admission 8/12	High or Low?
Blood Urea Nitrogen (mg/dL)	8-18	22	high
Creatinine serum (mg/dL)	0.6-1.2	1.3	high
Protein, total (g/dL)	6-8	5.5	low
Albumin (g/dL)	3.5-5	2.9	low
Prealbumin (mg/dL)	16-35	14	low
C-reactive protein (mg/dL)	< 1.0	5.1	high
HDL-C (mg/dL)	>45 M	33	low
LDL/HDL Ratio	<3.55 M	3.67	high

Biochemical Values - Hematology

Hematology	Reference Range	Admission 8/12	High or Low?
WBC (X 10^3/mm^3)	4.8-11.8	16.0	high
Hemoglobin (Hgb, g/dL)	14-17 M	13.5	low
Hematocrit (Hct, %)	40-54 M	39	low
Mean cell volume (um^3)	80-96	77	low
Mean cell Hgb (pg)	26-32	24	low
Mean cell Hgb content (g/dL)	31.5-36	30	low
Transferrin (mg/dL)	215-365 M	165	low
Ferritin (mg/mL)	20-300 M	18	low
Lymphocyte (%)	15-45	10	low

Patient Diagnosis

- Diagnosed with AD 4 yrs ago
- Stage III full thickness nonpressure wound
  - Fell and hit hip on the corner of a bed

Wound Healing

After cellular injury, the body's natural response involves the process of wound healing

"Healing is the repair and restoration of damaged tissue and cells, and is the process by which structure and function are restored after injury" (Nelms 167)

Laboratory Measures related to infection and wound

high	C-reactive protein	inflammation present and sign of infection
low	Prealbumin	sign of infection, inflammation and trauma
high	White Blood Cells	inflammatory disease and infectious diseases
low	Hemoglobin	Anemia (may be indicative of Vitamin C Deficiency)
low	Vitamin C	cause delay in wound healing
low	Transferrin	Anemia
low	Lymphocytes	decrease in tissue repair process of infection and wound healing

Wound Healing Stages

1. Inflammation
   a. time of injury to 4-6 post injury
   b. bleeding controlled by coagulation, clot formation
   c. vasodilation and increased capillary permeability
   d. neutrophils phagocytize bacteria
   e. macrophages remove debris and necrotic tissue; secretes growth factors

Wound Healing Stages

2. Proliferative
   a. end of inflammatory stage to next 2-3 weeks
   b. epithelial cells form protective covering
   c. Angiogenesis allows development of granulation
      tissue
   d. fibroblasts produce collagen and matrix protein
   e. cross-linking occurs to strengthen wound
   f. myofibroblasts induce wound contraction

Wound Healing Stages

3. Remodeling

    a. end of proliferative to up to two years

    b. collagen matures and stabilizes

    c. fibrous scar tissue matures

    d. decrease in fibroblasts and vascularization

Important to know: the skin will never retain it's full strength when this stage is completed

Essential Nutrients for Wound Healing

Table 11

Essential micronutrients for wound healing

Vitamins	
Vitamin A	Stimulant for onset of wound healing process
	Stimulant of epithelialization and fibroblast deposition of collagen
Vitamin C	Necessary for collagen synthesis
Minerals	
Zinc	Cofactor for collagen and other wound protein synthesis
Copper	Cofacter for connective tissue production
	Collagen cross-linking
Manganese	Collagen and ground substance synthesis

Nutrition Requirements

- Energy-Using Mifflin-St Jeor
  - 1300-1400 kcal/day
- Protein
  - Factor of 1.5 g/kg/day = 93 g/day of protein
    - Wound healing, malnutrition, elderly
- Micronutrients for wound healing

Dosage Recommendations, Additional Supplementation

- 20 mg of Zinc

- 2 mg of Vitamin C

- 18.5 g of Arginine

PES Statement

A.   Unintended Weight Loss

· Unintended weight loss (NC-3.2) related to lack of appetite and

Alzheimer's disease related symptoms as evidence by weight history

(30 pound weight loss), medical record (current weight of 138

pounds) and son's statement (normal weight of 170 pounds).

Goal: Unintended Weight Loss-MNT

- gain ~0.5 lb/week
  - up to around 170 lbs (BMI higher than 22)
- additional 250 kcal/day
- daily caloric intake: 1550-1650 kcal/day

encouraging: high-calorie/high-protein shakes between nutrient dense meals

PES Statement

B. Self-Monitoring deficit

- Self-monitoring deficit (NB-1.4) related to Alzheimer's disease symptoms of dementia as evidence by requirement of special modifications to diet, assistance with all meals and lack of independence with activities of daily living at long-term facility.
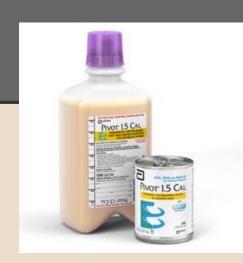
Goal: Self-Monitoring Deficit-MNT

- Consistent Nursing Aids for meal time
- Improved chance of recognizing and trusting medical staff
- Mealtime is consistent for each day to develop a routine and encourage eating
  - Minimize confusion

Treatment

- 1.5 g ampicillin-sulbactam IV every 6 hours
  - Antibiotic
- Wound debridement
  - Removal of dead, damaged or infected tissue

Pivot 1.5 Cal

- 1500 kcal/1000 mL
- 93.8 g/1000 mL protein
- 50.8 g/1000 mL fat
- Arginine and glutamine and high levels of Vitamins A,C, K , selenium and zinc

Prognosis

When the neurons die and are unable to communicate with each other, the brain will shrink. Patients with that happening have progressed to a severe stage of AD and will not being able to speak or move.

Monitoring and Evaluation

- Monitor caloric intake to see if he is meeting needs
- Check weight for any changes every week
- Continue to clean and redress wound until fully healed
  - Monitor for signs of infection

Enteral Nutrition?

- Pros
  - Has difficulty eating and getting required nutrients
  - Progression of disease could make swallowing more difficult
  - Could be used in addition to oral intake
- Cons
  - Cost
  - Combative episode-may be uncooperative with tubes being attached
- Ethical?

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