3 ☐ Immune System
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4 ☐ Immune System
Body’s Major Defense System
- Seek out & destroy infectious organisms
- Seek out & destroy damaged cells
- Identify & destroy malignant cells

5 ☐ Stem Cells
- Eventually lead to production of:
  - Leukocytes (WBCs)
  - Platelets
  - Red Blood Cells

6 ☐ Myeloid Stem Cells
- Granulocytes (60-80% of WBCs)
  - Neutrophils – (55-70%)
    - Phagocytes
    - 1st to arrive @ invasion site
    - Segmented vs Bands
  - Eosinophils – (1-4%)
    - Large #s in respiratory & GI tracts
    - Hypersensitivity Responses
  - Basophils (0.5-1%)
    - Release heparin, histamine, kinins, serotonin, leukotrienes

7 ☐ Myeloid Stem Cells
- Monocytes
  - Largest of leukocytes
  - Actively phagocytic
  - Become macrophages in tissues
- Lymphocytes
  - 20-40% of leukocytes
  - Regulate specific immune responses
  - Circulate from & to lymphoid tissue
Specific Immune Responses of Lymphocytes

- Humoral – antibody mediated: 10-15%
  - B cells
  - Various immunoglobulins (IgG, IgA etc.)
- Cell-mediated: 70-80%
  - Killer T-cells
  - Regulator cells
    - Helper T cells
    - Suppressor T cells

Non-Specific Inflammatory Response

- Purpose of acute inflammation
  - Protection/prevent further invasion
  - Lasts 1-2 weeks
- Chronic Inflammation
  - Slower onset
  - Cell proliferation necrosis, exudate, scaring
- Natural Barriers
  - Skin
  - Mucous membranes
  - Ciliary movement
  - Bactericidal substances

Manifestations of Inflammation

- Erythema
- Local heat
- Swelling
- Pain
- Loss of function

Healing

- Debridement
- Reconstruction
- Regeneration
- Non-reconstruction
  - Nerve cells
  - Skeletal muscle cells
  - Cardiac muscle cells
  - Scar tissue formation
Immune System Changes in Elderly
- Decreased thymus gland activity
- Reduced phagocytosis
- Decreased killer T cell cytotoxic activity
- Increased levels of autoimmune antibodies
- Decreased levels of specific antibody response

Gerontologic Considerations
- Infection
  - Top ten causes for hospitalizations
  - 1 of 5 leading causes of death in people > 65
- Slower inflammatory response
- Decreased fever response
- Diabetics – have neutrophil impairment

Gerontologic Considerations
- Respiratory System Changes
  - Chest wall changes
  - Ciliary changes
  - Reduced cough
  - GU – incomplete bladder emptying
  - Benign prostatic hypertrophy

Gerontologic Considerations
- Cardiovascular – decreased perfusion
- Decreased muscle tone
- GI – impaired swallowing, decreased acidity
- Skin – thinning, fragile
- Slower healing

Infants
- Skin/Secretions
  - Skin may be thin, immature
  - No tears or sweat
  - Lack of stomach acidity & enzymes
- Immunity
  - Maternal IgG antibodies for 3 mos.
  - Phagocytosis is less effective
  - Serum complement inadequate
• Breast Feeding
  – WBCs
  – IgA antibodies in colostrum

17 Considerations in Infants
• Neonatal Infections/Sepsis
• Risk Factors
  – Maternal
  – Intrapartum
  – Neonatal
• Generalized Infections
  – Upper airways, GI tract
• Local Infection
  – Conjunctiva, oral cavity

18 Causes of Infection in Infants
• Nursery Acquired
• Indwelling tubes/catheters
• Viral
  – HIV, HBV, Varicella, Rubella, CMV, Herpes Simplex
• Bacterial
  - Group B Strep, E. Coli, TB, Chlamydia
• Fungal
  – Candidiasis, Dermatitis

19 Signs & Symptoms of Infection
• Fever
• Confusion (especially in elderly)
• Irritability or lethargy (infants)
• Fatigue/changes in activity
• Increased WBCs
  – Neutrophils: acute infection, stress
  – Eosinophils: allergies, parasitic infections
  – Basophils: hypersensitivity
  – Monocytes: chronic inflammation
  – Lymphocytes: chronic bacterial/viral infection
• Increased Erythrocyte Sedimentation Rate

20 Patient Assessment
• Health Perception – Health Management
  – How are they feeling?
  – Perception of his/her health?
  – Recent illness?
  – Past illnesses/hospitalizations or injuries?
  – Occupation?
  – Current medications?
– Alcohol/drug use?

21 □ Patient Assessment

• Nutritional – Metabolic
  – Weight assessment – recent changes
  – Poor feeding & lack of weight gain - infants
  – Presence of skin lesions, rashes
  – Fluid Status
  – Evaluate:
    • Total protein
    • Albumin
    • Hemoglobin
    • WBCs
    • Cholesterol

22 □ Patient Assessment

• Cognitive/Perceptual
  – Presence of pain
  – Sensory deficit?

• Sleep/Rest
  – Behavioral changes
  – Change in sleep cycles

23 □ Patient Assessment

• Activity – Exercise
  – Tolerance
  – Joint pain
  – Stiffness

• Role-Relationship
  – Living situation
  – Significant other/sexual relationships

• Value-Belief
  – Religious/Spiritual
  – Use of herbs/medications

24 □ Impairments to Healing

• Malnutrition
  – Protein deficit
  – CHO deficit
  – Fat deficit
  – Vitamin deficits

• Impaired blood supply
  – Tissue hypoxia

• Impaired inflammatory & immune response

• Structural deficits
Pressure Ulcers

- Stage I: nonblanchable erythema
- Stage II: partial skin loss
- Stage III: full thickness skin loss/necrosis
- Stage IV: extensive destruction

Braden Scale

- Sensory Perception
- Moisture
- Activity
- Nutrition
- Friction & shear

Skin Care

- Managing Tissue Loads
  - Positioning in bed
    - Keep HOB low
    - Keep off ulcer
    - Turning schedules
    - Pad in-between bony prominences
    - Lift with “lift-sheets”
  - Positioning while sitting
    - Frequent repositioning
  - Careful handling in infants-tendency to blister

Skin Care

- Support Surfaces
  - Static
    - mattress
    - foam mattress
    - patient able to change positions
  - Dynamic
    - patient unable to stay off ulcer
    - patient “bottoms out”

- Pain assessment & relief
- Dressings - keep ulcer bed moist, edges-dry

Nursing Care

- Inspection
- Appropriate cleansing
- Positioning
- Mobility
- Nutrition
- Dressings prn

30 Purposes of Wound Care
- Provide a moist healing environment
- Protect wound from infection & trauma
- Provide compression for bleeding/swelling
- Apply medication
- Absorb drainage
- Debride necrotic tissue
- Reduce pain
- Control odor

31 Wound Care
Ulcers & Other wounds
- Cleansing agents
  - Normal Saline
  - Hydrotherapy
- Debriding agents - removal of eschar
  - Surgical removal
  - Autolytic
  - Mechanical (wet to dry dsg)
  - Enzymatic

32 Wound Care
- No drainage  (skin tears, superficial burns, non-stick)
  - Steri-strips
  - Tegaderm
  - Gels
  - Adaptic

33 Gauze Dressings
- Absorbs minimal exudate
- Conservative Treatment
- Put on moist & remove moist
- Change every 6 hours
• Can be used on stage II, III, & IV wounds

34 Clean Stage II Wounds
• Hydrocolloids
  – Minimal to moderate absorption of exudate
  – Protect against contamination
  – Available as wafers, pastes, powders, granules
  Application
  • clean surrounding skin
  • apply with no “wrinkling”
  • change weekly (no more than 3x/wk)
  • Duoderm, Tegasorb, Replicare

35 Large amount of drainage
• Copolymer starch dressings
  – absorb 20x their weight
  – can fill in wound cavities
  – change only 1x/day
• Dextranomer
  – beads absorb exudate
• Calcium alginates-porous, fibrous mats
  – convert to gel
  – cover with secondary dressing

36 Common Skin Disorders
• Pruritis
  – Triggers
    • Heat & prostaglandins
    • Histamine & Morphine increase
  – Lab Tests
    • Skin scrapings
    • Patch testing
  – Treatments
    • Oral medications
    • Topical medications

37 Psoriasis
• Chronic & non-infectious
• Raised, red plaques with white scales
• Location
• Cause/exacerbations
• Nursing Care
• Treatment
  – Topical medications
– Photochemotherapy
– Ultraviolet Light Therapy

38 Topic: Bacterial Skin Infections

• Offenders: Staph Aureus, B hemolytic Strep
• Folliculitis
• Furuncles
• Cellulitis
• Erysipelas
• Impetigo

39 Topic: Nursing Care & Treatment

• Antibiotics - cloxacillin, cephalosporins
• Watch for generalized infection
• Contact isolation
• Warm compresses
• Cover draining lesions
• Teach handwashing

40 Topic: Fungal Skin Infections

• Tinea Infections
  – Pedis
  – Capitis
  – Corporis
• Candidiasis
  – Mucous membranes
  – Skin
  – Vagina
  – GI tract

41 Topic: Nursing Care

• Teaching
  – Don’t share linens
  – Use clean washcloth & towel daily
  – Dry all skinfolds
  – Clean cotton underclothing/socks daily
  – Do not wear rubber or plastic-soled shoes
  – Talcum powder on feet
  – Avoid tight clothing

42 Topic: Viral Skin Infections

• Warts
  – Caused by HPV
Locations: hands, feet, genitals
• Herpes Simplex
  – Caused by HSVI = cold sore
  – Caused by HSVII = genital herpes
• Herpes Zoster
  – Caused by Varicella Zoster
  – Shingles

Dermatitis
• Contact
  – Allergies
  – Contact with irritants
• Atopic
  – Eczema
• Seborrheic
  – Yellow & white plaques (Cradle Cap)
• Exfoliative

Acne
• Non-inflammatory
• Inflammatory
• Acne Vulgaris
• Acne Rosacea
• Treatment
  – Medications
  – Dermabrasion

Nursing Care
• Wash with mild soap
• Shampoo to prevent oiliness
• Well balanced diet
• Expose to sunlight but prevent sunburn
• Regular exercise & sleep
• DON’T TOUCH YOUR FACE!

Altered Immune Responses
• Hypersensitivity Reactions
  – Allergy: response to exogenous allergen
  – Immediate
  – Delayed
• Autoimmune Disorders
  – Inability to recognize “self”
• Impaired Immune Responses
HIV

47 Hypersensitivity Reactions
  • Humoral reaction
  • Triggers
    – Hormones
    – Enzymes
    – Pollens
    – Foods
    – Antibiotics
    – Local anesthetics
    – Occupational agents

48 Anaphylaxis - Severe Type I
  • Symptoms
    – Bronchoconstriction
    – Decreased cardiac output
    – Massive vasodilation
  • Pharmacology
    – Immunotherapy
    – Antihistamines
    – Epinephrine
  • Plasmapheresis

49 Localized Reactions
  • Type I Reactions - less severe
    – Asthma
    – Allergic Rhinitis
    – Conjunctivitis
    – Dermatitis
    – Food allergies
  • Skin Testing
  • Immune assays

50 Other Types of Reactions
  • Type II - Blood Transfusion Reactions
    – Reactions:
      • Hives/Itching/Circulatory overload
      • Febrile/Hypersensitivity
      • Hemolytic
    – Lab Tests
      • ABO/Rh incompatibilities
      • Indirect Coombs - detects non-ABO antibodies
      • Direct Coombs - following blood reactions
51 .Delayed Hypersensitivity Reactions
   • Cell-mediated
   • Examples:
     – Contact dermatitis
       • redness
       • itching
       • skin thickening
     – Positive tuberculin test
     – Graft rejection

52. Treatments
   • Immunotherapy - desensitization
   • Antihistamines - relief of symptoms
   • Epinephrine - for anaphylaxis
   • Corticosteroids
     – Inhaled/topical/oral/IV
   • Plasmapheresis
   • Teaching
     – Care at home

53. Elimination
   • Diarrhea
   • Constipation
   • Hirschprungs Disease
   • Irritable Bowel Syndrome
   • Appendicitis
   • Peritonitis

54  Elimination (cont.)
   • Crohn’s Disease
   • Hernias
   • Small Bowel Obstruction
   • Diverticulitis

55  Diarrhea
   • Symptom of another disorder
   • Leading cause of illness in children < 5 yrs.
   • Fatal for 400 children/year
   • Water, K+, Mg+, HCO3 losses
   • Causes
     – inflammation/infection
     – toxins
     – antibiotic therapy
56 Assessments
• Abdominal girth
• Appearance of stools
• Frequency
• Auscultate for Bowel Tones
• Check abdominal girth
• Monitor output
• Monitor weights

57 Labs
• Stool specimens
  – Blood, mucus, pus, excess fat
  – Ova/parasites
• Stool cultures
  – Clostridium difficile toxin
• WBCs
• Electrolytes
• Arterial Blood Gases
• Sigmoidoscopy

58 Dehydration Assessment
Infants
• Mild
  – few loose stools daily/no other illness
• Moderate
  – several loose stools/other illness
• Severe
  – numerous to continuous stools
  – absent tearing
  – depressed fontanels/sunken eyeballs
  – change in vital signs & mentation

59 Treatments
• Infants & young children
  – Oral rehydration therapy: 60-80 ml/kg over 2 hrs.
  – Parenteral replacement - serious
  – Early reintroduction of food
  – DO NOT USE BRAT diet
    • bananas, rice, applesauce, toast
  – DO NOT USE Antidiarrheal agents
• Adults

60 Nursing Diagnoses
• Risk for impaired skin integrity
• Fluid volume deficit
• Activity intolerance
• Altered nutrition
• Bowel incontinence

61 Constipation
• Mechanical causes
  – Hirschsprung / Strictures
  – Meconium ileus
  – Encopresis
• Laxative abuse
  – Often in older patients
• Side Effect of medications
• Hypothyroidism
• Diverticular disease

62 Management
• Fiber
• Vegetables
• Water
• Eliminate constipating foods
• Mineral oil/enemas
• Laxatives
• Suppositories

63 Irritable Bowel Syndrome
• Motility disorder of GI tract
• Women affected more than men
• Causes
  – food ingestion
  – stress
  – gastrin
  – cholecystokinin
I.B.S.
- Symptoms
  - abdominal pain
  - excess gas/bloating
  - N & V, anorexia, fatigue, HA, depression, anxiety
- Labs
  - CBC
  - Sedimentation rate

I.B.S.
- Pharmacology
  - Anticholinergics
  - Antidiarrheals (temporary)
  - Antidepressants
- Diet - reduce coffee, gas producing foods, lactose, fructose
- Reduce stress
  - Exercise/relaxation

Appendicitis
- Inflammation/gangrenous/perforated
- Pain
  - RLQ/McBurney’s Point
  - Rebound tenderness
- Low grade temperature
- Nausea & vomiting
- Increase WBC
- Abdominal ultrasound

Appendicitis
- Things not to do:
  - Pain meds until diagnosed
  - Apply heat
  - Give laxatives
- Antibiotics
  - Rocephin
  - Fortaz
- Surgery

Peritonitis
- Symptoms
  - fever
  - tender, rigid, distended abdomen
  - bowel sounds decreased
– nausea & vomiting
– malaise
– tachycardia & tachypnea
– restlessness/confusion
– SICK PATIENT

69 Peritonitis

• Labs
  – Increased WBC; shift to left
  – Enzymes, protein
  – Blood cultures
  – ABGs
  – Liver & renal function studies
  – Paracentesis
  – X-rays to determine fluid levels

70 Treatments

• Surgery
  – Peritoneal lavage
  – Penrose or Jackson-Pratt drains
• NG tube until BT return & flatus
• I.V. antibiotic therapy
• TPN possibly

71 Nursing Care

• Pain management
• Intake & output
• Frequent VS
• Weigh daily
• Abdominal girths
• Assess incision & skin turgor
• Wound care
• Watch for septicemia & shock

72 Ulcerative Colitis

• Chronic inflammation of mucosa of colon & rectum
• Crypts of Lieberkuhn in Lg intest. & colon
• Affects clients age 15-40 yrs.
• Can be chronic or recurrent
• Diarrhea - 5-30 stools a day
• Cramping in LLQ - relieved with defecation
• Predisposes to cancer
Ulcerative Colitis

- Labs & X-rays - similar to previous cond.
- Pharmacology
  - Anti-inflammatory
  - Azulfidine-sulfonamide
- Dietary
  - Milk, caffeine, gas producing free
  - Metamucil
  - Possible TPN

Ulcerative Colitis

- Indications for surgery
  - After frequent exacerbation
  - Chronic symptoms
  - Malnutrition/Weakness
  - Interference with work/social activities
- Types of surgeries
  - Total colectomy with ileoanal anastomosis
  - Entire colon & rectum removed
  - Loop ileostomy for 2-3 months

Crohn’s Disease

- Chronic relapsing inflammatory disorder
- Often less severe than colitis
- Affects 10-30 yr. Olds
- Affects terminal ileum & right colon
- Fissures & ulcers develop
- RLQ/peri-umbilical pain

Crohn’s Disease

- Labs
  - Malabsorption --> low albumin
  - Anemia
  - Folic acid level decreased
  - Increase ESR
  - Liver enzymes/bilirubin elevated

Crohn’s Disease

- Pharmacology
  - Corticosteroids
  - Sulfasalazine
Antidiarrheal

• Dietary management
  – Eliminate milk products
  – Ensure

• Surgery - may require colostomy
  – Bowel obstructions/fistulas

78 Hernias

• Inguinal
  – Direct
    • Pregnancy
    • Obesity
    • Incisional
  – Indirect (congenital)

• Umbilical
  • Reducible/non-reducible

79 Large Bowel Disruptions

• Mechanical Obstructions
  – Imperforate anus
  – Intussuception
  – Volvulus
  – Foreign bodies
  – Obstruction with gas/fluid/adhesions

• Functional Obstructions

80 Small Bowel Obstruction

• Adhesions - 60% of SBO
  – High pitched BT early
  – Paralytic ileus & not BT

• May have paralytic ileus & no BT
• Dehydration - fluid sequesters in bowel
• Perforation is a risk
• Hypovolemic &/or septic shock

81 Large Bowel Obstruction

• Not as common as SBO
• 15% of all obstructions in adults
• Sigmoid usually involved
• Constipation & abdominal pain
• Vomiting - late sign
Treatment for Bowel Obstructions

- Gastrointestinal Decompression
- Surgery
- Fluid Replacement
- Monitor for complications
- Monitor for respiratory compromise
- Pain management
- TPN
- Manage patient’s anxiety

Diverticulosis/Diverticulitis

- Diverticulosis - Presence of diverticula
  - Constipation/narrow stools
  - Left-sided pain
  - Weakness & fatigue
  - Occult bleeding
- Diverticulitis - Inflammation/perforation
  - NSAIDS & corticosteroids
  - Low-grade fever
  - N & V

Treatment

- Pharmacology
  - Broad-spectrum antibiotics
  - I.V. Fluids
  - NO laxatives
- Dietary Management
  - High fiber diet
  - Metamucil
- Surgery - colectomy, temporary colostomy