# Medical Asepsis

Mrs. Zwiebel
Nursing 1

## Prevention of Infection

- Prevention of Infection
- Major Focus for Nurses; helps to protect patients and health care providers from disease
- Medical asepsis – (clean technique) reduces numbers & transfer of pathogens.
- Most effective : HANDWASHING

## Asepsis

- Absence of disease producing organisms called pathogens
- Two types of asepsis
- Medical
- Surgical

## Types of Asepsis

- Medical: clean technique reduces # of pathogens and prevents spread of infection
- Surgical: a sterile technique, eliminates all microorganisms and spores.

## Microorganism

- living animals or plants visible only with a microscope (germs)
- Microorganisms are everywhere
- Factor for disease; virulence & persons state of health
- Two groups:
- Non-pathogens; normal flora, harmless
- Pathogens; cause disease & illness, harmfull

## Microorganisms (cont'd)

- Bacteria:
- Single celled
- Shapes; round (cocci) rod (bacilli) spiral (spirochetes) see page 135

- Viruses:
- Smallest, seen only with electron microscope
- filterable, not all genetic material, can remain dormant, sporadic appearance, some self-limited

## Microorganisms (cont'd)

- Fungi : yeasts & molds
- Only some produce illness
- 3 types of fungal (mycotic) infections
  superficial; skin, mucous membranes, hair, nails
  intermediate; subcutaneous tissue
  systemic; deep tissues & organs

## Micro (cont'd)

- Rickettsiae:
- Resembles bacteria, cannot survive outside another living species. (intermediate)
- Fleas ticks lice mites
- EX. Deer tick causes Lyme disease

## Micro (cont'd)

- Protozoans:
- Single celled animals
- Classified as to how they move;
- ameboid; extend their cell walls
- Cilia; hair like projections
- Flagella; whip like appendages
- Some cannot move independently

## Micro (cont'd)

- Mycoplasms:
- Lack a cell wall therefore assume many shapes
- Not related to bacteria, but similar
- Infect the lining of the GU.-GI.-RESP., tracts

## Micro (cont'd)

- Helminths:
- Infectious worms, some microscopic
- Nematodes – (round worms)
- Cestodes _ (tapeworms)
- Trematodes – (fukes)
- Enter body (host) in the egg stage
- Larvel stage pents before entering host
- In host – mate & reproduce, many times over
- Excreted & begin cycle over again

## Micro. (cont'd)

- Prions:
- Contains no nucleic acid
- Normal prions found in brain cells prevents dementia.
- Mutates becomes infectious, alters other normal prions to be come like them.
- Process causes brain to become spongy (full of holes)

## Cause of Infection

- Inappropriate use of antibiotics
- Use of broad – spectrum antibiotics
- Failure to use approporiate techniques
- Multiple health care personnel caring for patient
- Low resistance; disease, injury, surgery
- Chronic Illness

## Causes (cont'd)

- Young and the elderly
- Electrolytes imbalance, poor nutrition, poor hygiene
- Ineffective immune systems
- Prolonged stays in hospital

## Signs of infection

- Pain – pressure of excessive fluid
- Redness – increased circulation
- Swelling – fluid & leucolytes into surrounding tissue
- Heat – increased circulation & chemical reaction
- Loss of function

## Infection (cont'd)

- Elevated white blood count (WBC)
- Drainage:
  Pus (destroyed leukocytes & decaying tissue)
- Serous (watery)
- Sero-sanguinous (serum and blood)

## Survival of Microorganisms

- Each species of microorganism unique (very small , but powerful enough to cause disease
- Need a favorable environment to survive; warmth, darkness, oxygen, water & nourishment
- Humans offer these as a host
- Some microorganisms produce SPORES.
- Spores, microbes that resists, heat, moisture, & destructive chemicals box 10-1,pg.136

## Chain of infection

- Microorganism
- Portal of exit from source
- Mode of transmission
- Portal of entry to body
- Susceptible host

## Chain (cont'd )

- Microorganisms – infectious agents
- Some species co-exist for mutual benefits
- Healthy host no problems
- Host weakens disease occur –opportunistic infections ( inf. dis. among compromised people)
- Common infections by nature produce illness

## Chain (cont'd)

- Reservoir or source:
- Where microbes grow & reproduce
- Thrive; in tissue, crevices of skin, shafts of hair, open wounds, blood, G.I. tract, nasal passages,
- Grow abundantly; stag. water, uncooked & unrefrigerated food, G.I. excreta, body waste.
- Pathogens resistant to antimicrobial agents most harmfull.

## Chain (cont'd)

- Port of Exit:
- How they escape out of the reservoir and move about
- When present on humans displaced by handling or touching objects, blood, excretions, secretions, body fluids
- Environmentally; flooding, soil erosion

## Chain ( cont'd)

- Mode of transmission:
  How microbes move to another location
- Means of transportation most important to microbes survival, cannot travel independently
- Transported by : contact ---- droplet ----- airborne -----vehicle -----vector

## Chain (cont'd )

- Port of Entry:
- How they find their way into or onto a new host
- Most common; break in the skin or mucous membrane
- Also, inhaled, swallowed, introduced to blood, transferred into body tissue or cavities.
- HOW: unclean hands, contaminated equip.
- WASH YOUR HANDS; WASH YOUR HANDS

## Chain (cont'd)

- Susceptible Host:
- When defense mechanisms become diminished, impaired, compromised.
  Last link of the chain
- Biologic def. mech. is weakened
- Person becomes ill.
- WASH YOUR HANDS, WASH YOUR HANDS, WASH YOUR HANDS.

## Chain ( cont'd)

- Exist everywhere; biologic defense mechanisms prevents production of infections
- Two types : biologic and mechanical defense mechanisms.
- Biologic; lysozyme, tears & other secretions; gastric acid, antibodies

## Methods of transmission

- Pg. 138 table 10 – 1
- Sex – DIRECT CONTACT: physical contact, body to body surface
- Contaminated equipment – INDIRECT CONTACT: susceptible person & contaminated equipment.
- Inhaled eg. Sneezing _ DROPLET TRANSMISSION: moist particles from infected person with in radius 3 ft.

## Methods (cont'd)

- Inhalation of spores –AIRBORNE TRANSMISSION: movement of microbes attached to (evaporated water droplet, dust particles suspended – carried greater than 3 ft.
- Consumption of water – VEHICLE TRANSMISSIOIN: present in or on contaminated items, food, water, medications, devices & equipment

## Methods (cont'd)

- Spread by vectors, fleas, ticks , rats, etc. – VECTOR TRANSMISSION: from an infected insect or animal

## Most susceptible Host

- Burn victims
- Major trauma
- Invasive procedures
- Indwelling equipment
- Implantable devices
- Inappropriate antibiotic therapy.
- Anticancer & anti-inflammatory drug therapy
- Infected with HIV

## Medical asepsis

- Practices that reduce & control or eliminate sources of transmission of infection
- Helps to protect patients & health care providers from disease
- Helps break the chain of infection
- How; hand washing, barriers, routine cleaning

## Principles for Med. Asepsis

- Microorganisms are everywhere
- Freq. hand washing, intact skin, best method to reduce organisms
- Blood, Body fluids, cells, & tissues major reserevoirs
- PPE & ISOLATION- serve as barriers
- A clean environment
- Clean from the cleaner to the dirtier areas

## Nosocomial Infections

- That which is obtained in health care facility

- Transmitted by direct contact
- Was not incubated at admission
- Can result in long stays at facilities
- Increase virulent microorganism

## Antimicrobial Agents

- Terminal cleaning is done daily while the patient is in the facility
  Con-current disinfecting is done when the patient is discharged from the facility.
- Different agents & methods are use for each type
- Antiseptic agents; inhabit the growth of germs, does NOT kill them. May be used on the skin
- Disinfectants; destroy microorganisms. But not spores. Not used on skin

## Anti-infective drugs

- Antibacterial & Anti-viral
- Antibacterial, alter the metabolic make up of bacteria, cell walls & mechanisms they need to grow – also destroy normal flora
- Anti-viral – recently found b/c of blood borne pathogens, they do not destroy the infecting virus, they control the replications of the virus the (copies). Goal is to limit the # of copies

## Drugs (cont'd)

- Increased pathogens replace normal flora when HCW fail to wash their hands
- 15 seconds. Mimimum time for hand washing
- Hand washing is the single most effective way to prevent infection.

## Guidelines for Hand washing

- Vigorous brief rubbing together of all surfaces of the hands
- Lathered soap (liquid)
- Rinsing under a stream of water
- Purpose: to remove soil & transient organisms
- Reduces the organisms count, called virulence
- HAND WASHING IS NOT AN OPTION , IT IS A MUST FOR ALL HCW'S

## Guidelines (cont'd)

- Hand washing depends on: Intensity of the contact
- Contaminated objects
- Degree or amount of contaminants
- Susceptibility of the patient or nurse
- Procedure or activity to be carried out

## Guidelines (cont'd)

- Recommendations for hand washing:
- Visible soiled hands
- Before & after patient contact
- Contact with the source of microbes, eg. blood or body fluids
- Pre – invasive procedure
- Post removal of gloves

## Guidelines (cont'd)

- CDC & PUBLIC health ; recommend washing 10/15 sec. with antiseptic soap, when more soiled 30 sec.
- BAR SOAP IS NOT USED: soap irritates the skin, causing breakdown
- Alternate using ETOH antiseptic hand washes, lanolin in the lotions
- Assess your hands for; breakage, condition of nails, no artificial nails, no long nails

## Guidelines (cont'd)

- Assess the patient for; heavy soiling, risk for infection, thick fungal nails (hand & feet)
- Blood count esp. WBC's increase
- Open wounds
- Medical diagnosis
- Medications ( never cut or shave, when on BLOOD THINNERS)

## Hand washing

- An aseptic practice
- Scrubbing with soap , water & friction
- Removes dirt & organic substances
- Removes resident microbes (present on skin non-pathogenic) removed with handwashing
- Removes transient microbes _( pathogens picked up) removed with hand washing
- Tend to cling to nooks & grooves

## Hand washing (cont'd)

- Contraindications:
- Rings
- Margins of nails
- Cracked nails
- Artificial nails –broken or separated
- Lang fingernails
- Microbes, become residence, transferring infection

## Hand washing procedure

- Push wrist watch & long sleeves aabove the wrist.
- Fingernails, short & smooth
- No rings, plain wedding bands ONLY
- Stand in front of the sink, hands & uniform not touching
- Turn on water- check the temperature & flow, NEVER HOT WATER

## Procedure (cont'd)

- Avoid splashing
- Wet hands & wrists
- Keep hands & forearms below the elbows
- Apply soap – 5 ml. – dime size, lather
- Wash, make lots of lather & friction 10/15 sec.
- Interlace fingers, rubbing the palms & back hands in a circular motion
- Clean under fingernails with the nail of the other hand, or use an orange stick

## Procedure (cont'd)

- Rinse hands and wrists, keeping them below the wrist
- The elbows should be up & out
- Dry hands with a paper towel or air dry
- Dispose of paper towel
- With a clean towel turn off faucet "AVOID TOUCHING THE HANDLES"
- OUTCOME: CLEAN HANDS FOR PROTECTION

## Isolation

- With known source of infections, hospital infection control practices & prevention are always put in use. Est.1996 by CDC
- Most common causes of infection; feces, urine, mucous, drainage, body fluids
- Know the reason for the isolation precautions
- Review procedure & skills to care for patient
- Know the patients emotional state
- Prepare all equipment

## Isolation (cont'd)

- Two type of precautions
- Standard- contact with body fluids, blood, non-intact skin, mucous membranes
- Colonized – known infected or suspected germs, transmitted by; airborne, droplet, or contact.
- Know; why, how, when, isolation is being carried out.
- Educate the families, and know their level of comprehension

## Isolation (cont.d)

- Isolation develops; loneliness, disrupts social relationships, self-concept of body image, disrupts communications between patient & nurse
- Always explain when you'll return
- Communications is most important, give as much information as possible about the condition
- Conversational topics should be that what is important to the patient

## Isolation (cont'd)

- PPE, personal protective equipment:
- Applying equipment; wash hands
- Handle masks little as possible, cover nose & mouth, bend mental strip to fit over the nose
- Top tie, behind the ears, down under the chin
- Bottom tie, behind the neck in a bow
- Ear ties, put behind the ears
- Glove

## Isolation (cont'd)

- PPE placement;
- Mask
- Eye ware
- Gown
- Gloves

## Isolation (cont'd)

- Removing Mask:
- Remove gloves
- Untie top strings
- Untie bottom strings
- ONLY TOUCH THE STRINGS
- Do not allow mask to fall onto your clothing
- Never touch the outer surface of the mask
- Wash your hands

## Isolation (cont'd)

- Removal of PPE:
- Gloves
- Mask
- Gown
- Eye ware

## Immunity

- Exposure to disease causing organisms during one's life stimulates the process of acquired immunity
- 1. ACQUIRED IMMUNITY – is attained through acquired or artificial source
- 2. NATURALLY ACQUIRED PASSIVE IMMUNITY- mothers to infants during pregnancy thru placenta – after birth, thru breast milk – lasts 6 months

## Immunity ( cont'd)

- 3. NATURALLY ACQUIRED ACTIVE IMMUNITY – having the disease
- 4. ARTIFICIALLY ACQUIRED ACTIVE IMMUNITY- injection of a causative agent called "ANTIGEN" into a persons system, such as Whooping cough, Measles, Hepatitis B (esp. for healthcare workers)

## Immunity (cont'd)

- "Tetanus" IS SHORT TERM – Booster Required Every 7 Years
- Active or Passive
- 5. ARTIFICIALLY ACQUIRED PASSIVE IMMUNITY – injection of a ready made antibody into a persons system. Antibodies were produced by another individual's immune system, eg. "immunity for rabies"
- Titer to check for immunity

## Courses for Disease

- Period Incubation : the time from entrance of the organisms to the appearance of the symptoms in the body.
- Prodromal Stage: from the onset of non-specific signs & symptoms to a more specific signs & symptoms. Microorganisms multiply & this is a very contagious stage
- Full/Acute Stage: all signs & symptoms of the infection present
- Convalescent Stage: the acute symptoms disappear, recovery depends of the severity of the infection