Burns and Plastic Surgery

Week 48
Objectives

• Care of the Burned Patient
• Distinguish between first, second and third degree burns.
• State how the area of body surface, as well as the degree of the burn, affects the care of the burned patient and the ultimate outcome for the patient.
• List the medical and nursing care for the patient with mild and severe burns.
• Distinguish between open and closed methods of treatment and plan nursing care for a patient on each method.
• Apply the “rule of 9s” to determine the percent of body surface that has been burned.
Burns

• Tissue injuries caused by heat
  – Thermal
  – Electrical
  – Radiation
  – Inhalation
• On average in the United States in 2004, someone died in a fire every 135 minutes, and someone was injured every 30 minutes (Karter 2005).

• Each year in the United States, 1.1 million burn injuries require medical attention (American Burn Association, 2002).
  – Approximately 50,000 burn injuries require hospitalization;
  – Approximately 20,000 are major burns involving at least 25 percent of the total body surface;
  – Approximately 4,500 of these people die.

• Up to 10,000 people in the United States die every year of burn-related infections.

• Only 60 percent of Americans have an escape plan, and of those, only 25 percent have practiced it (NFPA, 1999).

• Smoke alarms cut your chances of dying in a fire in half (NFPA, 1999).
Classification

• **Burn size**
  - Rule of nines
  - Lund and Browder method

• **Burn depth**
  - Superficial burn (first degree)
    • Affect only the epidermis
  - Superficial or deep partial-thickness burn (second degree)
    • Affects the epidermis and the dermis
  - Full-thickness burns (third degree, fourth degree)
    • Extend into even deeper tissue layers
First Degree Burns

Affects the epidermis only, causing erythema without blistering. Sunburn is a first-degree burn.

**Signs:**
- Red
- Painful to touch
- Skin will show mild swelling

**Treatment:**
- Apply cool, wet compresses, or immerse in cool, fresh water. Continue until pain subsides.
- Cover the burn with a sterile, non-adhesive bandage or clean cloth.
- Do not apply ointments or butter to burn; these may cause infection.
- Over-the-counter pain medications may be used to help relieve pain and reduce inflammation.

First degree burns usually heal without further treatment. However, if a first-degree burn covers a large area of the body, or the victim is an infant or elderly, seek emergency medical attention.
Second Degree Burns

- Affects the epidermis and the dermis, classified as *superficial* (involving the epidermis and the papillary dermis) or *deep* (extending into the reticular dermis). Called also *partial thickness burn*.

- **Signs:**
  - Deep reddening of the skin
  - Pain
  - Blisters
  - Glossy appearance from leaking fluid
  - Possible loss of some skin

- **Treatment:**
  - Immerses in fresh, cool water, or apply cool compresses. Continue for 10 to 15 minutes.
  - Dry with clean cloth and cover with sterile gauze.
  - **Do not** break blisters.
  - Do not apply ointments or butter to burns; these may cause infection
  - Elevate burned arms or legs.
  - Take steps to prevent shock: lay the victim flat, elevate the feet about 12 inches, and cover the victim with a coat or blanket. **Do not** place the victim in the shock position if a head, neck, back, or leg injury is suspected, or if it makes the victim uncomfortable.
  - Further medical treatment is required. **Do not** attempt to treat serious burns unless you are a trained health professional.
Third Degree Burns

- A third-degree burn penetrates the entire thickness of the skin and permanently destroys tissue. It destroys both the epidermis and the dermis, often also involving the subcutaneous tissue. Called also full-thickness b.

- **Signs:**
  - Loss of skin layers
  - Often painless. (Pain may be caused by patches of first- and second-degree burns which often surround third-degree burns).
  - Skin is dry and leathery
  - Skin may appear charred or have patches which appear white, brown or black

- **Treatment:**
  - Cover burn lightly with sterile gauze or clean cloth. (Do not use material that can leave lint on the burn).
  - Do not apply ointments or butter to burns; these may cause infection
  - Take steps to prevent shock: lay the victim flat, elevate the feet about 12 inches.
  - Have person sit up if face is burned. Watch closely for possible breathing problems.
  - Elevate burned area higher than the victim’s head when possible. Keep person warm and comfortable, and watch for signs of shock.
  - **Do not** place a pillow under the victim’s head if the person is lying down and there is an airway burn. This can close the airway.
  - **Immediate** medical attention is required.
3rd degree burn
Fourth Degree Burn

• a burn that extends deeply into the subcutaneous tissue, completely destroying the skin, subcutaneous fat, and underlying tendons, and sometimes involving muscle, fascia, or bone.
Electrical Burns
Estimating Burn Size: Rule of Nines

• An adult who has been burned, the percent of the body involved can be calculated as follows:
  • Head = 9%
  • Chest (front) = 9%
  • Abdomen (front) = 9%
  • Upper/mid/low back and buttocks = 18%
  • Each arm = 9%
  • Each palm = 1%
  • Groin = 1%
  • Each leg = 18% total (front = 9%, back = 9%)
Burn Severity

• Based on area, depth, location, age, mechanism of injury, health history.

• Major burn:
  – >25% BSA if younger than 40; 20% or more if older than 40
  – Disfiguring or disabling injuries to eyes, face, ears, hands, feet or perineum
  – High voltage electrical burn
  – Inhalation injury
  – Major trauma + burn
Pathophysiology of Burn Injury

- Local effects
  - Tissue releases chemicals that cause increased capillary permeability, which permits plasma to leak into the tissues
  - Injury to cell membranes permits excess sodium to enter cell and potassium to escape into the extracellular compartment
  - These shifts cause local edema and decrease in cardiac output
  - Fluid evaporates through the wound surface, further contributing to the declining blood volume
  - 18 to 36 hours after a burn injury, capillary permeability begins to normalize and reabsorption of edema fluid begins
  - Cardiac output returns to normal and then increases to meet increased metabolic demands
Pathophysiology of Burn Injury

• Systemic effects
  – Fluid balance
  – Gastrointestinal function
  – Immune system
  – Respiratory system
  – Myocardial depression
  – Psychological effects
Stages of Burn Injury

• Emergent: begins with the injury and ends when fluid shifts have stabilized
• Acute: begins with fluid stabilization and ends when all but 10% of burn wounds are closed or when all wounds are closed
• Rehabilitation: lasts as long as efforts continue to promote improvement
Medical Treatment: Emergent Stage

• Assess airway, breathing, and circulation and then determine whether the patient has injuries in addition to the burn
• If inhalation injury, oxygen therapy is started
• May require intubation if airway is compromised
• IV lines established to begin fluid resuscitation and to provide emergency vascular access
Medical Treatment: Emergent Stage

• Indwelling urinary catheter and a nasogastric tube usually inserted
• Blood drawn for baseline lab studies
• Tetanus prophylaxis may be administered
• Pain assessed and analgesics are ordered
• Wound is cleaned, débrided, and inspected
Medical Treatment: Emergent Stage

• Patient with serious burns is transferred to a burn specialty care unit or a critical care unit
• IV essential during the first few days of burn treatment
  – Volume based on patient’s weight and extent of injury
  – First 24 hours, IV fluids may consist of various combinations of electrolyte, colloid, and dextrose solutions
  – Second 24 hours, volume decreased based on urine output
  – Fluids then different combinations of electrolyte, colloid, and dextrose solutions
  – Some formulas omit electrolyte solutions in the second 24 hours
• Antibiotic therapy and surgical procedures
Wound Care

- Open method: topical antimicrobials but no dressings
- Closed care: topical medications covered by dressings
- Topical medications: silver sulfadiazine (Silvadene) and mafenide acetate (Sulfamylon)
- Tetanus booster given if patient has not been immunized within the past 5 years
Wound Care

• For clean partial-thickness wounds that will heal without grafting, temporary wound coverings
  – Amniotic membranes, grafts from cadavers or pigs, and a number of synthetic materials

• Graft sites also treated with negative pressure wound therapy

• Donor sites treated with fine-mesh gauze and synthetic and biosynthetic products
Wound Care

• Débridement
  – Removal of debris and necrotic tissue from a wound
  – By scissors, forceps, surgical excision, or enzymes

• Skin grafting
  – Autograft: the patient’s own skin
  – Split-thickness or a full-thickness graft

• Scarring
  – Can be reduced with pressure dressings in the early stages of care, followed by custom-fitted garments that apply continuous pressure
Care of the Patient with Burn Injury

• Health history
  – Circumstances surrounding the burn injury
  – Chronic diseases, surgeries, or hospitalizations
  – Medications and allergies
  – Family history even though not specific to burn injuries; it may alert the staff to other problems
  – Review of systems detects current problems
  – Habits and lifestyle, roles and responsibilities, stressors, and coping strategies
Care of the Patient with Burn Injury

• Physical examination
  – Vital signs
  – Inspect for burn wounds and other lesions
  – Wound color and the presence of eschar
  – Palpate intact skin for temperature and turgor
  – Chest expansion observed, and the lungs auscultated for wheezing, stridor, or atelectasis
  – Apical pulse be auscultated for rate and rhythm
  – Abdomen assessed: active bowel sounds/distention
  – Extremities are inspected for injury and deformity
  – ROM assessment is delayed if extremity immobilized
Care of the Patient with Burn Injury

• Interventions
  – Decreased Cardiac Output
  – Fluid Volume Excess
  – Acute Pain
  – Risk for Infection
  – Hypothermia
  – Risk for Imbalanced Nutrition: Less Than Body Requirements
  – Impaired Physical Mobility
  – Ineffective Coping
  – Ineffective Family Coping
Aesthetic Surgery

- Alters a body feature that is structurally normal but perceived by the patient as unattractive
- Examples: rhytidectomy, blepharoplasty, chin implants, rhinoplasty, abdominoplasty, breast augmentation, and breast reduction
Reconstructive Surgery

• Repair disfiguring scars, restore body contours after radical surgery like mastectomy, eliminate benign lesions such as birthmarks, restore features damaged by trauma or disease, and correct developmental defects
Preoperative Nursing Care

• Assessment: health history
  – Patient’s description of plastic surgery and what he or she expects the procedure to accomplish. Past medical history may elicit conditions that might affect wound healing
    • Review of systems: surgical area receives special attention
    • Functional assessment: patient’s lifestyle and usual activities

• Interventions
  – Anxiety
  – Deficient Knowledge
Postoperative Nursing Care

• Assessment
  – Vital signs and level of consciousness
  – Inspect dressings for drainage or bleeding, but do not remove them without specific orders
  – Observe flaps and grafts for color and evidence of fluid accumulation, and palpate for warmth
  – Inspect and measure drain contents each shift
  – Fluid should lighten from sanguineous (red) to serosanguineous (pink) to serous (pale yellow)
  – Patient’s comfort level
Postoperative Nursing Care

• Acute Pain
• Risk for Infection
• Risk for Injury
• Risk for Deficient Fluid Volume
• Disturbed Body Image
• Ineffective Therapeutic Regimen Management