Care and Management of Burn Injury

Outlines

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Outlines (Con.)

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Introduction

A burn injury can affect people of all age groups, in all socioeconomic groups. The nurse must also be able to communicate effectively with patients who have burn injuries, family members in crisis, and members of the entire interdisciplinary burn management team. Care of the patient with a burn requires knowledge and skill throughout the care continuum from injury to recovery. This ensures quality care, improved patient outcomes, and optimal quality of life.

Definition of Burn

A burn is defined as an injury to the skin or other organic tissue primarily caused by thermal or other acute trauma . It occurs when some or all of cells in the skin or other tissues are destroyed by hot liquid (scalds), or hot solids (contact burn) or flames injury to the skin or other organic tissues due to radiation ,electricity, friction or contact with chemicals are also identified as burns .

Causes of burn injury

1- Electrical Burns

Electrical injuries are about 3% of the annual burn center admissions and result in almost 1000 deaths per year. The severity of electrical burns depends on several factors, including the type of current (alternating or direct), the voltage, the path of the current, the contact areas and the body’s resistance.

2-Chemical Burns

Chemical burns occur after prolonged exposure to acids , alkalis , or organic compounds. The severity of chemical injuries is related to the agent, concentration, volume, extent of body surface involved, penetrability of chemical , type of chemical, speed of action, and properties of the skin involved.

3-Thermal Burns

They result from exposure to dry heat (flame) or moist heat (hot liquid).

4-Radiation Burn

Radiation burns are usually associated with sunburn or radiation treatment for cancer. These kinds of burns tend to be superficial, involving only the outermost layers of epidermis.

Classifications of burn injury

1- Burn depth

2- Severity

3- Extent of Body Surface Area Injured

1- Burn depth

Depth of burn & causes	Skin involvement	Symptoms	Wound appearance	Recuperative course
Superficial partial-Thickness (Similar to first degree)				
Sunburn Low-intensity flash	Epidermis , possibly a portion of dermis	Tingling, Hyperesthesia Pain that is soothed by cooling	Reddened,blanches with pressure,dry Minimal or no edema Possible blisters	Complete recovery within a week , no scarring Peeling

Deep Partial-Thickness (Similar to Second degree)

Scalds Flash flame Contact	Epidermis, upper dermis,portion of deeper dermis	Pain Hyperesthesia Sensitive to cold air	Blistered,mottled red base,broken epidermis,weeping surface Edema	Recovery in 2 to 4 weeks Some scarring & depigementation Contractures Infection may convert it to full thickness

Full-Thickness (Similar to third degree)

Flame Prolonged exposure to hot liquid Electric current Chemical Contact	Epidermis,entire dermis & some-times subcutaneous tissue,may involve connective tissue , muscle & bone	Pain free Shock Hematuria &possibly hemolysis Possible entrance &exit wounds	Dry,pale white,leathery or charred Broken skin with fat expoed Edema	Eschar sloughs Grafting Scarring &loss of contour & function ,contracture Loss of digits or extremity

Superficial burns

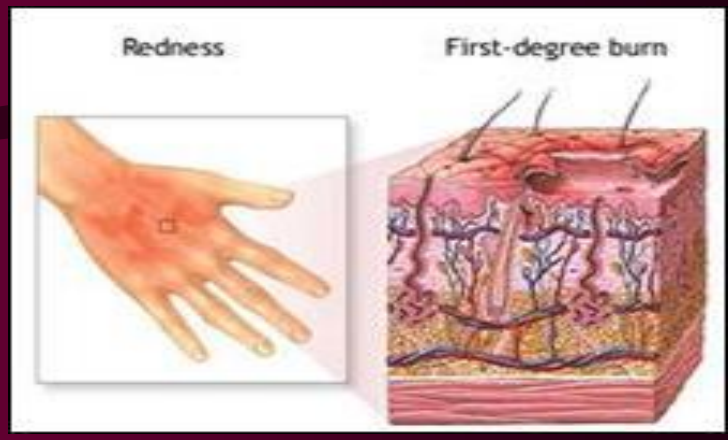
- Red , Blistered and Very painful

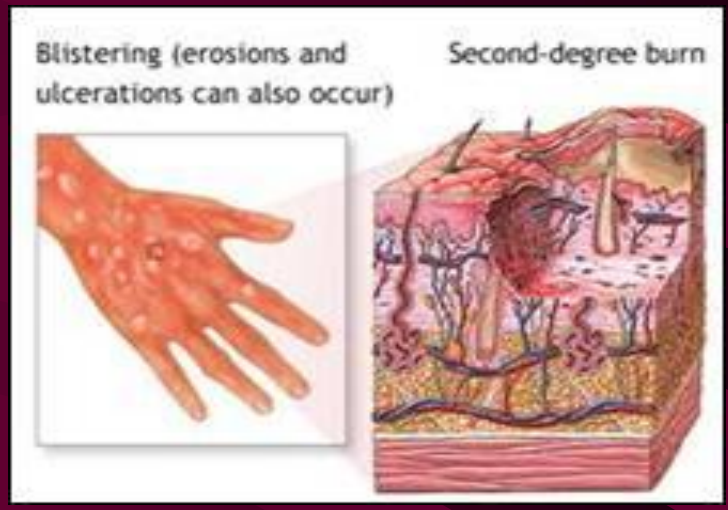
Deep burns

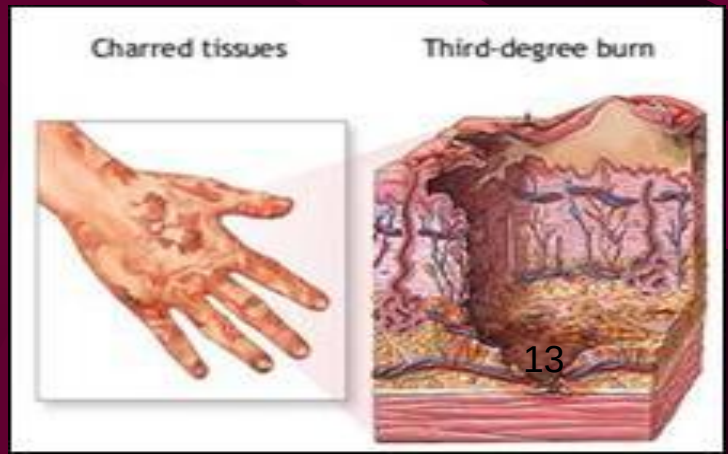
- Mottled red and white
- Painful
- Blistered, with a moist surface

Full thickness burns

- White or charred
- Feels dry and leathery.
- Pain is less (nerves are damaged)







2-The severity

Major: Age 10-50yrs: partial thickness burns >25%

- Age <10 or >50: partial thickness burns >20%
- Full thickness burns >10%
- Burns involving the hands, face, feet or perineum
- Burns that cross major joints
- Circumferential burns to any extremity
- Any burn associated with inhalational injury
- Electrical burns
- Burns associated with fractures or other trauma
- Burns in infants and the elderly
- Burns in persons at high-risk of developing complications

Moderate

- Age 10-50yrs: partial thickness burns involving 15-25% of total body surface area
- Age <10 or >50: partial thickness burns involving 10-20% of total body surface area
- Full thickness burns involving 2-10% of total body surface area

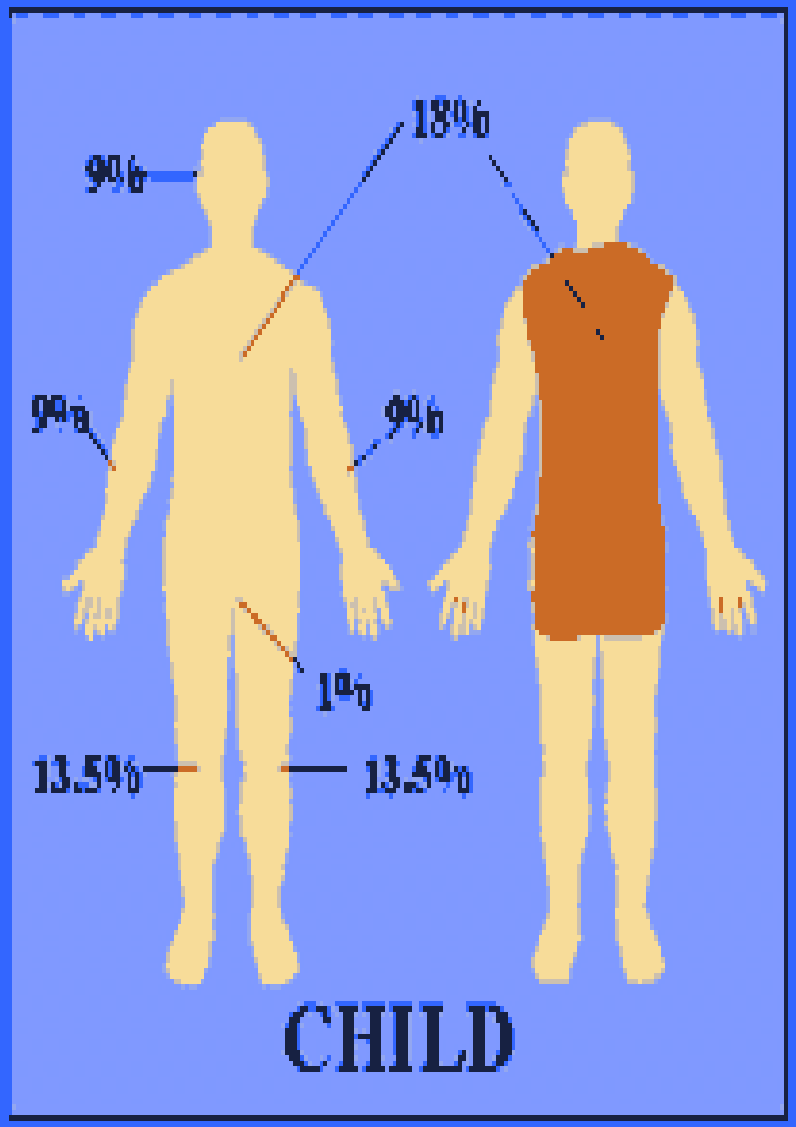
Minor

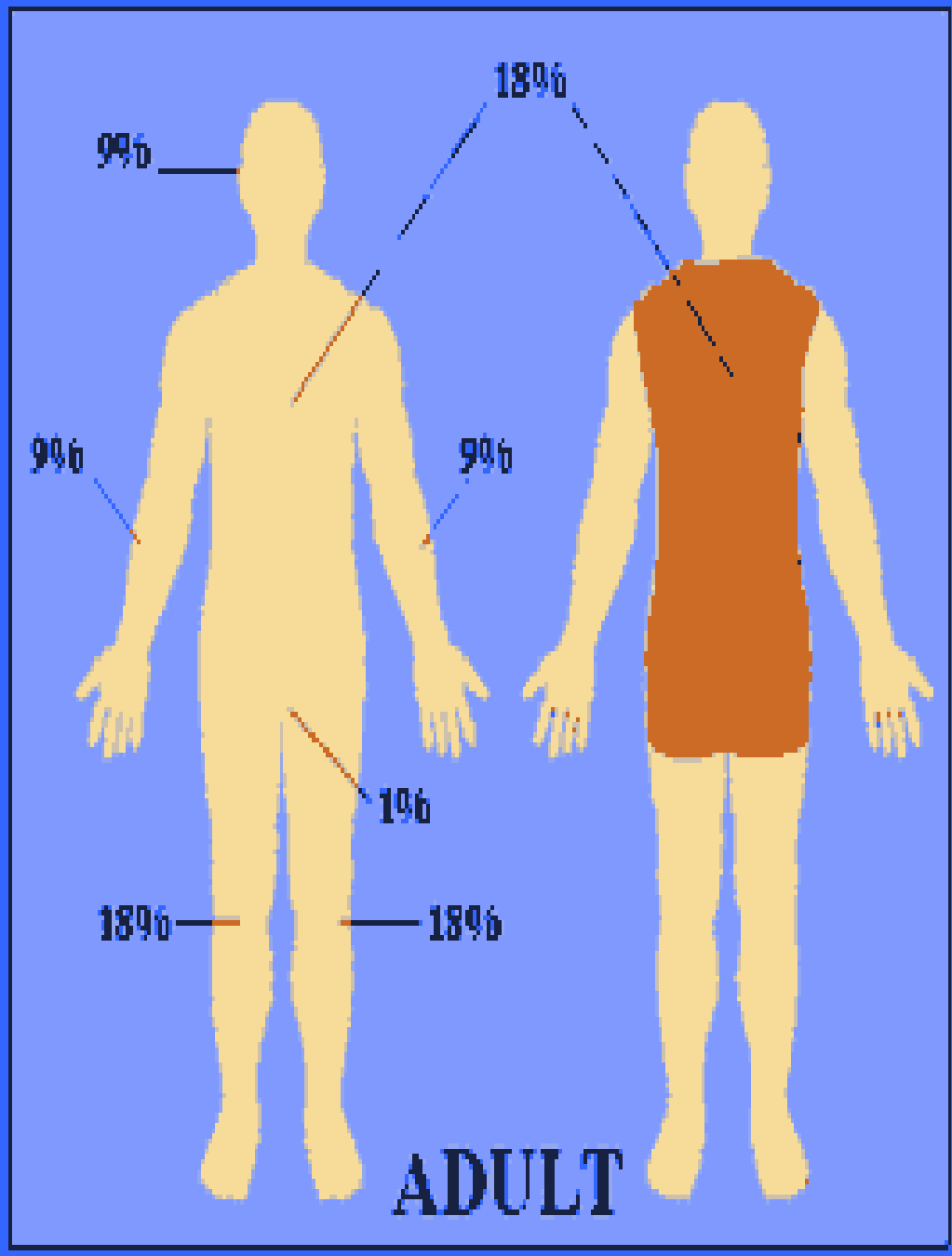
Age 10-50yrs: partial thickness burns <15% of total body surface area

Age <10 or >50: partial thickness burns involving <10% of total body surface area

Full thickness burns <2% of total body surface area, without associated injuries

RULE OF NINES





- Rule of palms→ each palm size is 1% of the TBSA burned .The palm size is the patient's palmer surface to include the fingers.
- Lund and Browder method→ Dividing the body into very small areas & providing an estimate of the proportion of TBSA accounted for by each body part.

Pathophsiology and manifestations of burn

A. Cardiovascular system:

- ✓Edema related to shifting of amounts of fluids from intracellular space into interstitial tissue
- ✓Blood pressure falls as cardiac output diminished
- ✓Hypovolemic shock (burn shock)
- ✓Abnormal platelets aggregation
- ✓Red blood cells are hemolyzed
- ✓Elevated leukocyte count .

B. Immune system:

- ✓ The immunologic defenses of the body are greatly altered by a burn injury.
- ✓ Loss of skin integrity is compounded by the release of abnormal inflammatory factors , altered levels of immunoglobulins , and serum complement.
- ✓ Impaired neutrophil function and reduction in lymphocytes.
- ✓ The patient is high risk for infection and sepsis.

C. Integumentary system :

- ✓ Loss of skin leads to inability to regulate body temperature.
- ✓ Patients with burn injuries may exhibit low body temperatures in early hours after injury.

D. Respiratory system :

- The manifestation of Carbon monoxide poisoning range from mild visual impairment and headache to coma and death
- Interstitial pulmonary edema develops secondary to the movement of fluid from the pulmonary blood vessels into interstitial compartment of lung tissue
- Smoke inhalation damage alveoli which inactivate surfactant lead to alveolar collapse finally result in complete airway obstruction

- ✓Upper airway thermal injury results from the inhalation of heated air
- ✓Ulceration , sloughing of the airway , increased secretions & inflammation , atelectasis , airway obstruction and tissue hypoxia

E. Gastrointestinal system :

- ✓ Curling`s ulcer
- ✓ Abdominal pain , acidic gastric ph levels hematemsis (vomiting with blood)
- ✓ Occult blood in the stool may indicate presence of gastric ulcer information
- ✓ Paralytic ileus
- ✓ Nausea and vomiting

F. Urinary system :

- ✓Massive fluid loss occurs leads to dehydration
- ✓Dark brown concentrated urine may indicate hemoglobineuria

Diagnostic Tests

- ✓ Chemistry panel → electrolytes, blood urea nitrogen, creatinine
- ✓ Hematology → hematocrit , coagulation studies
- ✓ Arterial blood gases: to monitor oxygen status and acide-base disturbances
- ✓ Urine analysis: to evaluate renal perfusion and nutritional status

- ✓ Drug toxicology
- ✓ Cultures of sputum, blood,_urine, and wound tissue are done to indicate the presence of infection.
- ✓ Blood group and cross matched: in case of blood transfusion
- ✓ Total protein and albumin: indicate nutritional status during rehabilitative phase

- ✓ Chest x-rays: document within the for first 24 hours to 48 hours that may reflect presence of atelectasis , pulmonary edema or acute respiratory distress
- ✓ Bronchoscope: if upper airway is manifested
- ✓ Electrocardiogram (ECG) : To monitor the development of dysarrythmias

Burn care Management

The treatment of the burn injured is divided into three stages:

1. Emergent or resuscitative phase
2. Acute phase
3. Rehabilitative phase

Emergent or Resuscitative phase

This stage from the onset of injury to completion of fluid resuscitation and include:

1. Primary survey

- The client's head elevated to 30 degrees
- Assess airway ,breathing ,circulation
- Apical pulse and blood pressure are monitored
- Humidified oxygen based on ABG results
- Airway may need frequent suction
- If airway obstruction occur → endotracheal intubation

- Mechanical ventilation if continuous positive airway pressure.
- Insert central venous catheter to large amount of IV fluids & monitor central venous pressure
- Insert urinary catheter to monitor urinary output
- Tetanus prophylaxis is administered because burns are contaminated wounds.

2. Second survey:

1. Head (depressions, laceration, fracture)
2. Eye
3. Mouth (foreign body – blood- vomits)
4. Neck(tenderness , deviations)
5. Chest (expansion , breath, and heart sounds, open wounds)
6. Abdomen (open wound, pain, tenderness, distension , rigidity)
7. Pelvis (stability)
8. Back(deviation, fracture)
9. Extremities (fracture, open wound , pulses)

3. Fluid resuscitation:

- Fluid resuscitation formula is a calculation used for the amount of fluid to be initially infused. The patient's preborn body weight and the percentage of TBSA burned.
- For adults → 2-4 ml Ringer's lactate × body weight in kg × %TBSA burn.
- For children→ 3-4 ml Ringer's lactate × body weight in kg × %TBSA burn

Burn Resuscitation Formulas

1. American Burn Association Consensus Formula
2. Modified Brooke formula
3. Brooke formula
4. Baxter (Parkland) formula
5. Evans formula
6. Dextran (Demling) formula

Acute phase

Beings from 48 to 72 hours after burn injury .

During this phase . This phase include :

- ✓ Infection control
- ✓ Burn wound care
- ✓ pain management
- ✓ Nutritional support

I-Infection control

- Use of cap, gown, mask and gloves
- Aseptic technique
- Gowns & gloves are worn by all caregivers & visitors .
- Hand hygiene is used before & after leaving patients room

- Monitoring & observation of the wound (changes in the wound , presence of purulent drainage , pain , increasing depth of burn wound).
- Tissue specimens may be obtained for culture to monitor colonization . These may be swab or tissue biobsy
- Sterilization of equipment.

II-Burn wound care:

a) Wound cleaning

- If the Patient is ambulatory the wounds can be cleansed in a shower.
- The wounds of non ambulatory patients can be cleansed using shower carts, Mobile stretchers made with removable sides , drainage holes & positioning capabilities.

- The use of plastic liners, water filters,& thorough decontamination of hydrotherapy equipment & wound care areas is required to prevent cross-contamination.
- The temperature of water is maintained at 37.8c
- During the bath, the Patient is encouraged to be active as possible.
- At the time of wound cleaning , all skin is inspected for any hints of redness ,breakdown , or local infection.

- Hair in &around the burn area should be clipped short or shaved .
- Intact blisters should be left alone & debrided only if they rupture or break.
- Hydrotherapy should be limited to a 20-30 minutes to prevent chilling.
- After the burn wounds are cleaned , they are gently patted with towels.

b) Topical antibacterial therapy :

- topical antibacterial therapy become more important in the deep dermal &full-thickness injury because they are more prone to infection .Silver has been introduced into a variety of topical treatment because of its broad spectrum effectiveness against staphylococcus aureus &psyeudomonas aeruginosa .

c) Wound dressing

- After wound cleaning , the wound covered with several layers of dressings.
- - Alight dressing is used over joint areas to allow for motion.

- Circumferential dressings should be applied distally to proximally.
- Occlusive dressings may be used over areas with new skin graft to protect the graft and promote an optimal condition for its adherence to the recipient site.

d) Wound Debridement

1. Natural debridement

The dead tissue separates from the underlying viable tissue spontaneously. Bacteria that are present at the interface of the burned tissue and the viable tissue underneath gradually liquefy the fibrils of collagen that hold the eschar in place for the first or second post burn weeks.

2)Mechanical debridement

The use of surgical scissors, scalpels, and forceps to separate and remove the eschar.If bleeding occurs, hemostatic agents or pressure can be used to stop the bleeding from small vessels. Dressings changes alone aid the removal of wound debris.

3)Chemical debridement

Total enzymatic debridement agents are available to promote debridement of the burn wounds. because such agents usually do not have antimicrobial properties , they should be used together with topical antibacterial therapy to protect the patient from bacterial invasion.

Surgical debridement

- ***Escharotomy***: (fasciotomy) is performed by the physician with a scalpel or by electrocautary. A sterile surgical incision is made longitudinally along the extremity or the trunk to prevent constriction, impaired circulation, and possible gangrene.

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Autografting: is used to effect permanent skin coverage of the wound. Early burn wound excision and skin grafting decrease the hospital stay and enhance rehabilitation. Skin is removed from healthy tissue (donor site) of the burn injured client and applied to the burn wound. After auto grafting is applied the graft area is immobilized.

Cultured epithelial autografting : is a technique in which skin cells are removed from unburned sites on the client's body and placed in a culture medium for growth. With this technique enough skin can be grown over a period of 3 to 4 weeks to cover an entire human body. The cells are prepared in sheets and attached to petroleum jelly gauze backing which is applied to the burn wound site.

III- Pain Management

- The pharmacological treatment (opioids , nonsteroidal anti-inflammatory drugs)
- Treatment of anxiety with benzodiazepines
- Nonpharmacologic pain control can be achieved by using relaxation techniques, distraction , guided imagery , hypnosis , therapeutic touch

3. Rehabilitative phase

- The rehabilitation begins from immediately after the burn has occurred and often extends for years after injury.
- Restoration of physical, emotional, psychological and social function through multidisciplinary supportive services is needed.

Apply nursing care plan for patient with burn

Actual Problems

- Acute pain related to burn injury as manifested by irritability, complaints of pain alteration in sleep pattern.
- Impaired skin integrity related to Major burn as manifested by redness, skin loss, skin color changes.
- Deficient fluid volume related to inflammatory response to burn with protein and fluid shifts as manifested by dehydration, thrust change in homodynamic status .

- Impaired physical mobility related to burn trauma as manifested by inability to move , unable to perform ADL.
- Disturbed body image related to massive edema , dressings, scarring or contractures as manifested by refusal to look at or care for altered body part , refusal to discuss change .
- Deficient knowledge related to need for long term rehabilitation follow up care. As manifested by questions, verbalize misconceptions.

Potential problems:

- Risk for infection related to damage to respiratory mucosa , presences of dead skin Poor nutrition .
- Risk for ineffective breathing pattern related to burn to head and neck, massive edema inhalation of smoke or heated air .
- Risk for ineffective peripheral tissue perfusion related to blockage of microcirculation, blood loss.

- Risk for poisoning : carbon monoxide related to smoke inhalation
- Risk for imbalanced nutrition: less than body requirements related to prolonged interference in ability to ingest or digest food , increased basal metabolic rate , loss of protein fro dermal wound .

Questions


Thank You!
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