

## BURNS

Burns are defined as tissue injury due to application of heat in any form to the external or internal body surface. Such injury may result from

1. Dry heat
2. Moist heat
3. Chemicals
4. Electric burns
5. X-rays, Laser, radiation burns.

### Characteristics:-

#### Dry heat:-

Burns produced by radiant heat from hot substances cause whitening of skin. On direct contact, such substances produce a blister, if kept in contact for a longer time, they produce roasting and charring of body parts. The skin proteins coagulate and full thickness burns result if the deepest layers of skin reach a temperature of  $45^{\circ}\text{C}$ .

#### Moist heat:-

A scald is an injury resulting from application of liquid at or near boiling point, or from steam. In such cases, only the superficial layers of the skin are affected. The severity of injury depend primarily on the temperature and duration of contact.

The skin is soddened and bleached in appearance. Vesication is an important feature. Scars of scalds are much thinner than those of burns and cause much less contraction and disfigurement.

## **Classification:-**

Scalds are classified in three degrees.

1. Reddening of skin (erythema)
2. Blister formation (vesication due to increased capillary permeability)
3. Necrosis of the dermis (deeper layer of skin)

Redness appear at once and blistering take place within a few minutes. The blisters are surrounded by a thin bright red area of inflammation. There is reddening and swelling of the papilla in the floor of the blister. If the blistered skin is removed it will leave a pink raw surface.

## **Chemicals:-**

They are characterised by inflammatory redness of skin, ulcerated patches of skin, discolouration and staining of skin and clothing, and the presence of the chemical in the stains. Singeing of hair is absent and vesicles are rarely found when burns are due to corrosive acids or alkalis. They may be followed by a keloid scar and disfigurement.

## **Electric burns:-**

The electric burn depends upon five factors.

1. Strength of the current
2. Length of exposure
3. Direction of the current
4. Resistance offered
5. Preparedness for shock.



## Fatal Period:

Death from shock occurs within 1 to 2 days in over 50% cases. Toxaemia persists upto 3 to 4 days and accounts for deaths occurring from 4 to 5 days or longer. Usually, most fatalities occur within the first week. In suppurative cases, death may occur after 5 to 6 weeks or longer.

## Classification:-

There are three kinds of electric burns.

1. Contact burns
2. Spark burns
3. Flash burns

They have some features in common. Their depth is greater than the surface appearance and severe sloughing of tissues may occur later. In addition, burnt areas may have non-signed hair suggesting that the heat effect was from an internal and not an external source, due to conversion of electricity into heat within the tissues.

### Contact burn:-

A contact burn is due to close contact with an electricity 'live' object with domestic voltage. The damage varies from a small and superficial injury to charring depending upon the time the contact is maintained. A characteristic injury is frequently present at the point of entry and exit.

### Spark burn

A spark burn is due to poor or intermittent contact with electrical equipment and the resistance of dry skin. The damaged area shows a dry pitted lesion due to arcing of current from the conductor to skin. A yellowish parchment like scab may form with a pale halo round it due to capillary contraction.

## Flash burn:-

The victim may be hurled from the vicinity by the force of muscular contraction. All types of burns may occur. Actual charring of tissues with carbonisation is common but depending on the degree there may be

1. Brown discolouration on large areas of skin apart from actual burning.
2. Arboroscent pattern of lightning burns.
3. Crocodile skin effect consisting of multiple spark burns.

## Lightning:-

Lightning is an electrical discharge from cloud the earth through an object. It liberates terrific amounts of electrical energy. When the path of lightning to earth is impeded by a poor conductor, violent damage at one takes place. The direct effects are as follows.

1. Burning by heat due to resistance.

Burns may appear as zigzag lines. As moist skin offer less resistance than dry skin, they are often found in moist areas and folds of the skin. If blisters are formed, they are due to electrolytically formed gas than from burns.

2. Arboroscent marks due to the passage of electric current. They are due to rupture of the smaller blood vessels at several places giving rise to echimosis with an arboroscent pattern . These markings fade with time.

3. Turning and magnetisation of metallic articles, such as rings, spectacle frames, pen-knives, keys and watches due to electrical discharges

4. Physical damage, if the electrical discharge finds its way through the feet, then skin may be ruptured. The ear drums may be damaged due to sudden over pressure.



## 5. Cardiac failure

### 6. Anuria

6. Due to the paralysis of local capillary and lymphatic vessels as a result of electrical injury to nerve supply of vessels or to vessels themselves. The resulting dilatation of blood vessels allows fluid to escape and local odema to form.

Location of injuries: Depending upon the effect of permissive waves, heat

### Signs & Symptoms:-

of all such as lungs, bronchi or ear drum, brain and

abdominal viscera. Intense and extensive burns occur with considerable frequency

1. Immediate unconsciousness
2. Streaky surface burns which involve only the epidermal layer of skin causing erythema.
3. Rupture of tympanic membrane.
4. They can manifest as various type of wounds, fractures of bones and thermal injuries.

### Flying missiles:-

### Cause of death:-

As a result of explosion, flying pieces of explosive debris may be directed through. Death is due to electrothermal injuries from high voltage direct current, or involvement of the central nervous system with paralysis of cardiac or respiratory centre.

### Anemia:-

### Explosion:

making its contents of its explosive various gases may be liberated. Their inhalation may result in poisoning.

It is a phenomenon resulting from sudden release of energy which is then dissipated by blast waves by translocation of objects in space, or by the generation of heat.

1. Complete disintegration of body

### Injuries:-

Death results due to burns, blunt force injuries and falling debris

1. Asphyxia due to inhalation of products of combustion.

They are mainly due to four factors.

1. Blast or shock wave
2. Flame or hot gases

3. Flying missiles

4. Anoxia

### **Blast:-**

A body exposed to blast is so shattered that its study will be limited to identification of remains. Depending upon the effect of pressure waves, blast lesions ensue. The parts of the body most readily damaged are the hollow organs which contain gas or air such as lungs, bowels or ear drums, brain and abdominal viscera. Intracranial haemorrhages occur with considerable frequency.

### **Flame or hot gases:-**

It is very extensive and accompanied by blackening and tattooing due to unexploded particles of powder being driven into the skin.

### **Flying missiles:-**

As a result of explosion, flying pieces of explosive debris may be driven through air against the skin causing abrasions, bruises, lacerations and ragged perforations of various sizes and shapes.

### **Anoxia:-**

Depending on contents of the explosive various gases may be liberated. Their inhalation may result in poisoning.

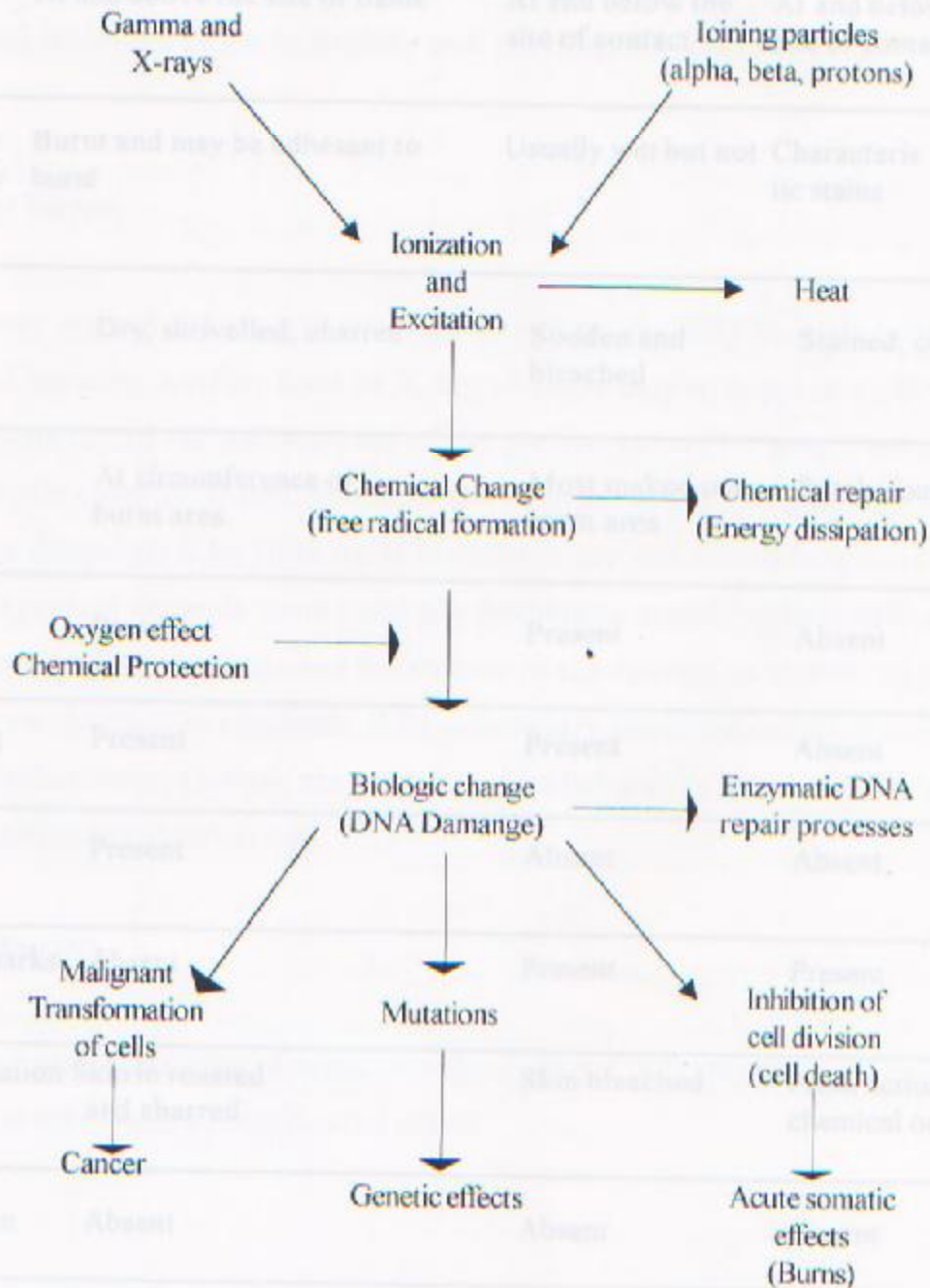
### **Cause of death:-**

1. Complete disintegration of body
2. Death results due to burns, blunt force injuries and falling debris.
3. Asphyxia due to inhalation of products of combustion.
4. Crush Syndrome
5. Shock
6. Systemic air embolism

**Radiation burns:-**

Burns produced by rays vary in intensity depending in the strength of the dose , period of exposure and the type of tissue irradiated.

**DEVELOPMENT OF RADIATION INJURY**





**Distinguishing features of burns from dry heat, moist heat, and chemicals.**

	<b>Dry heat</b>	<b>Moist heat</b>	<b>Chemicals</b>
1. Cause	Flame, heated solid substance or radiant heat	Steam or any liquid at or near boiling Point	Corrosive acids and alkalis
2. Site	At and above the site of flame	At and below the site of contact	At and below the site of contact
3. Clothing to the body	Burnt and may be adherent to burnt	Usually wet but not burnt	Characteristic stains
4. Skin	Dry, shrivelled, charred	Sodden and bleached	Stained, corroded
5. Vesicles	At circumference of burnt area	Most made over burnt area	Rarely found
6. Red line	Present	Present	Absent
7. Singeing	Present	Present	Absent
8. Charring	Present	Absent	Absent
9. Trickle marks	Absent	Present	Present
10. Discolouration	Skin in roasted and charred	Skin bleached	From action of chemical on skin
11. Ulceration	Absent	Absent	present
12. Scar	Thick and causes disfigurement	Thin and causes less disfigurement	Keloid scar and much disfigurement