

FORENSIC & TOXICOLOGY SUMMARY

Done by Shahed Atiyat

Burn

Types of burns:

1. Contact burns: Contact with hot object.
2. Flame burns: Contact with flam.
3. Scald burns: Contact with hot liquids.
4. Radiant heat burns: Caused by heat waves; a type of electromagnetic wave.
5. Ionizing radiant burns: Caused by x-ray, radium, or UV rays.
6. Chemical burns: Caused by acids or alkalis.

Classification of burns:

	First degree	Second degree	Third degree
Depth	Epidermis	Epidermis & dermis	Deeper to dermis
Color	Red or pink	Dark red	Whit, gray, black
Pain to stimuli	Painful & tender	Very painful	Painless
Blanching	Yes	Yes, but slow	No
Appearance	Dry	Moist	Dry/lethargy
Blisters	Not present	Present	May or may not
Healing time	3-6 days	3 weeks	Skin grafting
Scar	No	Yes	Yes
Medico-legally	Simple	Grievous	Grievous

Causes of death:

Immediate causes:

1. Primary or neurogenic shock due to pain or fright.
2. Asphyxia.
3. Smoke-or heat-induced laryngospasm, respiratory arrest, Vaal reflex-caused cardiac arrest.

Delayed causes:

1. Sepsis (death within 4-5 days), pseudomonas, S.Aureus. **The most important.**
2. Hypovolemic shock (death within 24-48h); multi organ failure.
3. Acute edema of glottis, respiratory failure (death within 3 days); due inhalation injury, pneumonia, or ARDS.
4. Toxemia (death within 3-4 days).
5. Infective complications; bronchitis, bronchopneumonia, enteritis.

Sequelae of burns:

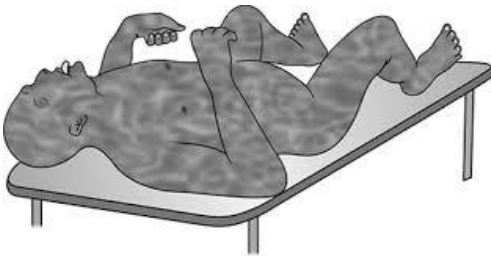
- ❖ Scars, keloid, marjolin's ulcers, curling ulcer, joint deformity, ankylosis.

❖ Corneal capacity, obliteration of external auditory meatus.

External findings of burns:

1. Examination the presence of any inflammable substance.
2. Site, distribution, and extent of burning are recorded.
3. Face: distorted and swollen, protruding tongue
4. Skin: veins stand out, giving a marbled appearance.
5. Blisters: may be ruptured or filled with fluid.
6. Hair: may be singed or burnt.
7. Degloving/ destocking.
8. Pugilistic attitude (boxing, fencing or defense attitude), not medico-legally significant
9. Heat ruptures: splits in the skin due to tissue contraction.

This result in incised or lacerated wounds.

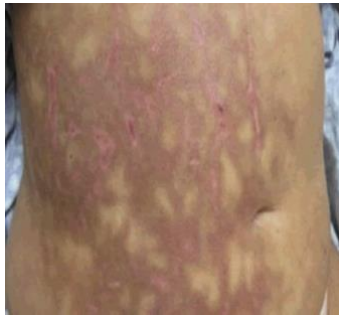


Pugilistic attitude

Happens due **heat stiffening**; due to coagulation of proteins of the muscles and dehydration which cause muscle contraction >> may lead to heat rupture (splits in the skin).



Skin findings



Marbled skin



Blisters



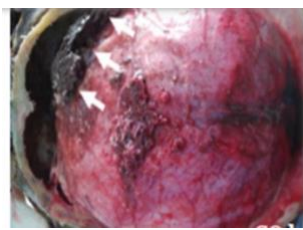
Degloving



Lacerated wounds



Escharotomy



Heat hematoma



Heat rupture

Differentiation between heat ruptured and lacerated wound:

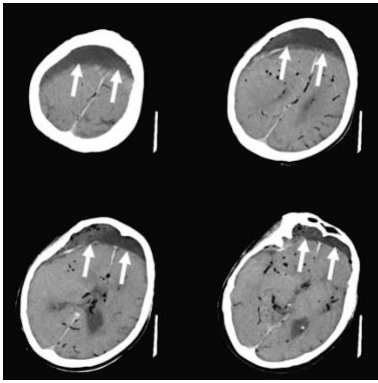
	Heat rupture	Lacerated wound
Cause	Exposure to heat	Blunt force
Site	Fatty tissue	Anywhere
Vessels and nerves	Intact	Torn
Bruising around the margins	Absent	Present

Internal findings of burns:

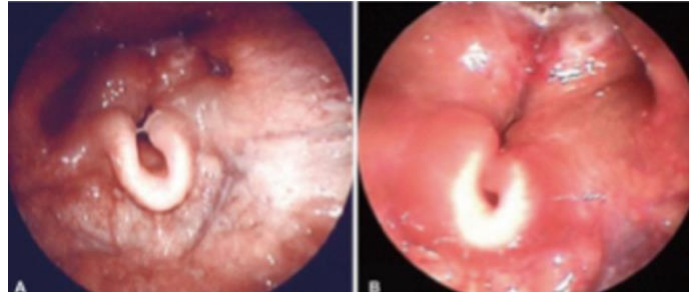
1. Skull: Heat hematoma, fracture.
2. Brain: Congested, swollen with widening, and flattening of guri and obliteration of the sulci.
3. Neck: Hemorrhage in the root of the neck and tongue.
4. Larynx, trachea and bronchioles: Frothy mucus secretion I is the surest sign of antemortem burns.
5. Pleural: Congested and inflamed with serous effusion.
6. Lungs: Congested and edematous, may be shrunken.
7. Heart: Full chambers, cherry red in color due to CO inhalation.
8. Spleen: Enlarged and softened.
9. Liver: Cloudy swelling, fatty liver, cell necrosis, jaundice may occur.
10. Kidney: Nephritis, thrombosis, infection.
11. Adrenal: Enlarged and congested.

Differentiation between epidural hematoma (EDH) due to burns and blunt force:

	Epidural hematoma	Heat hematoma
Cause	Intense heat	Blunt force
Situation	Anywhere	Usually adjacent to Sylvian fissure
Position	Usually bilateral	Usually unilateral
Distribution	Diffuse	Localized
Characteristics	Evenly distributed or sickle-shaped; honeycomb appearance; soft, granular, foamy, friable clot; chocolate brown in color (pink, if CO is present)	Disc shaped; uniform, smooth, rubbery; reddish-purple color
Skull fracture	Eggshell fracture, elliptical or circular defect seen above temple not radiating lines	Fracture line radiating from a skull defect present in temporal area
Crossing suture lines	May cross	No
Injury to CNS	Absent	Maybe
CarboxyHb level	Absent	Present



Heat hematoma



Laryngospasm

Differentiation between antemortem and postmortem burns:

	Antemortem burns	Postmortem burns
Line of redness	Present	Absent
Vesicles	Serous fluid rich in albumin, chloride , polymorphs	Air, if fluid is present, it contains little albumin
Base of vesicles	Red & inflamed	Dry, hard, yellow
Soot in URT	May be present	Absent
Inflammation & repair	Present along with pus and slough	Absent
Healing	Present	Absent
Carboxyhemoglobin	Present	Absent
Enzyme reaction	Increase at periphery of burn	No such increase

Scaled burns

Result from application of liquid $>60\text{ C}$, involve only superficial layers of skin.

Types:

1. Immersion burns: Accidental, homicide or deliberating (like child abuse).
2. Splash or spill burns: Usually accidental.
3. Steam burns: Superheated steam.

Classification (3 degrees):

1. Erythema by vasoparalysis.
2. Blister formation.
3. Necrosis if deeper layers are involved.



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