WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 12, Issue 5, 960-966. Review Article ISSN 2277– 7105

INTENTIONAL BURN INJURY IN CHILDREN: CLINICAL AND FORENSIC REVIEW

[*1]Dr. Archana Bagade and [2]Dr. Vijay Patil

[1]PG Scholar, [2]HOD & Professor, Department of Agadtantra Avum Vidhi Vaidhaka, Yashwant Ayurvedic College PGT & RC, Kodoli, Kolhapur.

Article Received on
13 February 2023,

Revised on 05 March 2023,
Accepted on 26 March 2023

DOI: 10.20959/wjpr20235-27680

***Corresponding Author**
Dr. Archana Bagade
PG Scholar, Department of Agadtantra Avum Vidhi Vaidhaka, Yashwant Ayurvedic College PGT & RC, Kodoli, Kolhapur.

ABSTRACT

Pediatric burns comprise a major mechanism of injury affecting millions of children worldwide, with causes including scald injury, fire injury and child abuse. Most defenseless children are themost likely to be burned intentionally. Child abuse burn victims are almost always under the age of 10 with the majority under the age of 2. 12% of children who faces physical abuse have evidence of severe burn. Inflicted burn injury can be intentionally either by one person to another whenever one has the ability to physically control the other person or it can be self - inflicted. Immediate identification of intentional burn victims by those individuals first responding to the call for assistance is crucial because most of the victims are unable to speak for themselves. A missed diagnosis can result in future fatality so a detailed history, including previous trauma, present of recent illnesses, immunization status, routine medical care, careful documentation of the scene of the injury, including photographs and drawings. In this child abused burn injury medical professionals gather evidence carefully and completely to apply logically and impartially. Lawyers, doctors, forensic experts collaborate together to produce a holistic approach in this review.

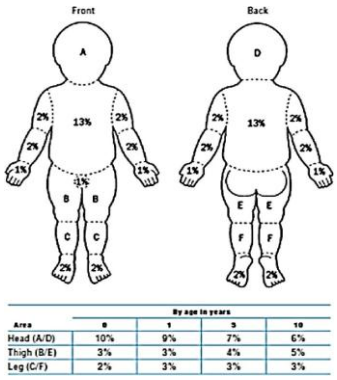
KEYWORDS: Inflicted, Abuse, BurnIntroduction.

Children are much more vulnerable to changes in the temperature of the environment because they produce and loose heat faster than adults. Between 15- 20% of burns sustained by chidren are due to child abuse. Cases of child abuse are an important manifestation of burns owing to thier very nature and not uncommon occurence. These injuries account for approximately 6-20% of all abuse cases and severe burns are reported in an estimated 10% of

all children suffering physical abuse. A burn is an injury which is caused by application of heat or chemical substance to the external or internal surfaces of the body, which causes destruction of tissues. The minimum temperature for producing a burn is about 44'C for an exposure of about five to six hours. At 65'C two seconds are sufficient to produce heat. In intentional burn injury to children the degree of burn depends upon the intensity of force applied to them. Burns are classified by degree depending on how deeply and severely they penetrative the skin's surface first, second, third or fourth. The depth of injury and area involved on the total body surface canalso be classified where we apply the rule of nine. The cause of burn injury varies depending on the age of the child and based on historical views.

Classification of Burn injury

- Initial Classification of burn injury involves both the depth of the burn and the total body surface area (TBSA) encompassed by the burn injury, which also has implications on the aggressiveness of fluid resuscitation. The estimation of the surface area of the body involved is usually worked out by the "rule of nine" by Wallace. A Lund- Browder burn chart is used in younger children for more accurate estimation due to different body surface areas than adults.
- Estimation of Percentage of body surface area burned.



Area of body	Infant	Child	Adult
Head	20	15	09
Front of trunk	20	20	18
Back of trunk	20	20	18
Upper limb	20	20	18
Lower limb	20	15	36
Genitalia	0	0 - 1	01

Rules of Nine: For Paediatric and obese patient the rule of nine are different.

1. Applies topartial thickness(2nd degree) and full thickness (3rd degree) burns.

2. Does not apply to superficial (1st degree) burn.
3. Patient's palm (excluding digits)= -0.5% BSA.
4. Patient's hand (including digits) =-0.8-1%BSA.

Dupuytren classified burns into six degrees depending on the severity and burns.
1st burns are classified by erythema, reddening of the skin followed by desquamation of the superficial layers of epidermis.
2nd burns are classified by blister formation.3rd burns result in destruction the skin.
4th burns result in destruction of whole thickness of skin. 5th burn involves destruction of muscles.
6th burn results in destruction of bone nerve.

Wilson has put forth a simple and clearer classification. Dupuytren divided burns into six degrees but they are merged into three degrees by wilson.

Wilson's Classification:
1. Epidermal: (First and second degrees Dupuytren): The affected part is red, usually a blister(vesicle or bella) is formed which is covered by white, a vascular epidermis and bordered by red, hyperaemic skin. Singeing of the hair is present. The blister contains gas and protein containing fluid. When epidermis is lost, the dermis becomes reddened, inflamed and exudes plasma and tissue fluid. These burns are very painful. Repair is complete without scar formation.
2. Dermo- Epidermal (Third and fourth degrees Dupuytren): Whole Thickness of skin is destroyed. These burns appear as wrinkled, depressed areas of coagulated tissue, boarded by reddish, blistered skin. The lesions may be brown or black, due to charring and eschar formulation. The necrotic tissue separates usually within a week and leaves an ulcer which heals with scar formation. Pain and shock are greater than first degree burns.
3. Deep(fifth and sixth degrees Dupuytren): In this, there is a gross destruction not only of the skin and subcutaneous tissues, but also of muscles and even tone. Nerve endings are also of muscles and even bone. Nerve endings are also destroyed and as such the burns are relatively painless. The appearances are similar to those of the second degree but in a more severe form. The burnt part is completely charred.

Hebra classified burn into three degrees, merging every two degrees of Dupuytren onto one. The traditional classification of burns (first, second, third degree) has been replaced by a

classification system that reflects the need for surgical therapy- burns are currently grouped as superficial, superficial partial-thickness, deep partial thickness, full thickness, and fourth-degree burns.

A superficial burn is classified as a burn that affects the epidermis, without involvement of the dermis, usually presenting with redness with erythema. A partial thickness burn (both superficial and deep) involves the entire epidermis and variable parts of the dermis.

A superficial partial- thickness burn presents with pain, redness that branches, and blistering. In contrast, a deep partial thickness burn presents with only pressure, a variable clor (white to red) that does not blanch, and blistering these generally require therapy.

Full Thickness burns affect the entire epidermis and dermis. Usually penetrative with a particularly leathery appearance. Lastly, fourth degree burns are the deepest subgroup with involvement of fascia muscle, and bones.

While deep partial- thickness burns are usually treated with surgical procedures, full-thickness and fourth- degree burns are almost always treated with surgical excision and grafting.

FORENSIC REVIEW

The physical examination of all burned children includes careful evaluation of the entire skin surface for the presence of other signs of abuse. Inflicted burns often leave characteristic patterns of injury that cannot be concealed. These patterns along with the history of the burn incident are primary indicators of inflicted rather than accidental burns.

Healed burns.
Multiple simultaneous burns.
Bruises, slaps and bite or whip marks.Evidence of sexual abuse.

Evaluation and documentation of the burn pattern should be precise. Multiple burns of varying ages and types that obviously could not have occured from the same accident (for example: cigarette and scald burns or different types of scald burns) are strong indicators of child abuse. However, the abscence of other injuries does not rule out child abuse, since 80% of deliberately inflicted burns are not associated with other trauma. Long bone, chest and a skull radiographic (x- rays) series (commonly called a "baby gram,") need to be performed on all burned children with suspected abuse. Unfortunately, there are no specific laboratory studies that will help distinguish deliberate from accidental burn injury.

Documentation

The following elements are important in diagramming and photographing the scene. When diagramming be sure to include all items in the room where the incident occurred. Children often climb when they are exploring.

Accurate measurements of the items involved in the incident - tub, basin, stove height, height to object etc- are essential. Photographs of these items should document the size and shape of the item and should contain a measure scale.

Always use color 35mm film for photographs. It will give u maximum clarity and detail and is best suited for making enlargements for court evidence. Instant cameras are acceptable but do not give the same clarity and produce photographs less suitable for enlargements.

All body parts should be photographed. Photographs should include a standard front, standard back, standard left and standard right. The significantly burned areas should be particularly well photographed. Reliable testimony however, should not be based solely as photographs or drawings. Testimony from the treating physician or medical personnel who conducted a hand on evaluation of the child is critical and more effective.

Burning as a cause of death

The presence of antemortem blisters, finding of particles of soot in the air passages, oesophagus and stomach, and cherry red colour of blood due to presence of carbon monoxide are certain signs of death from burning as a result of a conflagration. A child may be killed by throtting or poisoning and then, the dead body may be burnt to conceal the crime and to make it appear like death from Burning. Even under such circumstances a careful autopsy examination settles the issue. The differentiating features of antemortem and postmortem burning as well as evidence in respiratory tract and examination of blood provide clues, chemical examination of viscera also helps.

Difference between ante- mortem and post- mortem burns.

Trait	**Antemortem burns**	**Postmortem burns**
1.Line of redness	Present	Absent
2.Blisters	Contains serous fluid with proteins and chlorides. Baseis inflamed.	Contains air and thin fluid only. Base is dry, hard andyellow.
3. Vital reaction	Marked cellular exudation and reactive changes in thetissue cells present.	Absent
4.Enzymes	Peripheral zone of burn shows increase	Peripheral zone does not show

	in enzymereaction.	increase in enzymes.
5. Vesicles	Contains albuminous fluidand chlorides	Contain air
6. Infection	Pus and sloughing	Nil
7. Soot in upper respiratorytract	Present	Absent
8. Carboxyhaemoglobin inblood	Present	Absent

CONCLUSION

Features of intentional injury should be known and sought and vital clues can be found in the history, physical examination and common patterns of presentation. Children are more vulnerable than adults so there case should examined carefully. Doctors, forensic experts have most important role while examining them. All the crucial evidence should be kept in proper recorded form so that the guilty should be punished and innocent be spared.

REFERENCES

1. The Synopsis of forensic medicine and toxicology. Dr. K. S. Narayan Reddy, Nineteenth edition, 2005. Published by K. Sugna Devi- Hyderabad.
2. Pediatric burn injuries - PMC by V. Krishnamoorthy, 2012.
3. Burn injuries child abuse - US department of justice. By Phylip.J. Peltier, Gary Purdue, Cap. Jack. R.
4. Textbook of Agadtantra. Dr. S. G Huparikar, Dr. V. P. Joglekar, First edition 2008, published by Rastriya Shikshan Mandal, Pune, pg- 552.
5. Parikh's Textbook of medical Jurisprudence, Foreinsic medicine and toxicology. By. Dr. C. K. Parikh, sixth edition, CBS publisher & distributors, Noida(UP), pg- 4.161.
6. Forensic medicine and Toxicology. By- R. N. Karmarkar, fourth edition 2013, published by Academic Publisher, kolkata.
7. Singhal's Forensic medicine & jurisprudence- S. K. Singhal, fifth edition 2021, Published by The national Book depot, Mumbai, pg- 199.
8. The essentials of forensic Medicine and Toxicology, Dr. K.S. Narayan Reddy, Dr. G. P. Murthy, thirty fourth edition, published by K. Suguma Devi- Hyderabad.
9. Textbook of forensic medicine & toxicology: By Krishna vij, sixth edition, published by Reed Elsevier India Private limited, New Delhi, Pg- 150.
10. Law & medicine By. Dr. Nandita adhikari, revised by Dr. Ishita Chatterjee, fourth edition 2015, Central law publications Allahabad, pg- 508.
11. Pubmed.ncbi.nim.nih.gov.
12. http://www.sciencedirect.com.
13. https://europepmc.org.

14. https:// ojjdp.ojp.gov.
15. https://www.researchgate.net.
16. https://www.hopkinsmedicine.org.
17. https://espace.library.uq.edu.all.
18. https://www.Keanlaw.com.
19. https://www.stanfordchildren.org.