

Histopathological changes of skin in antemortem burn injuries

Nayan Mani Choudhury^{1*}, Suvajit Ray², Gunajit Das³

¹Demonstrator, ²PG Trainee, ³Professor and HOD, Department of Forensic Medicine, Silchar Medical College, Silchar, Assam, INDIA.
Email: drnayanfsm@gmail.com, raylsmu02@gmail.com, drgd12@gmail.com

Abstract

Burns are one of the most devastating injuries a person can sustain. The injury represents an assault on all aspects of the patient, from the physical to the psychological. It affects all ages, from babies to elderly people, and is a problem in both the developed and developing world. All of us have experienced the severe pain that even a small burn can bring. Burns constitute a major cause of death and morbidity in this country too. A retrospective study of medicolegal autopsy conducted between 1st September 2015 to 31st August 2016, in the Department of Forensic Medicine, Silchar Medical College and Hospital, Silchar, Assam carried out in an attempt to know the histopathological changes that occurs in antemortem burn injuries. During this period there were 681 deaths out of which 74 cases were due to antemortem dry flame burn injuries. In the present study, Blisters were present in 45.9% cases, pus was present in 47.29% cases, signs of healing were present in 22.97% cases and red line of demarcation were present in 100% cases. Capillaries were dilated in 81.08% cases. Vacuolisation and petechial haemorrhages was present in 67.56% cases respectively, flattening and elongation of the epithelial cells were present in 85.13% cases. Congestion and leucocytic infiltration were present in 90.54% cases respectively.


Key Words: Burn, Antemortem, Blisters, Pus, Vacuolisation, Petechial haemorrhage, Epithelial cells, Leucocytes.

*Address for Correspondence:

Dr. Nayan Mani Choudhury, Demonstrator, Department of Forensic Medicine, Silchar Medical College, Silchar, Assam, INDIA.

Email: drnayanfsm@gmail.com

Received Date: 06/01/2017 Revised Date: 19/02/2017 Accepted Date: 10/03/2017

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	DOI: 20 March 2017

INTRODUCTION

The origin of fire is tied to the origin of plants, which are responsible for two of the three elements essential to the existence of fire: oxygen and fuel. The third element, a heat source has probably been available throughout the history of the planet (mainly through lightning, but less predictably from volcanoes and sparks from rock falls or meteorite impacts). Fire has been known to mankind for about a millions of years. INDIA has an ancient culture of worshipping fire. Along with water (Jal), air (vayu), earth (prithvi), fire (agni) is perceived as one of the four basic components of Universe. Burns are one of the most

devastating injuries a person can sustain. The transfer of energy from the heat source to the living tissue causes disruption of their normal metabolic process, which often leads irreversible changes and ends with tissues death. Extent of burn depends on degree of temperature, duration of exposure and areas of contact over the body. The injury represents an assault on all aspects of the patient, from the physical to the psychological. It affects all ages, from babies to elderly people, and is a problem in both the developed and developing world. With progress of human civilization, the extensive use of fire in day to day life has made rapid progress in society. Though fire has become one of the most useful agents, yet it has proved to be one of the most destructive enemies of the man. All of us have experienced the severe pain that even a small burn can bring. Burns constitute a major cause of death and morbidity in this country too.

MATERIALS AND METHODS

Selection of Cases

Present Study is a retrospective one which was carried out from 1st September 2015 to 31st August 2016, in the Department of Forensic Medicine, Silchar Medical College and Hospital, Silchar, Assam. During present

study period, 681 medicolegal autopsies were carried out, out of which 74 cases were due to antemortem dry flame burn injuries. Skin tissue was taken from burnt and junctional area of burnt and unburnt region which was subjected to histopathological examination.

Method of Slide Preparation

The slide preparation procedure started with fixation of tissue. For that it was done in 10% formalin solution for 6-12 hours at room temperature. After that Dehydration of the tissue was done in the ascending series of alcohol i.e. 50%, 70%, 90% absolute alcohol. The tissue was cleared by two changes in xylene. Then the tissue was impregnated with paraffin wax for 10-12 hours and block was made. Tissue was cut in 3-5 microns thick section with the help of rotatory microtome floated in water with a petridish and subsequently transferred to a clean glass slide. For removal of paraffin the slides were placed on the hot plate for melting of wax and then were given three changes in xylene for 5 minutes each. Slides should be hydrated by bringing them to descending series of alcohol i.e. absolute alcohol 90%, 70% and 50% and then by placing them under running water for 2 minutes for complete hydration. Then the slides were stained with haematoxylin and eosin. For haematoxylin and eosin staining, section from distilled water dipped in haematoxylin solution for 15 minutes. Then the slide with section was removed and was thoroughly wash with tap water for half minute. 1% of acid alcohol was kept on the slide for 15 seconds and then washed with tap water. For Bluing of the section was done by keeping the slide in tap water for 10 minutes. 1% aqueous eosin used for 1-3 minutes for counter staining and excess of stain was removed by washing with tap water. Finally before mounting, the slide was dehydrated again with ascending series of 50%, 70%, 90% alcohol and absolute alcohol for 2-3 minutes duration each and then mounting was carried out by putting few drops of DPX (Distrene Plasticizer Xylene) on dried slide (slide was dried by placing it over the heater). Cover slips were placed with precaution taken to avoid collection of air bubbles. Then the slides were examined under the light microscope to get the information in relation to different histological changes.

OBSERVATIONS AND RESULTS

Prevalence

Number of autopsies performed at SMCH mortuary and the percentage of death due to antemortem dry flame burn injuries

Table 1:

Total No. of autopsies	No. of death due to dry flame burn injuries	Percentage
681	74	10.87%

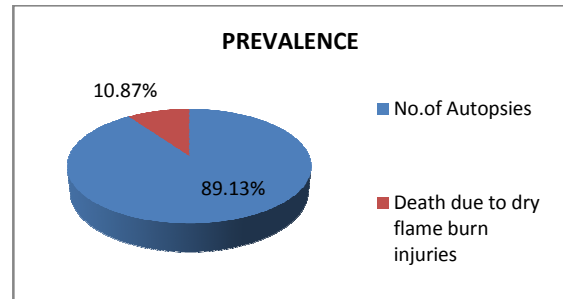


Figure 1: Antemortem dry flame burn injuries cases among all the cases brought to the mortuaries

Morphological Changes In Burnt Skin

Table 2:

Changes	Present	
	No.	%
Blisters	34	45.95
Pus	35	47.29
Healing	17	22.97
Red line of Demarcation	74	100

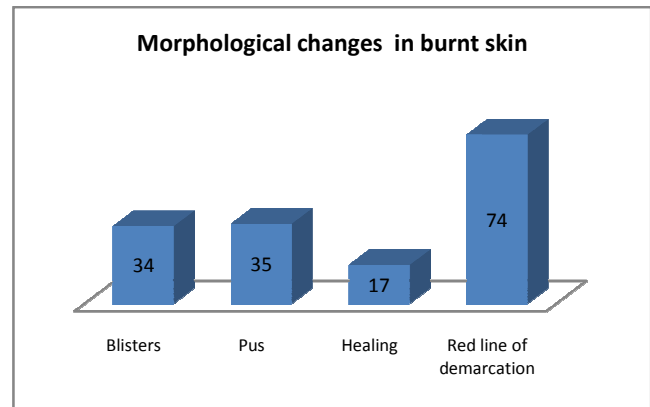


Figure 2: Morphological changes in burnt skin

Histopathological findings of burnt skin

Table 3:

Burnt skin	No.	Percentage
Separation of epidermis and dermis	69	93.24
Vacuolisation	50	67.56
Petechial Haemorrhage	50	67.56
Flattened and elongated epithelial cells	63	85.13

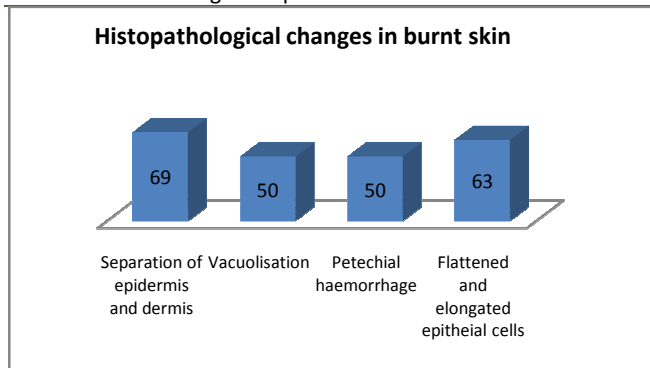


Figure 3: Histopathological findings of burnt skin

Histopathological Changes Between The Healthy And Burnt Skin (Junctional Skin) In Burn Cases

Table 4:

Findings	Present	Percentage
Capillary dilatation	60	81.08
Oedema	59	79.73
Congestion	67	90.54
Leucocytic infiltration	67	90.54

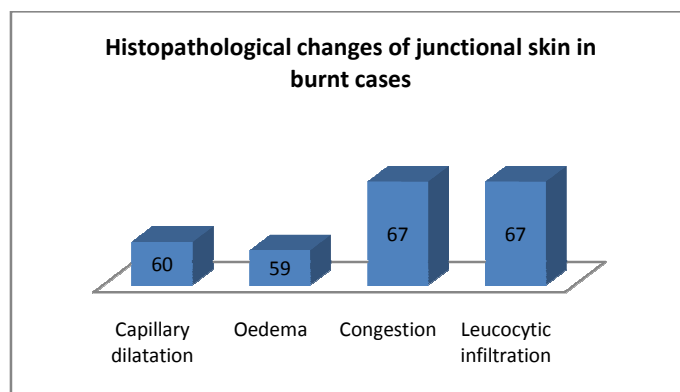


Figure 4: histopathological changes of junctional skin in burnt cases



Figure 5



Figure 6

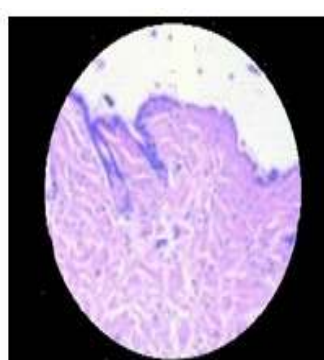


Figure 7

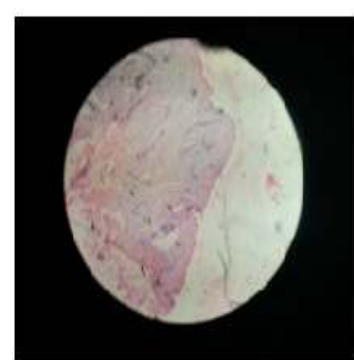


Figure 8

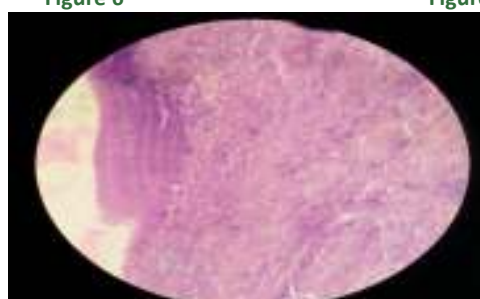


Figure 9

Figure 5: Showing pus and healing; **Figure 6:** Showing vital reaction, pus formation and healing; **Figure 7:** Junctional skin; **Figure 8:** Histopathological changes of burnt skin; **Figure 9:** Showing histopathological changes of burnt skin

DISCUSSIONS

Out of 681 medico legal autopsies performed in the Department of Forensic Medicine, SMCH, Silchar, Assam, during one year period with effect from 1st September 2015 to 31st August 2016, 74 cases, i.e. 10.87% were due to antemortem dry flame burn injuries.

Morphological Changes in Burnt Skin

In the present study, blisters were present in 45.9% cases, pus in 47.29% cases, signs of healing in 22.97% cases, petechial Haemorrhage in 67.56% cases and red line of demarcation was present in 100% cases. Sevitt (1957) and Foley (1970) observed blisters in various degrees of burns. Chawla R. *et al* (2014) also observed similar

findings. In the present study histopathological findings of burnt skin showed the separation of epidermis from dermis in 93.24%, vacuolisation in 67.56% cases and flattened and elongated epithelial cells were present in 85.13% cases. In the present study, histopathology of junctional skin showed congestion and leucocytic infiltration in 90.54% cases each, capillary dilatation in 81.08% cases and oedema in 79.73% cases. Sevitt (1957) observed oedema, separation of dermo-epidermal junction, vasodilation and leucocytic infiltration in the later stage. Mallik (1970) by inflicting burns on guinea pigs and observed the similar findings. Cuppage *et al* (1973) observed dilatation of capillaries and oedema.

Emanuel and Faber (1988) describe congestion, vasodilation, oedema and separation of epidermis from dermis. Mant (1984), Ritchie (1990) and Chawla R *et al* (2014) observed similar findings. The findings of present study are almost similar with the findings of above mentioned authors.

CONCLUSIONS

In present days burn injuries are challenging problems to the forensic surgeons and pathologists. The principal issue usually is about the nature of burn injury – Antemortem or Postmortem. In this study, the histopathological changes as observed on postmortem examination are exclusively present in antemortem burn injuries. So this histopathological parameters can be an important tool for the detection of antemortem and postmortem burn injuries.

REFERENCES

1. Cooper PN. Burn injury. In Essentials of Autopsy Practice 2006. Springer London. p.215-232
2. Chawla R, Chawla K, Sharma G, Malik Y, Aggarwal AD. Differentiation Of antemortem and Postmortem Burns by Histopathological Examination. Journal of Forensic Medicine and Toxicology. 2014;31(2):70-4.
3. Emanuel R, John LF. Environmental and nutritional pathology. Company Philadelphia:JB Lipin Cott. 1988. p.303-304. South Zone Delhi. Punjab Medical Journal 1970; XX(12): 451.
4. Foley FD. Pathology of cutaneous burns. The surgical Clinics of North America. 1970;50(6):1201-1210.
5. Mant AK. Taylor's Principle and Practice of Medical Jurisprudence. 13th Ed. London : Churchill Livingstone. London. 1984. p. 251-253, 257-258.
6. Malik MOA. Enzyme Changes in the Early Phase of Healing Skin Burns in Guinea Pigs. British Journal of Experimental Pathology 1971; 52: 345-352.
7. Ritchie AC. Physical injury Boyd's Textbook of Pathology. 9th Ed. Philadelphia London : Lea and Febiger. 1990. p. 567-568.
8. Sevitt S. Histopathological changes in burned skin. Burns Pathology and Therapeutic Applications. Butterworth and Co. Ltd. 1957. p. 18-27.

Source of Support: None Declared
Conflict of Interest: None Declared