

## Profile of Burn Injuries Among Autopsies Conducted in Dept. of Fmt, Rims, Ranchi.

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### Abstract :

**Introduction :** Amongst the different cases of unnatural deaths encountered in day to day medicolegal practice, deaths due to different causes of burn are very important. The present study encompasses only those cases of burn where thermal injury is the responsible factor. Effects due to thermal burns depend on : (a) the degree of heat (b) the duration of exposure (c) the extent of surface (d) the site (e) age (f) sex. In this study we aim to analyze the detailed macroscopic or naked eye changes in liver and kidneys in cases of deaths due to burn injury and side by side giving reflection of microscopic changes depending upon the factors that influence the outcome of a case of burn injury.

**Material and Method:** Materials for the present study were collected from the medico legal autopsies of 302 burn cases, performed at the mortuary of Rajendra Institute of Medical Sciences (RIMS), Ranchi, during the period from October 2015 to September 2016.

**Results:** In our study the histopathological changes as observed on postmortem examination were as follows, in 40 cases (40%) showed congestion of the liver. It was associated with generalized congestion of all internal organs and the cause of death is shock due to burns. Necrosis (centrilobular, focal and periportal) comprised 13 cases (13%). Fatty changes in the liver were observed in 2 cases (2%). Varying amount of fat was present in hepatic cells. Fatty changes were centrilobular or perilobular and were scattered or diffused in distribution. Extent of fatty changes was related with higher extent of burnt body surface area. Histopathological examination of kidneys showed congestion in 84% cases. Microscopic examination of these revealed normal histology of kidney in 40% cases, 9% slides were shown interstitial oedema, 2% of slides were of Tubular degeneration and 1% slides were of pyelonephritis. Others were of mixed histology.

**Conclusion:-** Our study underlined prime importance concerned with histo pathological studies of liver and kidneys in burn cases.

**Keywords :** Burn, liver, kidneys, histopathology, congestion

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### I. Introduction

Thermal burns and related injuries are major cause of death and disability. Even in developed countries more than two million individuals annually are burned seriously and require medical treatment<sup>1</sup>. The magnitude of deaths due to burns is so large as India is the only country in the world where fire is classified among the fifteen leading causes of death in 1998 standing fourteenth in the list<sup>2</sup>. Burn is an injury which is produced by the application of dry heat such as flames, radiant heat or heated substance over the body surface<sup>3,4</sup>. The term burn is restricted to the local effects of dry heat. By law all dry heat lesions have been designated as burns. Burn injuries have long been described as among the most serious injuries that may afflict a human being.<sup>5</sup> The most common cause of flame burns in modern society is accident.<sup>6,7</sup> Burn is a unique but significant mode of suicide and homicide everywhere in the world.

### II. Materials And Methodology

Materials for the present observational study were collected from the medico legal autopsies, showing burn injuries, carried out at the mortuary of Rajendra Institute of Medical Sciences, Ranchi, during the period from October 2015 to September 2016. Thorough and complete post mortem examination was conducted on all

the bodies autopsied; including both external and internal findings with attempts made to establish the cause of death and circumstances leading to death.

**2.1 Inclusion criteria:**

1. All cases of deaths due to burn injuries coming for post mortem
2. Cases considered for study will include subjects of all age group of all genders.

**2.2 Exclusion criteria:**

1. Highly decomposed bodies
2. Charred and nearly completely burnt bodies

**III. Results**

The present study was based on 100 medico legal autopsies of cases of deaths due to burn out of 302 cases in a period from October 2015 to September 2016, conducted in the Department of Forensic Medicine & Toxicology, Rajendra Institute of Medical Sciences, Ranchi. The period of study was from October, 2015 to September, 2015. Cases were selected on the basis of systematic random sampling. The observations on various aspects were recorded and are being presented here in form of various tables.

**1. Distribution of the study population according to according to the habitat /native place (n=100).**

**Table I :**

NATIVE PLACE	NO. OF CASES	PERCENTAGE
Ranchi	36	36
Hazaribagh	10	10
Gumla	7	7
Ramgarh	6	6
Giridih	6	6
Palamu	5	5
Chatra	5	5
Lohardagga	5	5
Bokaro	4	4
Latehar	4	4
Dhanbad	4	4
Deoghar	2	2
Koderma	2	2
Garhwa	1	1
Jamtara	1	1
Khunti	1	1
West Singhbhum	1	1
Total	100	100

**2. Distribution of study population according to the Age and Sex(n=100)**

**Table II:**

Age groups(in years)	MALE(%)	FEMALE(%)	TOTAL(%)
<10	2 (2)	3 (3)	5 (5)
10 to20	5 (5)	13 (13)	18 (18)
21 to 30	12 (12)	21 (21)	33 (33)
31 to 40	9 (9)	12 (12)	21 (21)
41 to 50	4 (4)	6 (6)	10 (10)
51 to 60	3 (3)	4 (4)	7 (7)
>60	3 (3)	3 (3)	6 (6)
Total	38 (38)	62 (62)	100 (100)

**3. Distribution of study population according to the time of burn injury(n=100)**

**Table III:**

Time of injury ( Hours)	Number of cases	Percentage
00:00-06:00	14	14
06:01-12:00	14	14
12:01-18:00	23	23
18:01-23:59	49	49
Total	100	100

**4. Distribution of study population according to the period of survivability (n=100)**

**Table iv:**

Period of survivability ( days)	Number of cases	Percentage
0- 1	38	38
2-5	31	31
6-10	21	21
11-20	8	8
21-30	2	2
>30	0	0
Total	100	100

**5. Distribution of study population according to manner of death (n=100).**

**Table V:**

Manner of death	Number of cases	Percentage
ACCIDENTAL	86	86
SUICIDAL	8	8
HOMICIDAL	6	6
UNKNOWN	0	0
TOTAL	100	100

**6. Distribution of study population according to the percentage of burn (n=100).**

**Table VI :**

Percentage of Burn	Number of cases	Percentage
<30	14	14
30-50	3	3
51-70	10	10
71-90	42	42
>90	31	31
Total	100	100

**IV. Discussion**

The present study was undertaken during the period from October, 2015 to September, 2016 in the Department of Forensic Medicine and Toxicology, R.I.M.S., Ranchi to analyze the pattern of deaths due to burn on various parameters included in the study. While comparing the results of our study with other workers, many factors were taken into consideration. Firstly, this study was conducted in the Department of forensic Medicine and Toxicology, Rajendra Institute of Medical Sciences, Ranchi. It is a tertiary Health Centre wherein cases are referred from many health centers. Hence, this study included medicolegal autopsy of deaths due to burn which came from various districts of Jharkhand at the mortuary of RIMS, Ranchi.

**Incidence of burn death on the basis of native place**

As shown in Table I, a total 100 cases were conducted in the department during the period of study and out of these,36%cases are from Ranchi ,10% from Hazaribagh,7% cases from Gumla,6% cases from Giridih and Ramgarh each,5% cases from Lohardaga ,Palamu and Chatra each ,4% cases from Bokaro ,Latehar,and Dhanbad each ,2% cases from Deoghar and Koderma and 1% cases each from Gharwa, Jamtara, Khunti and West Singhbhum.

**Incidence of burn deaths on the basis of age**

As shown in TABLE II. For the sake of analysis and description ,the study population has been divided into seven age groups; In the present study of burn death, it was observed that 33% of cases were in the age group of 21-30 years,21% cases were in the age group 31-40 years,18% cases were in the age group 10-20 years,10% cases were in the age group 41-50 years ,7% cases were in the age group 51-60,6% cases were in the age group above 60 years and 5% cases were in the age group , less than 10 years .So, the study reflects that burn death cases mostly comprise of three age groups from study population i.e 21 to 30 years , 10 to 20 years and 30 to 40 years ,which signifies the majority of deaths due to burn injury between 10 years to 40 years of age (72%),with peak incidence in 21 to 30 years (33%) of age group. This findings as par with standard text books .Moreover, it closely tallies with the observations of N.P.Zanjad et.al(2007)<sup>8</sup> & S.Sevitt<sup>9</sup> .

**Incidence of burn deaths on the basis of sex**

As shown in TABLE II,In the present study of deaths due to burn injury ,it was observed that female cases were 62% as compared to male having 38% of cases of death due to burn injury i.e female dominates male in the incidence on the basis of sex, which reflects a male: female ratio of 1:1.51 which is close to the

observation by S.sevitt<sup>4</sup> which shows male :female ratio 1:1.51 . It is very well known fact that woman are more susceptible to burn injuries than men due to their place of work that is the kitchen where they are to spend a big time for the purpose of cooking foods and making tea etc. It is seen in different text books and different authors world wide that men are almost equally, if not more, susceptible to burn injuries in the foreign countries (mainly in USA &UK) because of industrialization ,increased number of factories and electrical works.

#### **Incidence of burn death on the basis of time of injury**

As shown in TABLE III, It was seen that the time of burn injury were predominant in the 18:01 hours to 23:59 hours of the day ,and consists of about half of cases(49%),23% cases were in between 12:01 hours to 18:00 hours ,14% each case were in 00:00 hours to 06:00 hours and 06:01 hours to 12:00 hours respectively.t also reflects that more than 70 percent (72%) of burn death were occurred in period of time 12:01 hours to 23:59 hours ,when people are usually engaged in domestic work in kitchen and professional work in factory.

#### **Incidence of burn death on the basis of the period of survivability**

As shown in TABLE IV, It was observed that most of the death due to burn injuries were occurred within 10 days from the time of injury ,38% of burn patient died within 1 day,31% died within 2-5 days and 21% burn patient were survived for 6-10 days from the time of getting burn injury .Apart from this, 8% of burn patient died in 11-20 days and only 2% patient were survived till a period from 21-30 days. No burn patient survived for more than 30 days from the time of getting burn injury. But the interesting fact about it that 38% of cases died within 24 hours of burn injury which were included brought dead cases and rest died few hours after admission in the hospital which corresponds to the cause of death like primary (neurogenic shock) and smoke inhalation .It was also evident that 31 cases of burn injury died within 2-5 days of burn injury which signifies the period when secondary shock due to fluid loss from the burned surface is the commonest cause of death according to most of the authors of different standard textbooks<sup>10,11,12,13,14</sup> Next common period of death was 6-10 days which correspond to the time when toxemia and sepsis were the most important factors of death<sup>13,14,15,16,17</sup>

#### **Incidence of burn death on the basis of manner of death**

As shown in TABLE V, The manner of death is usually accidental comprising about 86% cases,8% cases were from suicidal manner and 6% cases were occurred in homicidal pattern .In this study most of the injuries were accidental in nature , which is similar to the findings of Buchade, & K C Das<sup>18,19</sup> and which was also consistent with other study Bangal RS,H.M. Mangal,Akhilesh Pathak,Memchoubi ,H. Nabachandra, Sharma BR,Harish D,Sharma A,Sharma S,Singh H & Verma VCS and Das P K.<sup>20,21,22,23,24</sup>

#### **Incidence of burn death on the basis of percentage of body surface area burned.**

As shown in TABLE VI, More than 70% of death due to burn were occurred in greater than 70 percent of body surface area involvement in which ,42% of cases were involved 71-90 percent of body surface area ,31% of cases were involved greater than 90 percent of body surface area. Besides this,14% of cases were from less than 30 percent of body surface area involvement ,10% cases were from 51-70 percentage of burn involvement and rest 3% cases were found from 30- 50 percent of body surface area involvement. In the similar study, N.P. Zanjad et .al(2007)<sup>3</sup> observed in 189 cases (41.4%), total body surface area involved was more than 80% which was very close to the observation in present study. The findings were not consistent with the study of Usama B.Ghaffar,Munnawar Hussain & Shameen J Rizvi et al<sup>25</sup> where 26 to 50% burns 116(28.8%) was most commonly affected victims.

### **V. Conclusion**

Amongst the total 100 cases of present study , it was observed that 33% of cases were in the age group of 21-30 years,21% cases were in the age group 31-40 years,18% cases were in the age group 10-20 years,10% cases were in the age group 41-50 years ,7% cases were in the age group 51-60,6% cases were in the age group above 60 years and 5% cases were in the age group , less than 10 years .

\*The study population comprises of 38 (38%) male and 62(62%) females with a sex ratio of 1:1.51.

\* Regarding period of survivability; it was observed that most of the death due to burn injuries were occurred within 10 days from the time of injury ,38% of burn patient died within 1 day,31% died within 2-5 days and 21% burn patient were survived for 6-10 days from the time of getting burn injury .Apart from this, 8% of burn patient died in 11-20 days and only 2% patient were survived till a period from 21-30 days. No burn patient survived for more than 30 days from the time of getting burn injury. But the interesting fact about it that 38% of cases died within 24 hours of burn injury which were included brought dead cases and rest

died few hours after admission in the hospital . More than 70% of death due to burn were occurred in greater than 70 percent of body surface area involvement in which ,42% of cases were involved 71-90 percent of body surface area ,31% of cases were involved greater than 90 percent of body surface area. Besides this,14% of cases were from less than 30 percent of body surface area involvement ,10% cases were from 51-70 percentage of burn involvement and rest 3% cases were found from 30- 50 percent of body surface area involvement.

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