Study Of Changes In Air Passage Histopathology In Burns Cases

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Abstract: Background :Every year a substantial proportion of deaths in India occur due to burn injuries. Prolonged morbidity as well as temporary and permanent disability due to burns results in a heavy economic loss. Method : we studied relation between manner of death and histopathological findings in air passages at Civil Hospital, Ahmedabad. Result: There is no relation between manner of death and histopathological changes because there is no specific pattern in degree and body surface area involved in various cases of burns of different manner of death. Injuries of airways due to burns decreased in trachea and lungs are survival period in days increased. This may be due to clinical interference in way of treatment. Airway injuries increased in trachea and lungs with increasing severity of degree of burns, but irrespective of degree of burns, congestion is found in all cases in larynx. Larynx is affected in all cases due to its easily accessible anatomical position. Conclusion: Larynx is affected in all cases due to its easily accessible anatomical position. Again it is understandable that ; more the involvement of body surface area, more will be the airway injury. This may be due to inhalation of smoke and more exposure to burns. [Parmar A et al NJIRM 2013; 4(1) : 87-91]

Key Words: Burns, Air Passage, Histopathology

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Introduction: Christenson and Kockrow[1] states that a burn can be defined as an injury to the tissue which results from thermal, chemical, radiation, or electrical. Thermal burns are caused by a flame, hot fluids or gases, friction, or exposure to extremely cold objects. Flame burns are most often associated with smoke or inhalation injury.

Doenges et al.[1] suggests that there are several risk factors predispose a person to burns including substance abuse, careless smoking, cultural practices, overcrowded living conditions, lack of parental supervision of children, insufficient safety precautions and violence, including child abuse and neglect.

Burn injuries are among the most devastating injuries seen in the emergency unit ranging from minor to lethal injury. Excluding road traffic injuries, they are the most common cause of accidental deaths in both the developed and developing countries. The past few decades have seen many changes in burn care aimed at decreasing patient morbidity and mortality.[2] The establishment of improved resuscitation, specialized burns care centers, early surgery, nutritional support, and skin replacement techniques have decreased morbidity and mortality.[3]

Burns often result in severe deformity, disability, and adverse psychological reactions, which affect patients and their parents.[4]

It is a function of civilization, industrialization, culture, and societal stability.[5]

Materials & Methods: All the patients (50) managed in the B.J.M. College, Ahmedabad with burns injury from January 2003 to December 2003, were prospectively studied based on a questionnaire. This included, biographic data, social history, associated medical conditions, mechanism/circumstance of injury, prehospital care, primary/secondary survey, associated injury, investigations, and initial and definitive treatment. The incidence was compared with total number of emergencies and traumatic injuries recorded during the same period.

In each case rigor Mortis, heat stiffening, cadveric spasm were examined, color of PM lividity and fixation of it were also examined. After making multiple incisions on the separatre organs of air passage like larynx, trachea and pieces of both lund were preserved in 10% formalin solution and personally handed over to department of pathology of histopathological examinations. In pathology department- organ was kept in 10% formalin for 2-3 days. After fixation of organs they

were cut randomly and cut sections of organs were preserved in paraffin blocks. Slides are made from best part of the strips and examinations were carred out in HE stain. Some time diestryal 80 dibutylphalate xylene was used for longar preservation.

Result: In all cases histophathological changes were found in larynx. While changes in trachea was observed in 74% cases. Detail results are shown in the following tables

Table 1 :

This Table Shows Number Of Cases In Which Histopathological Changes Were Found In Lunges

Total no. of cases	No. of cases and 1% cases in which congestion found		No. of cases and 1% cases in which hemorrhage Found		No. of cases and 1% cases in which edema found		No. of cases and 1% cases in which inflammation found	
	No. of cases	% of cases	No. of cases	% of cases	No. of cases	% of cases	No. of cases	% of cases
50	50	100%	50	100%	40	80%	29	58%

The above table shows that congestion and hemorrhage were found in all cases. While edema was found in 80% cases and inflammation was found in 58% of cases

Table 2 : Relation Between Manner Of Death And Histopathological Findings In Air Passages

Manner of death	No. of cases	No. of cases in which congestion found	% of cases in which congestion found
Accidental	35	35	100%
Suicidal	10	10	100%
Homicidal	5	5	100%

Looking to the above table the percentage of cases in which congestion was found in larynx in all kinds of manner of deaths are same and 100 %

Table 3: Relation between manner of death and histopathological findings in trachea

Manner of death	No. of cases	No. of cases in which congestion found	% of cases in which congestion found
Accidental	35	27	77.14%
Suicidal	10	6	60%
Homicidal	5	4	80%

The above table the percentage of cases in which congestion was found in trachea was nearly same in all kinds of manner of death

Table below hows the percentage in cases in which congestion hemorrhage and edema in lungs are nearly same in all kinds of manner of death. But percentages of cases in which inflammation of lungs are with difference.

Table 4 : Relation Between Manner Of Death And Histopathological Findings In Lungs.

Manner of death	No. of cases	Histopathological findings in lungs							
		Congestion		Hemorrhage		Edeama		Inflammation	
		No. of cases	% of cases	No. of cases	% of cases	No. of cases	% of cases	No. of cases	% of cases
Accidental	35	35	100%	35	100%	27	77.14%	18	51.42%
Suicidal	10	10	100%	10	100%	8	80%	7	7%
Homicidal	5	5	100%	5	100%	5	100%	4	100%

Table 5: Relation Between Survival Period And Histopathological Changes Found In Air Passages.

Survival period in days	Total No. of cases	No. of cases in which congestion found	% of cases in which congestion found
Upto 2 days	29	29	100%
3 to 7 days	11	11	100%
8 to 14 days	4	4	100%
More than 14 days	6	6	100%

Observation of the above tables grossly shows, there is no relation between histopathological findings in various organs of air passages and manner of death and presence of congestion in larynx in all cases of burns, irrespective of survival period in days.

Table 6 :relation between survival period and histopathological changes found in trachea

Survival period in days	Total No. of cases	No. of cases in which congestion found	% of cases in which congestion found
Upto 2 days	29	24	82.75%
3 to 7 days	11	9	81.81%
8 to 14 days	4	2	50%
More than 14 days	6	2	33.33%

The above table state percentage of congestion in trachea is decreases as the survival period increases.

Table 7:

This table shows relation between survival period and histopathological changes found in lungs

Survival period in days	Total No. of cases	No. and % of cases in which C,H,E and I found		No. and % of cases in which C,H and E found		No. and % of cases in which C and H found	
		No.	%	No.	%	No.	%
Upto 2 days	29	29	100%	29	100%	29	100%
3 to 7 days	11	0	-	11	100%	11	100%
8 to 14 days	4	0	-	0	-	4	100%
> 14 days	6	0	-	0	-	6	100%

C = Congestion, H = Hemorrhage, E = Edema, I = Inflammation

Above table shows presence of congestion, hemorrhage, edema and inflammation in all cases in which death occurred within 2 days due to burns. It also shows presence of congestion, hemorrhage and edema in all cases in which death occurred between 3 to 7 days as well as upto 2 days. It also shows presence of only congestion and hemorrhage in all cases, irrespective of survival period.

The above table states presence of congestion in larynx in all cases of burns , irrespective of degree of burns.

Above all statements and tables suggest that injuries of airways due to burns decrease in trachea and lungs as survival period in days increases, but irrespective of survival in days, congestion is found in all cases in larynx.

Table 8: This Table Shows Relation Between Degree Of Burns And Histopathological Changes Found In Larynx

Degree of burns	Total No. of cases	No. of cases in which congestion found	% of cases in which congestion found
Ist to IIIrd	45	45	100%
IVth to VIth	5	5	100%

Table 9: Shows Relation Between Degree Of Burns And Histopathological Changes Found In Trachea

Degree of burns	Total No. of cases	No. of cases in which congestion found	% of cases in which congestion found
Ist to IIIrd	45	32	71.11%
IVth to VIth	5	5	100%

The above table states percentage of cases in which congestion is found in trachea increases with increasing severity of degree of burns.

Table 10:
This Table Shows Relation Between Degree Of Burns And Histopathological Changes Found In Lungs

Date of burns	Total No. of cases	No. and % of cases in which C and H found		No. and % of cases in which C,H and E found		No. and % of cases in which C,H,E and I found	
		No.	%	No.	%	No.	%
Ist to IIIrd	45	45	100%	35	77.77%	24	53.33%
IVth to VIth	5	5	100%	5	100%	5	100%
8 to 14 days	4	0	-	0	-	4	100%
> 14 days	6	0	-	0	-	6	100%

C = Congestion, H = Hemorrhage, E = Edema, I = Inflammation

Above table shows in about 50% of cases which are affected with 1st to IIIrd degree burns; congestion, hemorrhage, edema and inflammation are found. But in 100% of cases which are affected with 4th to 6th degree burns, congestion, hemorrhage, edema and inflammation found. It also shows percentage of cases in which congestion , hemorrhage,

edema and inflammation found increases with increasing severity of degree of burns. Irrespective of degree of burns atleast congestion and hemorrhage are found in all cases of burns.

Above all statements and tables indicate , airway injuries of increase in trachea and lungs with increasing severity of degree of burns; but irrespective of degree of burns, , congestion is found in all cases in larynx.

Discussion: In study of air passages histopathologically in various cases of burns, congestion, found in 100 % of cases in larynx, congestion found in 74% of cases in trachea and congestion & hemorrhage are found in 100% of cases in lungs. But edema found in 80% of cases and inflammation found in 58% of cases in lungs.

Some of the scientists had carried out nearly same study as my study , Their findings and comparisons with my study area as follows :

- In study of Frances M. Sochor[7], he found bronchiolitis in 88 % of cases intralveolar hemorrhage in 76% cases and focal atalectasis in 59% ofcases. Percentage of cases of intraalveolar hemorrhage found in his study and in my study is approximately same.

- In study of Chi-Sing Chu[8], he found pulmonary congestion, small focal hemorrhages, focal pneumonia and perivascular edema in lungs. Again these findings of congestion, hemorrhage and edema in lungs are similar to findings of my study.

- In study of Engene R. Bleecker[9], he found inflammation, capillary damage, bronchospasm, pulmonary congestion, edema of tracheobronchial tree and pulmonary edema. These findings of pulmonary congestion, pulmonary edema inflammation are also similar to the findings of my study. In addition , he found capillary damage, bronchospasm, edema of tracheobronchial tree.

- In study of Butch M. Huston[10] , he found diffuse alveolar damage, interstitial and intraalveolar hemorrhavge and edema in both lungs.Three findings of interstitial and intraalveolar hemorrhae and edema in lungs are similar to the findings of my study.

- In study of Prien[11] , he found pathologically congestion, interstitial edema and hemorrhage in the lung tissues. These findings of congestion, interstitial edema and hemorrhage in lungs are similar to the findings of my study.

- In study of Burns T. R[12] , he found soot, pulmonary congestion and edema with light microscopy and interstitial and intraalveolar congestion and edema in confirmed by electron microscopy. These findings of interstitial and intraalveolar congestion and edema are similar to the findings of my study.

Conclusion: The observations made from the present study lead to the following conclusions.

- In any case of burns irrespective of degree, percentage of burns and survival period; congestion is found in larynx.
- Airway injuries observed histopathologically in trachea and lungs decreases with increasing survival period after burns.
- Airway injuries observed histopathologically in trachea and lungs increases with increasing severity of degree of burns.
- Airway injuries observed histopathologically in trachea and lungs increases with increasing body surface area (percentage) involved in burns.
- There is no relation between manner of death and airway injuries observed histopathologically.

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