

Original Research Article

Impact on fetal outcome following burns in pregnancy

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Received: 23 December 2020

Revised: 24 March 2021

Accepted: 30 March 2021

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ABSTRACT

Background: The incidence of female burn patients of reproductive age varies from 0.6%-15% in different series with highest incidence reported from India. Foetus is at high risk due to burns injury, which is often associated with a high rate of fetal mortality.

Methods: All cases of burns injury encountered during pregnancy admitted at our tertiary care hospital were included in this study over a span of two years from 2017 to 2019. A total of 20 cases were included in the study. Patients with burns injury from 5 to 100% body surface area were included in this study.

Results: Fetal deaths occurred in 11 out of the total 20 cases amounting to 55% overall fetal mortality.

Conclusions: Burns during pregnancy requires adequate resuscitation especially in initial stages. There is 100% fetal death outcome for burns greater than 50% body surface area.

Keywords: Burns, Fetal, Maternal, TBSA, Mortality

INTRODUCTION

The incidence of female burn patients of reproductive age varies from 0.6-15% in different series with highest incidence reported from India.¹⁻⁷

Foetus is at high risk due to burns injury, which is often associated with a high. Urgent delivery has been considered the treatment of choice in term or near-term pregnant women with extended burn injury.

Aggressive resuscitation and early control of the airway with obstetric management including early delivery of the fetus is vital for optimal maternal and fetal outcome. Aim of this study was to study the maternal and fetal outcome of acute surgical emergencies in pregnant women.

The objectives of the study were- (a) to study the clinical presentation of non-obstetric surgical emergencies; (b) to study the management for non-obstetric surgical emergencies; (c) to study the morbidity and mortality in pregnant women associated with surgical emergencies.

METHODS

After approval of Institutional Ethics Committee, we conducted a retrospective observational study that included all pregnant patients with burns injury admitted and managed at a tertiary hospital under department of General Surgery from June 2017 to May 2019. A total of 20 cases were included in this study. All cases were managed by a combined team of surgeons and obstetricians. Baseline investigations and confirmation tests for pregnancy including urine dipstick tests and ultrasonography were done in all cases. The rule of nine was used to determine the percentage of burns according to total body surface area involved by parkland's formula. Data analysis was carried out with primary focus towards maternal outcome.

Inclusion criteria

All pregnant patients presenting with history of trauma to abdomen, head and chest. All pregnant patients diagnosed on clinical and radiological examination with acute surgical conditions and admitted for management. All

pregnant patients presenting with history of burns injury. All pregnant patients requiring non-obstetric surgical intervention during the second and third trimester of pregnancy.

Exclusion criteria

All non-pregnant patients. All pregnant patients with surgical conditions managed on outpatient basis. All pregnant patients in the first trimester of pregnancy. All obstetrical emergencies. Patients not willing to participate in the study.

Approval from the institutional ethics committee was taken and the study was conducted. Statistical method used in the study was chi square test to calculate the p-value for various correlations. Sample size was time based including cases occurring between June 2017 to June 2019.

RESULTS

This study included 20 pregnant patients with burns injury. All patients were of average built with normal pregnancies at the time of injury. The percentage of TBSA varied from 5 % to 100%. In terms of mode of burns injury, there were 19 cases of accidental burns and 1 case of homicidal burns. With increasing TBSA, burn complication rate and fetal deaths increased. Fetal deaths occurred in 3 out of 12 cases having <50% TBSA and 8 fetal deaths out of all 8 cases having >50% TBSA were noted. Fetal mortality was 25% in <50% burns and 100% in >50% burns. Overall fetal deaths occurred in 11 of 20 cases amounting to 55% overall fetal mortality. Higher incidence of fetal deaths were noted in burns involving TBSA more than 50%. The relation between TBSA and maternal outcome is mentioned in Table 2. The relations between other various factors are given in the following tables. The relation of %TBSA (total burns surface area) with number of cases in the present study is shown in Table 1.

Table 1: Shows cases according to different %TBSA.

%TBSA (total burns surface area)	No. of cases
0-25	6
26-50	6
51-75	2
76-100	6
Total	20

Table 2: %TBSA with fetal outcome.

%TBSA	Fetal outcome			Total
	Survived	Death	%Deaths	
0-25%	5	1	16.7	6
26-50%	4	2	33.3	6
51-75%	0	2	100	2
76-100%	0	6	100	6
Total	9	11	55	20

X²= 11.25; df=3; p-value=0.01047

This table has significant p-value indicating significant association between fetal deaths and %TBSA. It indicates that fetal death rate increases as surface area increases. Fetal deaths occurred in 3 out of 12 cases having <50% TBSA cases while remaining 8 cases having >50% TBSA had 100% fetal mortality.

The distribution of gestational period of fetal deaths is shown in Table 3.

Table 3: Gestational period with fetal outcome.

Gestational period	Total cases	Fetal outcome		
		Survived	Death	%deaths
2 nd trimester	11	3	8	72.7
3 rd trimester	9	6	3	27.3
Total	20	9	11	55

X²= 3.104; df=1; p-value=0.03906

This table has significant p-value, indicating significant association between gestational period and fetal deaths indicating that as gestational age increases there is rise in fetal deaths. Eight deaths were observed in second trimester while three deaths noted in third trimester. With increasing surface area, complication rate with maternal and fetal loss increased. Only fetal anomaly reported was in an operated case of right upper limb post burns contracture release with newborn having cleft lip.

The relation between mode of burns injury in pregnancy with the total cases encountered for each type is shown in Table 2.

Table 4: Shows various modes of burns injury.

Mode of burns injury	No. of cases	%
Accidental	19	95
Homicidal	1	5
Suicidal	0	0
Total	20	100

There were 19 cases of accidental burns forming the more common mode of injury while 1 case of homicidal burns was observed.

DISCUSSION

This study includes 20 cases of burns injury in pregnant women. Fetal mortality was 25 % in <50% burns and 100% in >50% burns. Higher rate of fetal deaths was noted in TBSA involvement of more than 50%. Overall fetal deaths occurred in 11 out of 20 cases amounting to 55% overall fetal mortality.

Bartle et al conducted a retrospective cohort study from 1955-1975 of 42 pregnant women with burns injury.¹ A total of 20 fetal deaths were reported amounting to 48% fetal mortality. There is disparity in our study with the study by Bartle et al owing to a longer time period over

which their study was conducted and lesser body surface area involved in their patients, making it incomparable.

Gautam et al did a retrospective study of 19 pregnant patients with burns injury admitted from January 2013 to January 2014.² There were 14 fetal deaths amounting to 74% fetal mortality. This study was found to be statistically significant to our case study for having similar sample size (N=19) but with a relatively higher fetal mortality rate (74%) compared to 55% in our study.

Maghsoudi et al conducted a 9-year prospective study involving 51 patients. There were 23 fetal deaths amounting to 45% fetal mortality.³ Also 51% of patients in their study had burns more than 40% of total body surface area, resulting in 100% foetal mortality rates.

Mago conducted a study in India, in his study, out of 1200 patients admitted with burns, 384 cases (32%) were pregnant women in the age range of 19-35. Overall there were 254 fetal deaths leading to 66% fetal mortality. In women with burn areas above 50% of total body surface area, foetal mortality rate was 70%.^{4,5} The difference in the results could be attributed to the difference in the facilities available in centres, the experience of the physicians in charge, and causes of the burns.

Also, patients belonging to a lower socioeconomic stratum form the majority of cases in this study. They lack adequate financial resources and nutritional support, often causing delay in procuring appropriate timely management and leading to slower recovery, also probably leading to higher mortality as noted in this study. Rode et al conducted a retrospective cohort study from 1986-1987 of 33 pregnant women with burns injury. A total of 13 fetal deaths were documented amounting to 39% fetal mortality.⁵ Agarwal et al conducted a study to assess the parameters that may predict maternal and fetal outcome in 49 thermally injured pregnant women in a Plastic surgery unit in tertiary referral center over five years. There were 34 fetal deaths at 69 % fetal mortality.⁶

Unsur et al conducted a retrospective study on 917 burn victims between 1986 and 1994 where 11 pregnant patients were affected by burns.⁷ There were four fetal deaths at 36% mortality. Gang et al conducted a study on 16 patients at various stages of pregnancy with burns between 10 and 80 per cent of the body surface area. There were five fetal deaths at 31% fetal mortality rate.⁸

We observed a statistically significant relationship between severity of burns and foetal mortality rates. This is consistent with the findings of Mago, Unsur, Rode, and Gang who reported that fetal mortality rates were directly related to the severity of burns.^{5-7,10} The severity of injuries due to burns and the consequent fluid and electrolyte disturbances directly threaten the life of the fetus. The following table establishes the statistical comparison of burns in pregnancy with fetal outcome, between this study and other studies described above.

Table 5: Stastical comparison.

Source	No. of patients	Fetal outcome (% deaths)
This study	20	11 (55)
Bartle et al.	42	20 (48)
Rode et al.	33	13 (39)
Gautam et al.	19	14 (74)
Maghsoudi et al.	51	23 (45)
Mago et al.	384	254 (66)
Agarwal et al.	49	34 (69)
Unsur et al.	11	4 (36)
Gang et al.	16	5 (31)

According to previous reports and results obtained, the percentage of total body surface area and gestational age were the most important effective factors in the prognosis and outcome of fetus. It implied that the fetal mortality rate increased with higher body surface areas involved. Thus, fetal survival rate was directly influenced by the percentage of the mother's total burned body surface area.

CONCLUSION

There is usually 100% fetal death outcome for maternal burns injury greater than 50% total body surface area. Pregnancy itself does not influence maternal and fetal outcome after thermal injury and highest chance for fetal survival is by ensuring maternal survival. Burns in pregnancy increases the risk of spontaneous abortion and premature labour and fetal survival depends upon fetal maturity. Septicemia usually being the commonest cause of death in these patients, initial aggressive and timely management is advocated to improve outcome.

ACKNOWLEDGEMENTS

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Mehta HR, Wasadikar PP. Impact on fetal outcome following burns in pregnancy. *Int Surg J* 2021;8:1454-7.