MATERNAL AND FOETAL OUTCOME OF BURNS DURING PREGNANCY IN KERMANSHAH, IRAN

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SUMMARY. Burn injury is rare during pregnancy. However, severe burn injury during pregnancy is very dangerous for both mother and foetus. Maternal and foetal outcome depends on the mother's total body surface area (TBSA) burned. In women with more than 50% TBSA burned, foetal and maternal complications are considerable. Our study on pregnant women over a period of 12 years in Kermanshah, Iran, found 59.5% maternal mortality in the age range 21-40 yr. This study shows a positive correlation between foetal and maternal mortality, morbidity, and TBSA burned, with the highest rate in women with more than 50% TBSA.

Introduction

Burn injuries bring about significant morbidity and mortality in developing countries, including Iran,[1] with pregnant women being at the highest risk. Pregnant women burn injuries are commoner in developing countries and can lead to severe medical complications for both mother and foetus, requiring costly medical care.[2-4]

Pregnancy, by itself, does not alter maternal outcome in burn injuries, and foetal and maternal survival correlate with the total body surface area (TBSA) burned. In pregnant women with burn injuries in more than 40-50% TBSA burned, the prognosis is usually poor. For example, when the TBSA burned is 20-40%, the foetal death rate is about 11%; when it is 40-60%, foetal and maternal mortality reaches 50%.[5-7]

In view of the severe complications caused by foetal and maternal burns and the lack of relevant data, we conducted a study to investigate foetal and maternal outcome in pregnant women with burn injuries in a western province of Kermanshah, Iran.

Materials and methods

We conducted this study at the Imam Khomeini Hospital Burns Centre, Kermanshah, Iran, the sole referral centre for major burns in Kermanshah province and in neighbouring provinces. During the 12-yr period 20 March 1991 to 20 March 2002 we found 91 cases of burn injuries in pregnant women. The data of the study, including the patients' age, job, education, residence, parity, gestational age, TBSA burned, cause of burn, and time, as well as foetal complications, i.e. abortion, stillbirth and pre-term labour, premature rupture of membrane, and maternal mortality, were collected from the medical records. Foetal outcome was then determined on the basis of the different trimesters of pregnancy. Since we had no access to the foetal and maternal outcomes of 12 patients who were referred to other medical centres, the statistical analysis was performed on the remaining 79 patients. To determine the relationship between TBSA burned and maternal and foetal outcome, we employed Fisher's exact test as the means of data analysis.

Results

During the 12-yr period, of the 8000 patients admitted to the burns ward of Imam Khomeini General Hospital in Kermanshah, Iran, 3760 (47%) were women of reproductive age. The total number of pregnant women with burn injury was 91 (1.2% of all patients and 2.5% of women of productive age). Twenty-four per cent (22/91) of the patients were in the age group 16-20 yr, 35% (32/91) in the age group 21-25 yr, 29% (26/91) in the age group 26-30 yr, 5.5% (5/91) in the age group 31-35 yr, and 6.5% (6/91) in the age group 36-40 yr.

Of the patients, 30.8% (28/91) were in the first trimester of pregnancy, 41.8% (38/91) in the second, and 27.4% (25/91) in the third. Seventeen patients (18.7%) had burns in less than 25% TBSA, 25 patients (27.5%) had 25-50%, and 49 patients (53.8%) had more than 50%. Thirty-five patients (38.5%) were identified as being in their first pregnancy and 15 patients (16.5%) in their second, while the rest had had three or more pregnancies. Of the burned pregnant women, 74% were illiterate, 21% were literate but had no high-school certification, 3% had high-school certification, and 2% had a university education. The vast majority (95%) were housewives; 3% were employed and 2% were university students. Fifty-nine per cent of the patients (54/91) resided in town and 41% (37/91) were from rural areas. Forty-two per cent of the burn injuries occurred in spring, 22% in summer, 21% in autumn, and 15% in

Table I - Foetal outcome according to maternal total body surface area burned in first trimester

TBSA burned / Foetal outcome	<25% No. (%)	25-50% No. (%)	>50% No. (%)	Total No. (%)
Abortion	-	1 (1.26 %)	4 (5.06%)	5 (6.32%)
Discharge without complications	4 (5.06%)	5 (6.32%)	-	9 (11.39%)
IUFD*	-	-	3 (3.79%)	3 (3.79%)
Alive foetus until maternal death	-	1 (1.26%)	6 (7.59%)	7 (8.86%)
Total	4 (5.06%)	7 (8.86%)	13 (16.45%)	24 (30.37%)

* Intrauterine foetal death.

Table II - Foetal outcome according to maternal total body surface area burned in second trimester

TBSA burned / Foetal outcome	<25% No. (%)	25-50% No. (%)	>50% No. (%)	Total No. (%)
Abortion	-	-	11 (13.92%)	11 (13.92%)
Discharge without complications	3 (3.79%)	8 (10.12%)	-	11 (13.92%)
IUFD*	-	1 (1.26%)	10 (12.65%)	11 (13.92%)
Alive foetus until maternal death	-	-	1 (1.26%)	1 (1.26%)
Total	3 (3.79%)	9 (11.39%)	22 (27.84%)	34 (43.03%)

* Intrauterine foetal death.

winter; 53% (48/91) were accidental and 47% (43/91) were due to suicide attempts. While in 28 cases the pregnancy continued uneventfully, 23 cases ended in intrauterine foetal death (IUFD), 16 cases terminated in abortion, and three cases had pre-term labour. In nine cases, the foetus was alive until the mother's death. Data on foetal and maternal outcome were not available in 12 cases (*Tables 1-III*).

The study reported a total maternal mortality rate of 59.5% (47/79) and no mortality in burned pregnant women with less than 25% TBSA burned. Three patients (15.78% = 3/19) with 25-50% TBSA burned and 44 (93.6% = 44/47) patients with more than 50% TBSA burned died. There was a significant relationship between TBSA burned and maternal and foetal outcome ($p = 0.001$ and $p = 0.033$, respectively).

Table III - Foetal outcome according to maternal total body surface area burned in third trimester

TBSA burned / Foetal outcome	<25% No. (%)	25-50% No. (%)	>50% No. (%)	Total No. (%)
Pre-term labour	1 (1.26 %)	1 (1.26 %)	1 (1.26 %)	3 (3.79%)
Discharge without complications	5 (6.32%)	1 (1.26%)	2 (2.53%)	8 (10.12%)
IUFD*	-	1 (1.26%)	8 (10.12%)	9 (11.39%)
Alive foetus until maternal death	-	-	1 (1.26%)	1 (1.26%)
Total	6 (7.59%)	3 (3.79%)	12 (15.18%)	21 (26.58%)

* Intrauterine foetal death.

Discussion and conclusion

Pregnancy is not a predisposing factor for burn injuries. However, though rare, an extensive burn during pregnancy is a serious complication.[8,9] In this study, 2.5% of women who were admitted with burn injury were pregnant. This incidence rate may be underestimated because a pregnancy test is not routinely administered to burned women of reproductive age.[8,10,11] The high rate of burn injury among illiterate or poorly literate pregnant women in this study is indicative of the positive impact of education on the reduction of burn injuries.

Similarly to Mehdizadeh et al.,[8] this study showed the incidence of burn injury to be higher in spring, followed by summer, autumn, and winter. Contrary to our expectation we found that the incidence of burns during the cold seasons was not very high. Also as in Mehdizadeh et al.,[8] this finding may be due to the high incidence of suicide attempts.

The total maternal mortality rate in our study was 59.5%, while other studies reported a maternal mortality rate between 28.3% and 63%;[8,12-14] Khadzhiiski reported 100% maternal mortality among pregnant women with more than 50% TBSA burned.[15] A higher mortality rate in patients with over 50% TBSA burned was also the rule in our study (93.6% = 44/47). As in Mehdizadeh et al.,[8] who reported a higher maternal mortality rate in patients with suicide attempts (80% vs 59.1%), our study showed that the maternal mortality rate was higher among patients with intentional burns (30.7% vs 20.8%). The relatively high mortality rate in our study can be attributed to: 1. the high incidence of suicide attempts; 2. limitations in the isolation of patients with infection; 3. the high incidence of *Pseudomonas aeruginosa* infection; and 4. the lack of effective antibiotics in certain times/seasons.

Consistently with several other studies, ours found a

positive correlation between TBSA burned and maternal and foetal mortality. We also found that women with more than 50% TBSA burned, in any trimester, had a higher mortality rate,[5,8,12-20] with sepsis being the commonest cause of maternal mortality. No case of IUFD was identified among women with less than 25% TBSA burned, and only one case was seen in patients with 25-50% TBSA burned. Twenty-one cases of IUFD occurred in women with more than 50% TBSA burned. The high incidence of IUFD in pregnant women with severe burns may be attributable to insufficient foetal-uterine circulation. Since foetal health depends on maternal health, when the mother's course is not complicated by sepsis, hypotension, hypoxia, and death the chances of foetal complications are low.[5,6,8,13,21-23] However, fatal maternal injury can lead to sudden in-utero death or complications of prematurity following spontaneous labour.[20] It is recommended that viable pregnancies should be terminated as soon as the mother is resuscitated following severe burn injury. Prophylactic systemic antibiotics should be given to minimize the development of sepsis.[15]

As suicide attempts are the major cause of burn injury during pregnancy in Iran, access to psychiatric consultation in prenatal clinics can be effective in decreasing the incidence of burn injury and its complications due to suicide attempts among pregnant women. A multidisciplinary approach is encouraged in the management of cases of severe burns in pregnancy.

In short, this study showed that burn injuries in pregnancy caused severe medical complications for both mother and foetus. It also indicated that there was a positive correlation between maternal and foetal mortality and between morbidity and total body surface area burned.

RÉSUMÉ. Les brûlures se produisent rarement pendant la grossesse. Néanmoins, les brûlures sévères pendant la grossesse sont très dangereuses pour la mère et pour le fœtus. Les conséquences maternelles et fœtales dépendent de la surface corporelle totale (SCT) brûlée. Chez les femmes qui présentent une SCT brûlée de plus de 50%, les complications fœtales et maternelles sont considérables. Les Auteurs présentent une étude sur les femmes enceintes effectuée à Kermanshah, Iran, pendant une période de 12 années qui a démontré une mortalité maternelle de 59,5% chez les femmes âgées de 21 à 40 ans. Cette étude indique une corrélation positive entre la mortalité fœtale et maternelle, la mortalité, la morbidité et la SCT brûlée, avec le taux le plus élevé chez les femmes atteintes de brûlures de plus de 50% de la SCT brûlée.

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Acknowledgements. We would like to thank Miss Farah Siah for her useful recommendations.

This paper was received on 8 March 2006.

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