

A Retrospective Study Of 11 Pregnant Women With Thermal Injuries

YANIKLI 11 GEBENİN RETROSPEKTİF OLARAK İNCELENMESİ

Vedat ÜNSÜR, Cihan ÖZTOPÇU, Fatih AYTEKİN, Cemal ATALAY, Bedri TURHANOĞLU, Erol ALPAY

Department of Obstetrics and Gynecology, Ankara Numune Hospital, Ankara

SUMMARY

Objective: To obtain the morbidity and mortality rates for mother and the fetus in pregnancies with thermal injury.

Institution: Department of Gynecology and Obstetrics, Ankara Numune Hospital

Materials and Methods: Out of 917 burn victims admitted to the Burn Unit of Ankara Numune Hospital between 1986 and 1994; 11 pregnant patients were scrutinized retrospectively. All patients were classified by using the rule of 9's.

Findings: Two maternal deaths (18,2%) occurred in patients with burns involving more than 50 % of the skin surface area and 4 fetal deaths (36,4%) occurred less than 72 hours after the burns.

Results: The maternal and perinatal outcome is related to the extent, presence or absence of complications of burns and to the gestational age of the fetus. In view of the high perinatal mortality, patients with extensive burns who are more than 32 weeks' pregnant should be delivered soon after admission.

Key Words: Burns, Pregnancy.

T Klin J Gynecol Obst 1995,5:99-102

Thermal injury sustained during pregnancy, while an infrequent event, presents special management problems both for the gravid woman and her unborn child.

Because of the rarity of severe burns in pregnancy there are no concrete management protocols for burns' patients.

The incidence of burns complicating pregnancy has been stated to be 3.9 % to 7 % of burns in the reproductive age group (1,2).

Geliş Tarihi: 14.11.1994

Yazışma Adresi: Dr. Vedat ÜNSÜR
Ankara Numune Hastanesi.
Kadın Hastalıkları ve Doğum Kliniği,
Ankara

T Klin J Gynecol Obst 1995, 5

ÖZET

Amaç: Gebelik sırasında oluşan termal kazalarda, anne ve fetus için morbidite ve mortalite oranlarını tesbit etmek.

Çalışmanın Yapıldığı Yer: Ankara Numune Hastanesi, Kadın Hastalıkları ve Doğum Kliniği.

Materyal ve Metod: 1986-1994 yılları arasında Ankara Numune Hastanesi Yanık Kliniğine yatırılan 917 hastadan gebe olan 11'i retrospektif olarak incelendi. Tüm olgular dokuzlar kuralı kullanılarak total vücut yüzey alanının yanık yüzdesine göre sınıflandırıldılar.

Bulgular: Total vücut yüzey alanının, %50'den fazlasının yandığı iki olguda maternel ölüm oldu (%18,2). Bununla birlikte yanıkları takip eden 72 saat içinde de dört fetal ölüm gerçekleşti (%36,4).

Sonuç: Maternal ve perinatal durumun, yanık komplikasyonlarının varlığı ve ciddiyeti ile fetusun gestasyonel yaşına bağlı olduğu görüldü. Perinatal mortalitenin yüksek olması, 32 haftadan büyük gebeliği olan ve ciddi düzeyde yanığı bulunan gebelerde obstetrik girişimin hemen yapılmasını zorunlu kılmaktadır.

Anahtar Kelimeler: Yanık, Gebelik.

T Klin Jinekoloj Obst 1995, 5: 99-102

This paper reports a series of 11 patients admitted to hospital with burns in pregnancy.

MATERIALS AND METHODS

Of the 917 burn victims admitted to the Ankara Numune Hospital, during the 9 year period between 1986 and 1994; 25 % (229 patients) of these patients were women in the reproductive age group; 11 of the patients were pregnant giving an incidence of 4,8 %.

Although there were probably minor deviations from standard treatment protocols, all patients received routine thermal injury care including fluid resuscitation, wound care and nutritional support. Patients were treated with topical antibacterial agents and antibiotics when indicated. Wound cares included hydrotherapy escharectomies and skin grafting. All surgical procedures were carried out under general anesthesia.

Tablo 1. Hastaların karakteristik özellikleri.**Table 1. Characteristics of patients.**

Patient	Age (years)	Area of Burns(%)	Gestational Age (wks)	Mode of delivery	Fetal outcome	Maternal outcome
1	36	18	10	SVD	Alive	Alive
2	36	5	8	SVD	Alive	Alive
3	20	14	8	SVD	Dead	Alive
4	22	25	16	SVD	Alive	Alive
5	31	70	14	SVD	Dead	Dead
6	19	40	24	SVD	Dead	Alive
7	21	4	20	SVD	Alive	Alive
8	32	14	18	SVD	Alive	Alive
9	29	18	30	SVD	Alive	Alive
10	27	68	26	SVD	Dead	Dead
11	24	9	34	SVD	Alive	Alive

SVD: Spontaneous Vaginal Delivery

Tablo 2. Maternal yanık alanı, komplikasyonlar ve sonuç**Table 2. Maternal burn size, complications and outcome**

TBSA(%)	No.	Resp.	Hypoxia	Septicemia	Mother		Fetus	
					A*	D	A*	D*
0-9		3	0	0	3	0	3	0
10-19	4	0	0	0	4	0	3	1
20-49	2	1	1	0	2	0	1	1
50+	2	1	2	1	0	2	0	2
Total	11	2	3	1	9	2	7	4

A: Alive

D: Died

Resp.: Respiratory

(Respiratory pneumonia, pulmonary edema, inhalation injury)

A burn wound less than 10% in total body surface area (TBSA) was considered a minor injury. A major burn was defined as a partial thickness (PT) or full thickness (FT) injury affecting more than 10 % TBSA with 10-19 % being graded as moderately severe: 20-50 % as severe and in excess of 50 % TBSA as critical (3).

All the patients were referred to the Obstetrics and Gynecology department for evaluation of the fetus at the time of admission.

RESULTS

Table 1 summarizes the patient characteristics in this series. Ages ranged from 18 to 36 years with an average of 25,4 years. Three patients presented in the first trimester, 5 in the second and 3 in the third trimester. The percentage TBSA involvement varied from 4% to 70% (mean 26%). Owing to the nature of the injuries, the majority of wounds in excess of 30% TBSA were either PT or FT injuries. Three patients had minor and 8 major (4 between 10 % and 19 %, 2 between 20 % and 50 % and 2 more than 50 % TBSA) injuries.

Resuscitation was successful in all patients, except 2 who had sustained more than 50 % TBSA burn wound

and who died within 48 hours and 5 days of admission to hospital.

The injuries were all domestic (11/11) and fire (4 cases) and hot liquids (7 cases) were the causative factors. Gestational age at the time of burn injury varied from 7 weeks to 34 weeks. Three patients required tangential excision of the burned skin with split skin graft.

Thermally related maternal complications and outcome are shown in table 2. In general, prognosis for both mother and child was related to the extent of the injury and maternal complications. Maternal death was directly attributable to septicemia in 1 and cardiopulmonary arrest in 1 patient.

The relationship between burn size, maternal and fetal survival and gestational age are shown in table 3. All the fetuses were alive at the time of the mothers' admission to hospital and it was assumed that the pregnancies were uncomplicated. Fetal death occurred in 4 of 11 cases (36,4 %) and was related to gestational age and extent of maternal injury. Fetal loss during the first trimester of pregnancy was 1 of 3 patients (case 3) aborting within 7 days of being injured. Five patients were seen during the second trimester of

Tablo 3. Gestasyonel yaş ve fetal iyilik hali arasındaki ilişki

Table 3. Relationship between gestational age and fetal outcome

	TBSA1-9%		TBSA10-19%			TBSA20-49			TBSA50%+			
	II.*	III.*	I.	II.	III.	I.	II.	III.	I.	II.	III.	
Mother												
Alive	1	1	1	2	1	1	0	2	2	0	0	0
Dead	0	0	0	0	0	0	0	0	0	0	1	1
Normal												
Pregnancy	1	1	1	1	1	1	0	1	1	0	0	0
Abortion	0	0	0	1	0	0	0	1	1	0	0	0
Stillbirth	0	0	0	0	0	0	0	1	0	0	0	1

I: First Trimester

II: Second Trimester

III: Third Trimester

pregnancy and fetal death occurred in 2 patients (case 5 and 6) within 48 hours of being injured. Fetal loss during the third trimester of pregnancy was 1 of 3 patients (case 10) within 24 of being injured.

DISCUSSION

There are specific physiological changes during pregnancy that, after thermal injury, may have an impact on maternal and fetal welfare. The hemodynamic status of the pregnant patient (enlarging placenta and fetus) is greatly altered with a 35-40% increase in intravascular volume and a tendency to peripheral vasodilatation. The pregnant uterus can be regarded as the central target of the increased circulation and uterine blood flow. The response of the pregnant uterus during periods of hypoxia is paradoxical. Firstly, there is an increase in uterine vascular resistance and consequently a decrease in uterine blood flow during periods of induced hypoxia resulting in a reduction in fetal oxygenation (4). Secondly, control of arterial blood flow is normally depended on vasomotor activity located in arterioles. However, in the pregnant uterus the placental spiral arteries have their walls destroyed by trophoblasts and are merely passive channels. This makes the fetoplacental unit particularly sensitive to hypovolemia and hypoxia (5). Maternal respiratory insufficiency and the trans placental diffusion of inhaled carbon monoxide, may further compromise fetal oxygenation (6).

An additional factor may be invasive burn wound infection and septicemia. A number of common burn wound organisms can release the enzyme phospholipase A2; this can produce deacylation of arachidonic acid from amniotic phospholipids, with increased concentrations of free arachidonic acid and prostaglandin synthesis. This in turn could initiate labor (7).

Thermally injured tissue may also produce prostaglandin E2 and thromboxane A2, especially during the acute phase. Thus episodes of sepsis can result in premature labor and adverse vasoactive effects (8-10).

The approach to management of the burn victim depends on two basic issues; depth of the burn and

size of the area involved. Partial thickness burns are those in which sufficient numbers of epithelial cells allow for spontaneous re-epithelialization after injury. These were previously classified as first and second-degree burns. Full-thickness burns, formerly called third-degree burns, are those in which total destruction of the skin does not allow for regeneration of the epithelial surface.

"Minor" burns are usually defined as partial-thickness injuries covering less than 10 percent of the total body surface. "Major" burns are partial or full-thickness injuries covering more than 10 percent. These major burns can further sub classified as moderate (10 to 19%), severe (20 to 39%), and critical (>40 %) (11).

Prior to developing a treatment protocol for the pregnant women with burns, physicians must have clearly in mind the individual medical requirements of both patients. In the absence of inhalation injury, the determinant of survival is the extent and depth of the thermal injury (12). Basically, management in pregnancy can be divided into three components. Management in the acute phase centers on providing fluid and electrolyte therapy, establishing hemodynamic and ventilatory stability, and when a fetus is involved who has reached a viable gestational age, evaluating fetal well-being. With regard to this latter issue, stillbirth or preterm delivery usually occurs within the first few days after injury and is most often associated with instability of the mother's condition. If fetal compromise can be minimized during this acute phase, prognosis is much improved (11).

In contrast to the needs of the mother, the fetus is best served by avoiding medication and anesthetics especially during the first trimester because of the increased risk of birth defects (13). The prevention of maternal hypoxia or hypotension is critical to minimize fetal wastage; since hypoxia or hypotension, or both, can cause fetal distress and initiate premature labor (4). Intravenous fluid administration should be considered for patients with less than 10-15% TBSA injuries (14).

As in all burn wound management during the post-acute phase, the goal should be to combat sepsis and achieve early wound closure and to provide adequate nutrition during convalescence (1,15-17,18).

Fetal survival was related primarily to gestational age at the time of injury and the extent of maternal injury. During the third trimester, fetal survival depends less upon maternal survival and more on gestational age. Fetuses delivered before 24 weeks generally will not survive, while fetuses delivered after 32 weeks will do well with modern neonatal intensive care if they are born without hypoxia or birth trauma. Most difficult to manage are fetuses between 24 and 32 weeks of age when ex utero survival is difficult to predict. Thus, when preterm labor occurs, tocolysis should be considered while treating underlying causes of maternal stress such as hypoxia or hypotension or as a temporary method of arresting labor while maternal homeostasis is restored. The administration of beta-mimetic tocolytic agents to a woman with a thermal injury is not without risk. These agents may cause dangerous myocardial ischemia, pulmonary edema, hyperglycemia and hypokalemia. Tocolytic therapy using parenteral magnesium sulfate might be better tolerated (19),

Based on those findings our approach to obstetric intervention would be determined by the gestational age and the mother's chances of survival. If the injury is less than 50% TBSA, maternal prognosis is excellent. If the fetus is too immature, and the mother's condition stable, premature labor could be suppressed in an attempt to increase fetal survival. If the injury is less than 50% TBSA, maternal prognosis is excellent. If the fetus is too immature, and the mother's condition stable, premature labor could be suppressed in an attempt to increase fetal survival (1,15-17,18).

Maternal survival is less likely if the burn wound exceeds 50 % TBSA and the fetus is at risk during the first few days. Obstetric intervention is indicated within the first 24 hours after injury for high risk third trimester pregnancies or if the patient has a lethal injury, since the pregnancy usually terminates before the patient's death. Other indications for obstetric intervention include progressive fetal distress or significant maternal complications (1).

Pregnancy and labor have no effect on the burn itself and the mode of delivery should be dictated by obstetric considerations. Vaginal delivery is obviously preferred, even in the presence of a perineal burn.

Unfortunately, little is known about long term emotional effects of burn injury during pregnancy.

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