



Contents lists available at ScienceDirect

Burns Open

journal homepage: www.burnsopen.com

Burn injuries in pregnancy in a regional burns center in Nigeria: Presentation, maternal and fetal outcome

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ARTICLE INFO

Article history:

Received 8 September 2017

Received in revised form 8 November 2017

Accepted 9 November 2017

Available online xxxxx

Keywords:

Burns

Pregnancy

Maternal outcome

Fetal outcomes

ABSTRACT

Introduction: Paucity of published data on the specific problems of burns in pregnancy has made it difficult to determine the incidence, maternal and fetal outcomes, as well as the most effective management program for them, hence this analysis of burns in pregnancy from January 2009–December, 2014 (6 years).

Method: A retrospective study of records over 5 years was conducted. The patients' demographic and burn characteristics, stage of pregnancy, the causes, management, outcome and complications were noted.

Results and discussion: Ten mothers were included, with mean age of 30 years (range 17–45 years). The average TBSA was 36.3%, mean gestational age was 18.22 weeks (60% were within the first trimester while 40% were in the third trimester, none was in second trimester). The major cause of burn injuries was flame burns (80%). All dead fetuses were within the first trimester. The most common cause of death of mothers was sepsis. No statistically significant association was found between socio-demographic and burn characteristics and maternal and fetal outcome. The mortality rate of pregnant women is almost three times that of the non pregnant women.

Conclusion: Burns in pregnant women have a profound effect on the fetal wellbeing while the outcome of the burn injuries can be affected by the presence of a fetus. Burn injury prevention is essential in reducing the morbidity and mortality associated with these injuries.

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1. Introduction

Burn injury is a major source of morbidity and mortality in many parts of the world, particularly in the low- and middle-income countries where more than 95% of fatal fire-related burns occur [1]. Four million women suffer severe burns from fire each year worldwide –the same number as those diagnosed with HIV/AIDS [1,2]. However, it does not appear that burn injuries have attracted the same degree of public health concern [2]. Burn injuries during pregnancy are considered relatively rare, but they affect the fate of the mother and the developing fetus. If the victim is pregnant, the type and severity of the injuries may pose some challenges depending on the mother's physical condition during pregnancy [3] and possible complications include precipitated labour

and still births. The factors contributing to this are hypervolaemia, pulmonary injury, septicaemia, and a catabolic state associated with the burn. Maternal and foetal survival rates have been related to the percentage of the total burned area, and when it exceeds 60%, foetal and maternal morbidity increase significantly [3,4]. It is therefore very pertinent that the fetus be considered as the second patient when developing the individualized plan of care knowing that the intervention for the mother can have a profound effect on the fetus [4,5]. The presence of a fetus creates many special maternal physiological changes and the burn wound may place additional stress on the system [4,5]. The essential principles of burn management in pregnant and non-pregnant women are similar, except for some considerations about teratogenic drugs which should be fully avoided. Prevention and management of sepsis in a burned pregnant mother possess a lot of challenges because of the limitations imposed by the state of the pregnancy. The commonly used topical and systemic drugs (aminoglycosides, chlorampheni-

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<https://doi.org/10.1016/j.burnso.2017.11.001>

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Please cite this article in press as: Ogbogu CJ et al. Burn injuries in pregnancy in a regional burns center in Nigeria: Presentation, maternal and fetal outcome. Burns Open (2017), <https://doi.org/10.1016/j.burnso.2017.11.001>

col, ciprofloxacin, sulpha drugs and vancomycin) have been reported to have teratogenic effects. It is clear that the state of pregnancy considerably reduces the use of the common protocols for the burn management, hence early coverage of wound was done to improve outcome. Tetanus prophylaxis, antibiotics, hemodynamic stabilization, wound management, fetal assessment were performed. Moisture balanced dressings like cutimed, acticoat, epi-graft, gentamycin ointment were used in wound management. Escharectomy, skin grafting, negative pressure wound therapy were carried out as the need arose. Team approach representing almost every healthcare discipline is needed for successful burn care [4,5]. The aim of the present study was to report on presentation, maternal and fetal outcome in pregnant burn patients in a regional burns center in Nigeria.

2. Material and methods

This retrospective study was approved by the ethics committee of National Orthopaedic Hospital, Enugu, Nigeria. 10 pregnant burn injury patients presented to the hospital within the 6-year period from January 2009 to December 2014 and this was matched with 9 non pregnant females with the same socio-demographic and burn characteristics. The sources of data were the admission registers, the patients' folders from the medical records department, consultations and sonography reports. The information obtained included age, parity, gestational age, cause of burn injury, total body surface area burned, anatomical site and extent of injury, occupation, highest level of education, management, maternal outcome, fetal outcome, mode of delivery and its indication, length of hospital stay and complications. The percentage of TBSA burned and the grade of the burn injury were determined clinically (Wallace's Rule of Nine). Intravenous fluid replacement was initiated using the Parkland formula (percentage of TBSA burned \times 4 mL per kg of body weight). All patients received routine burn injury care, including fluid resuscitation, wound care, physiotherapy,

nutritional support and were co-managed by Obstetricians. Wound care included hydrotherapy, escharectomies and skin grafting. All surgical procedures were carried out under general anaesthesia. Patients were initially managed with topical antibacterial agents (1% silver sulphadiazine and/or 10% povidone-iodine ointment). When the patient was known to be pregnant, the topical antibacterial agents (1% silver sulphadiazine and/or 10% povidone-iodine ointment) were discontinued and replaced with acticoat, cutimed and gentamycin due to the concerns regarding absorption and toxicity. The state of the mother and fetus (motion/activity) was recorded and monitored while maternal complications were treated. Statistical results were obtained by the t test, the χ^2 test, (or the Fisher exact test) using SPSS software, version 20 (SPSS, Chicago, IL, USA). P value of $<.05$ was considered significant. These statistical analyses were used to assess the relative predictive power of TBSA, age, presence or absence of inhalation injury, trimester of pregnancy, duration of hospital stay, performance or nonperformance of surgery in hospital course and cause of burn as well as different combinations of these eight variables, as predictors of maternal and fetal mortality. The level of statistical significance was set at 0.05 (see Table 1).

3. Results

3.1. Mothers' demographics/presentation

From the 534 cases of burn injuries reported within the study period, 218 (40%) were in children (≤ 16 years), 189 (35%) were adult males and 139 (25%) were adult females. Ten (7.2%) women with burn injury aged between 17 and 45 years old were pregnant.

Majority (90%) of the pregnant mothers were between the ages of 20–39 years. The distribution gestational ages were as 6 (60%): first trimester, and 4 (40%): third trimester. 3 (30%) were primigravida and 7 (70%) multigravida. Majority (80%) had at least a secondary level of education and a good number (60%) were not

Table 1
Sociodemographic characteristics n = 19.

Characteristic	Pregnant females (n = 10)		Non-Pregnant females(n = 9)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Age(yrs) 10–19	1	10.0	0	0.0
20–29	3	30.0	6	66.7
30–39	5	50.0	3	33.3
40–49	1	10.0	0	0.0
Mean (SD) 30(6.831)			Mean 27.83(8.57)	
Gravidity				
Mean (SD) 2.67(2.291)				
0–2	5	50.0		
3–4	3	30.0		
≥ 5	2	20.0		
Parity				
Mean (SD) 1.89(2.028)				
0–2	8	80.0		
3–4	1	10.0		
≥ 5	1	10.0		
GA(weeks)				
Mean (SD) 18.22(11.713)				
1–13	6	60.0		
14–26	0	00.0		
27–40	4	40.0		
Educational level				
Secondary	8	80.0		
Tertiary	2	20.0		
Occupation				
None	6	60.0		
Professional eg. Banker	1	10.0		
Civil servant	1	10.0		
Trader	1	10.0		
Artisan eg. Tailor	1	10.0		

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