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Burn Injuries During Pregnancy; A Dual Challenge of Saving the Mother and Fetus

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Burn injuries are highly prevalent in our part of the world (Pakistan). [1-3] In our country, the exact incidence of burn injuries during pregnancy is unknown, however data from other countries reports these injuries to affect 6% -15% of the pregnant women. The highest frequency of these injuries is reported from India, followed by Iran. There is abundant published literature on burns in pregnancy from the developing world: however, there is scarcity of such publications from the developed countries.[4-6]

Pregnancy represents an altered physiological state of the body. The pregnant woman has a hyperdynamic circulation as compared to her normal non-pregnant counterparts. The hyperdynamic cardiovascular state and expanded total body plasma volume are aimed to ensure adequate blood supply to the placental vascular bed. The burn injury results in increased capillary permeability and accelerated fluid loss from the body. Resultantly the mother's effective circulatory volume is jeopardized. If the process continues unabated, she develops systemic hypotension with placental insufficiency, fetal ischemia, hypoxia, and acidosis. This will eventually culminate in fetal distress and onset of premature labor. The outcome of burn injury as well as that of pregnancy depends primarily on whether the burns are minor (Figure 1, A-D) or major and if there is an associated inhalational injury or not. Additionally, age of the woman, gestational age, any pre-existing co-morbids on part of the woman and more importantly adequacy of the burn and obstetric care, all contribute to the feto-maternal outcomes. As a general rule, the maternal outcome predicts the fetal outcome.[5, 7, 8] The outcome not only depend on the magnitude of the burns and the gestational age but also equally on the robustness of burn care and timely instituted obstetric management for the unfortunate pregnant woman. Close collaboration between the burn care surgeon and obstetrician is imperative for achieving better outcomes.

Generally, more than 35% of total body surface area (TBSA) deep burns constitute major burns in pregnancy and often signal a gloomy prognosis, both for the mother and fetus. The spectrum of possible issues that can present the aftermath of such burns include higher risk of miscarriage, intrauterine death/ still birth, preterm labor, prematurity, neurodevelopmental issues for the newborn, maternal post-traumatic stress disorder (PTSD) and increased risk of maternal and fetal mortality. Within a few days to a week, spontaneous labor may set in and culminate in stillbirth in most cases of major burns sustained during pregnancy. Considerable variations exist in the reported outcomes in various studies from different countries of the world regarding pregnant

Figure 1 (A-D): Clinical photographs of different pregnant women who sustained burn injuries to different body areas. They all belonged to the category of <35% TBSA burns. They were all managed successfully with standard burn care and obstetric protocols.

women sustaining up to 35% TBSA burns. However, when the burns are over 60–70% of the TBSA, majority of the published studies report inevitable mortality of both the mother as well as her fetus. [9-11]

Whereas burn injuries during pregnancy carry significant repercussions for both the mother and fetus, prudent management will significantly improve the feto-maternal outcomes. Multidisciplinary team, which primarily includes a competent burn surgeon, a confident obstetrician and their dedicated juniors would make remarkable positive impact on the outcomes for both mother and the fetus. Continuous fetal monitoring, critical care of the mother, early interventions for the burns and individualized obstetric care would all considerably reduce the morbidity and mortality for both the precious lives at stakes.

Principles of burn care of a pregnant burnt patient are no different than those of a non-pregnant burnt patient. In managing the mother, due attention is paid to the prevention of burn shock, burn wound infection, septicemia, pain and catabolism. These are achieved by ensuring appropriate fluid resuscitation, oxygen supplementation, pain alleviation, nutritional care, and performing early excision and resurfacing of the deep wounds (Figure 2, A-C). Fluid management is done more meticulously in order to ensure adequate fluid resuscitation on one hand and avoid fluid over load on the other hand. Side by side with adequate fluid resuscitation, upright positioning and provision of supplemental oxygen to the mother is ensured even in the absence of smoke inhalation injury. During pregnancy, the choice of antibiotics is limited and only those agents are employed which are non-teratogenic and safe during pregnancy. Paracetamol infusion is used more often and other analgesics when needed are employed more cautiously. Adequate attention is given to the psychological well-being of the woman and hence effectively circumvent the psychological issues and PTSD. [11-13] Early excision and grafting of the deep wounds offers certain added advantages especially among pregnant burnt patients. It ensures early wound healing, reduces the risk of septic complications and considerably improves the feto-maternal outcomes. Coverage of the abdominal wounds allows for painless stretching of the abdomen owing to advancing pregnancy, helps the obstetrician to assess the growing fetus and perform caesarian section when indicated. Early coverage of the breast wounds subsequently allows for breast-feeding. [2,5,14]

Figure 2 (A-C): Clinical photographs of a pregnant woman aged 23 years. She had sustained burn injuries (measuring 38% of TBSA) to different body areas including front of the abdomen, chest wall/ breasts, right arm, left forearm/hand and left thigh. She was 24 weeks pregnant. She was successfully managed with early excision and skin grafting of the deep wounds as per standard burn care protocols. She had good obstetric care that resulted in normal vaginal delivery of a viable baby.

Burn injuries during pregnancy pose certain obstetrical challenges to the obstetrician. At the very outset, the obstetrician may encounter the issues of spontaneous uterine activity, intrauterine fetal death and miscarriage secondary to the compromised uterine and placental circulation in the aftermath of inadequately managed burn shock. When the mother and fetus both are stable and well managed, an individualized obstetric care should be planned. Generally, when the gestational age is ≥24 weeks and the TBSAB is ≥55%, emergency cesarean section improves the outcome of both fetus and the mother. [15-17] The burn surgeon and the obstetrician should coordinate, work together and implement the best treatment plan for each individual patient.

We conclude that burn injuries among pregnant women constitute a uniquely challenging group of patients where there an imminent threat to both the mother as well as the fetus. Pregnancy per se does not pose any additional burden on the patient and the prognosis of burn injuries is the same as that among a non-pregnant female. The management of burn injuries and pregnancy is individualized and tailored to ensure the safe recovery and well-being of both the mother as we as the fetus.

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