

Pattern of Trauma In Pregnant Women and Outcome of Its Management

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ABSTRACT

Objective	To document the pattern of trauma during pregnancy and outcome of its management.
Study design	Descriptive study.
Place & Duration of study	Department of Surgery, Sir Syed Medical College Hospital Karachi, from January 2019 to December 2024.
Methods	All pregnant trauma victims who presented to the emergency department below 40-year of age with no known co-morbid were included in the study after taking their informed consent. The data were collected in two time periods, a retrospective review of records and a prospective data collection in a descriptive study design. A data collection form was developed to collect variables related to the mechanism of injury, clinical presentation along-with resuscitation, investigations performed, treatment provided and maternal and fetal outcome. Data were presented as mean with standard deviation and in frequency and percentages for continuous and categorical variables.
Results	A total of fifty patients were included in the study. The mean age of the patient was 26.50±4.50 year. Motor vehicle collision (MCV) was the most common mechanism of injury noted in 27 (54%) women. Majority of the pregnant trauma victim presented during their third trimester of pregnancy. Forty (80%) patients were treated under Obstetrics and gynecological services. Surgery was performed in 30 (60 %) women of which eight (16%) underwent cesarean section. Two (4%) women and four (8%) fetuses died in this series.
Conclusion	The motor vehicle collision was the most frequent mechanism of injury in pregnant women. Most of the women required surgical intervention. The cesarean section was performed in few patients. Three women and four fetuses died in this series.
Key words	Pregnancy, Trauma, Injuries, Fetus, Cesarean section.

INTRODUCTION:

Trauma is a major cause of morbidity and mortality in the low and middle income countries (LMIC).¹

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Pakistan is a part of WHO Eastern Mediterranean Region and included in LMIC. The burden of diseases including trauma is huge and most of the victims involved in trauma are of younger age group. Thus the outcome of trauma in terms morbidity also increase the socio-economic burden on already limited healthcare services. Other factors that make the population prone to the injuries are the behavior, poor road infrastructure as well as lack of awareness and poor legislation along-with law enforcement.

Women constitute almost half of the population of Pakistan. Each year over five million women become pregnant. About 30,000 women die due to the

pregnancy related complications.² The trauma during the pregnancy is an important cause of non-obstetric maternal mortality accounting for more than 20% of cases in those up to 35 years of age.^{2,3} The mechanism of injury and mortality can be typified as motor vehicle collision, fall, assault and domestic violence. MVC contributes to approximately 80 % of all the trauma during pregnancy.⁴⁻⁶ Furthermore, 1 out of 3 pregnant trauma victims are expected to deliver when hospitalized. This carries high fetal mortality due to maternal shock, uterine rupture, placental abruption and direct fetal injury etc.⁷

Trauma may be considered as a public health issue and needs data on regular basis so that current policies can be addressed and revised where indicated, both in terms of injury prevention and treatment. This study was conducted to add evidence based information related to the patterns, types, and outcomes of trauma in pregnant women to the existing literature from Pakistan.

METHODS:

Study design, place & duration: This descriptive study employed a hybrid design integrating both retrospective (January 2019 – December 2022) and prospective (from January 2023 - December 2024) data collection components. It was conducted in the Sir Syed Medical College Hospital Karachi.

Ethical considerations: Ethical Review board approval was obtained from the Institutional Review Board of Sir Syed College of Medical Sciences for Girls (IRB letter: 026-sscms-Ethics / 2024 dated 11/03/2024) for both components of the research project. Informed consent was obtained from the patients enrolled in the prospective arm.

Inclusion and exclusion criteria: All the pregnant females less than 40-years of age who met with trauma and presented to the emergency department with no known co-morbid were included in the study. Patients with incomplete data entered in the files or deficient records were excluded.

Sample size estimation: All patients as a part of retrospective review of the records were included in the study as well those who were managed during prospective period.

Study protocol: Medical records were collected and reviewed. Relevant variables included patients' demographics, gestational age at presentation, type and mechanism of trauma, clinical findings, maternal and fetal outcomes. From January 2023 to December

2024, pregnant women presenting with trauma were recruited prospectively after informed consent. The variables collected included presenting complaints, clinical findings, type of trauma, investigations carried out and the management provided. Pregnancy and fetal outcome as well as complications were recorded. The anatomical regions involved are mentioned in table II. Investigations performed included x rays in addition to FAST and fetal ultrasound. CT scans were performed in nine (18%) patients. CT was done when maternal life was at risk, because of better diagnostic yield. The dose of radiation was kept as low as reasonably possible with pelvic lead jacket as a protector. MRI was avoided due to logistics, time required, monitoring difficulties and limited usefulness in trauma setting.

Statistical analysis: Data were entered and analyzed using the SPSS version 20. The continuous data were presented as mean and standard deviation while the categorical data in frequency and percentages.

RESULTS:

A total of 50 patients presented to the emergency department during the study period. The mean age of the patients was 26.50 ± 4.50 year. As a part of the protocol most of the patients ($n=40$ - 80%) were admitted under Obstetrics and Gynecological services where general surgical consultation and care was also provided. Twenty-eight (56%) women were in their third trimester of pregnancy. The most common mechanism of injury ($n=27$ - 54 %) was motor vehicle crash followed by a fall ($n=12$ - 24%). The pattern of injury and trimester of pregnancy are shown in table I.

Surgery was performed on 30 (60%) patients. Most ($n=16$ - 32%) of the surgical procedures were performed in the third trimester of the pregnancy, followed by 12 (24%) in second and two (4%) in the first trimester. Furthermore, needle decompression followed by chest intubation was done for pneumothorax in two (4%) patients, one in second and one in third trimester of pregnancy respectively. There were two (4%) women with rib fractures who were managed conservatively. Three open wound fractures in lower limb in the third trimester were also recorded. Three (6%) cases of extradural hematoma who underwent drainage were also observed, along-with one case of cerebral contusion in the second trimester of pregnancy. Four (8%) cases of abdominal injury were managed conservatively in ICU. Cesarean section was required in eight (16%) women. Management was

Table I: Mechanisms of Injury

Mechanism	First Trimester (n=6)	Second Trimester (n=16)	Third Trimester (n=28)
MVC	04	01	22
Domestic Violence	02	02	04
Fall		08	-
Gunshots	-	02	01
Others	-	03	01

Table II: Common Sites of Injury

Anatomical Region	First Trimester (n=6)	Second Trimester (n=16)	Third Trimester (n=28)
Upper Limb	01	05	04
Lower Limb	01	03	06
Chest	01	01	03
Abdomen and Pelvis	-	03	09
Head	02	01	03
Spine	01	01	02
Neck	-	02	01

team-based as in few severe cases, surgery (laparotomy for liver laceration and splenectomy) and emergency cesarean section were performed in the same sitting.

The mean length for the hospital stay was 4.45 ± 3.50 days. One woman died due to poly-trauma resulting in shock and multi-organ failure. A woman was left with quadriplegia following trauma. Two (4%) women died in this series due to irreversible shock. Four (8%) fetuses also died in utero.

DISCUSSION:

This study provided information regarding an important subject which is not reported frequently. Trauma in pregnancy is a critical condition and a team work is required for its management as followed in our study. The patients were admitted in Obstetrics and gynecology service and surgical team also work in close collaboration. The outcome for women and fetuses was rewarding. The management of trauma in pregnant patient is almost the same as for a non-pregnant female. The special challenge is to deal with two lives. The resuscitation needs of women and ultimately of fetus requires a knowledge of various anatomical, physiological and psychological alteration that occur during pregnancy.⁸⁻¹²

The study by Weiss et al revealed the mean age of the pregnant trauma victim was 24.6-year which is similar to our study.¹³ Another study by Karadas et al reported the mean age of pregnant trauma of 26.72 ± 6.29 year.¹⁴ In our study majority of the women

presented during third trimester and MVC was the most common mechanism of injury reported in all trimesters of pregnancy followed by fall. These results are quite similar to a study conducted by Petrone et al.¹⁵ They hypothesized that during the third trimester due to an increased weight of the women and the resultant gravitational forces led to an increased incidence of fall.

Another pattern observed in our study was the frequency of the domestic violence that was reported in all the trimesters. Eight women were victim of such an abuse. A past survey from Pakistan also reported this mode of injury.¹⁶ It was pointed out that many females do not report violence being done on them because of societal practices. Similar pattern is also reported from other countries.¹⁷⁻¹⁹

Ultrasound was the preferred imaging modality in our study as fetus is prone to develop radiation hazards due to x rays. Maternal and fetal ultrasounds provided important information that helped in planning of the treatment and also the follow up. However, x rays may be justified if other diagnostic modality like MRI is not available and radiology is needed to manage the patients. In such a condition maternal well-being is a priority. Fetus is usually at risk in first sixteen weeks of pregnancy therefore x-rays may be used when indicated in emergency.¹⁹ Ultrasound FAST is a gold standard imaging modality in trauma patients as it is non-invasive and cost-effective.²⁰ However, CT scan can be requested in a hemodynamically stable patient with fetal

protection by using the pelvic shield.²¹⁻²² In this study CT scan was also performed based upon the needs of the pregnant women.

In 30 (60 %) patients in this series surgical intervention was performed. Eight patients underwent cesarean section. They were in the third trimester of pregnancy. The maternal mortality in this study was 6%. However, 8% fetal loss was observed. The possible causes include direct injury, maternal shock and placental abruption.

Limitations of the study: This was a single center study with retrospective data collection as a part of research in a private hospital which is a low volume facility.

CONCLUSION:

MVC and fall were the common causes of trauma in the pregnant women. Most of the women were in their third trimester of pregnancy. Both maternal and fetal mortality were observed. However, overall outcome was considered as satisfactory.

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Shireen Abdul Aziz Ramzanali: Concept, study design, data collection, analysis, manuscript writing and revising.
Shamsa Alnoor Kassam: Data collection, analysis, manuscript writing and revising.
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