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STUDY CHALLENGES IN MANAGEMENT OF HEAD INJURY IN PREGNANCY AT A TERTIARY CARE CENTER

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ABSTRACT

Background: Exposure of women to trauma in general has increased in recent years due to their more active lifestyle. Trauma is the main cause of non obstetric death in females between 14 and 44 years old, occurring more frequently during the 3rd trimester of pregnancy than at any other stage in life. Severe trauma in a pregnant woman can be considered a lesion of double magnitude, with significant fetal mortality. 6 Its occurrence varies from 6 to 7% of pregnancies, with hospitalization in 0.3 to 0.4% of cases. **Aim & Objective: 1**. Study challenges in management of head injury in pregnancy.2. study of complication in head injury cases. **Methods: Study design:** Prospective Observational Study. **Study setting:** Neurosurgery department of tertiary care centre. **Study duration:** December 2021 to January 2024 **Study population:** The study population included all the pregnant cases with head injury Admitted at a tertiary care center **Sample size:** 100 **Results:** majority of cases presented in 18-25 years age group, majority of cases presented with cognitive impairment 32 cases followed by Difficulties with sensory processing and communication 18 cases, Immediate seizures 5, Hydrocephalus 1,CSF leakage 4, cranial nerve injury found in 3 cases and hemiparesis in 1 cases. Most of cases found with preterm 29 cases followed by LBW 25 cases, neonatal seizures 12, cerebral palsy 2 and IUD in 1 case. **Conclusions:** Most of cases presented in 18-25 years age group, majority of cases presented with cognitive impairment with preterm labour. Traumatic brain injury during pregnancy, whether minor or severe, is associated with unfavourable maternal outcomes.

Keywords: Traumatic brain injury complication to mother, complication to fetus, challenges in management.

INTRODUCTION

Exposure of women to trauma in general has increased in recent years due to their more active lifestyle. Trauma is the main cause of non obstetric death in females between 14 and 44 years old,[1,2] occurring more frequently during the 3rd trimester of pregnancy than at any other stage in life.[3,4] Severe trauma in a pregnant woman can be considered a lesion of double magnitude,[5] with significant fetal mortality.[6]

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Its occurrence varies from 6 to 7% of pregnancies,[6,7] with hospitalization in 0.3 to 0.4% of cases.[5] The effect of trauma on a pregnant woman depends on the gestational age, on the intensity of maternal-fetal aggression, and on the type and severity of the injury,[5] and it is generally difficult to predict the possibility of fetal loss after trauma.[8] The extent of maternal injury does not correlate with the degree of fetal injury,[9] and it known that even small traumas can cause fetal death and premature labor.[3]

Management of head injury in pregnancy:

Radiation Exposure:

Diagnostic imaging in injured pregnant women is always delayed in view of reluctance to expose the foetus to ionising radiation. However, this discomfort should be avoided in critical decision making, and the risk of teratogenic potential should be well understood.

Management for the First and Second Trimesters:

The standard guidelines for the management of traumatic brain injury can be applied to pregnant patients with appropriate modifications for the population.[10] Prophylactic anti-epileptic therapy can be applied as a pre-emptive measure against intracranial hypertension–induced seizures. If neurosurgical intervention has been performed in early pregnancy (< 24 weeks), the decision about subsequent foetal management can be based on obstetric considerations.[11]

Management for the Third Trimester

Brain Trauma Foundation 2016 guidelines, a variety of measures to control intracranial pressure can be administered, such as a slight head-up position, low tidal volumes during intermittent positive pressure ventilation and avoidance of vomiting.[10] Application of mannitol in pregnant women should involve caution, as it slowly accumulates in the foetus, causing foetal hyperosmolality; this will lead to physiological changes, such as reduced foetal lung fluid production, reduced urinary blood flow and increased plasma sodium concentrations.[12,13]

Neurosurgical Intervention

If the foetus is viable (> 24 weeks of gestation) at the time of the planned neurosurgery, a decision must also be made concerning whether delivery is appropriate.

Neurosurgeons may face one of the following scenarios:

A. Caesarean delivery alone or followed by neurosurgery (simultaneous)

• When the uterus interferes in trauma related surgical interventions or

• With foetal compromise in a viable foetus with a stable mother: placental abruption/uterine rupture (maternal mortality rate of up to 10% and nearly universal foetal mortality); and

B. Neurosurgery followed by caesarean/vaginal delivery

• If cardiopulmonary resuscitation has been unsuccessful after 4 min or there is obvious impending or recent maternal death [14].

Post-operative Management

Continuing care in the intensive unit for pregnant women involves maintaining neurological and systemic homeostasis; in addition, sustaining the foetal viability should be undertaken (with or without surgery). Good analgesia support should be ensured to facilitate

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maternal mobility, as well as providing pain relief and avoiding undesirable haemodynamic compromises.

Morphine, codeine and tramadol are safely applicable, with few side effects and the best pain control. It is important to avoid cyclooxygenase inhibitors, in view of their effects on platelet function and potential bleeding after intracranial surgery and the potential foetal complications that can arise (renal failure, necrotising enterocolitis and persistent foetal circulation after birth), especially after 32 weeks of gestation.

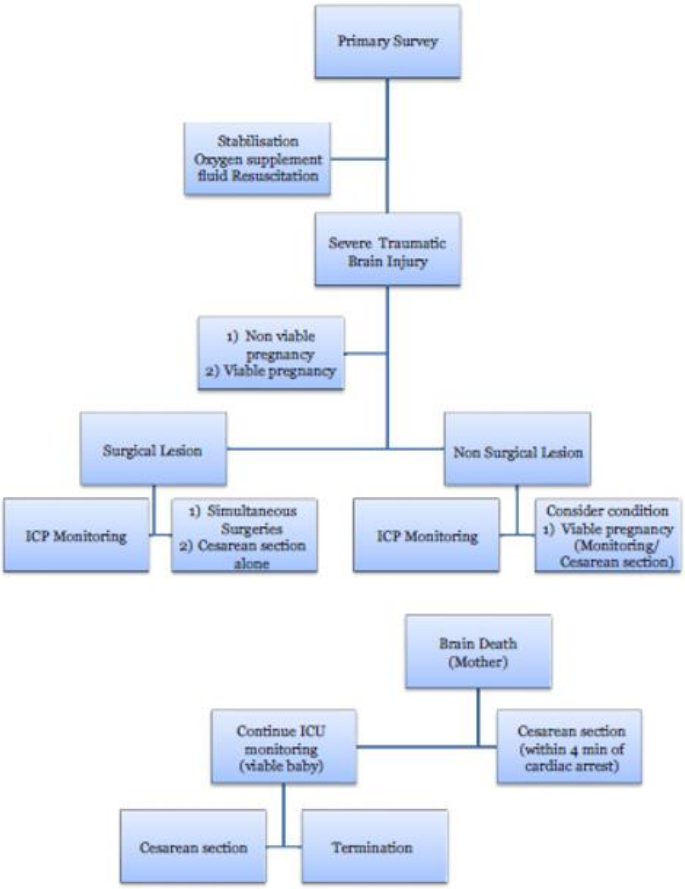

Figure 1: Algorithm management of severe traumatic brain injury in pregnancy, including surgical and nonsurgical intervention as a guideline for medical personnel and hospital facilities, when facing the dilemmas shown

AIM AND OBJECTIVE

OBJECTIVE:

1. clinical profile of head injury patients.
2. Study of complication among head injury cases
3. Study outcome in head injury patients

MATERIAL AND METHODS

Study design: Prospective Study.
Study setting: Neurosurgery department of National institute of Jaipur India
Study duration: December 2021 to January 2024

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Study population: The study population included all the pregnant cases with head injury Admitted at a tertiary care center

INCLUSION CRITERIA:
1. All pregnant cases with head injury

EXCLUSION CRITERIA:
1. **Not willing to participate**

Approval for the study:
Written approval from Institutional Ethics committee was obtained beforehand. Written approval of Neurosurgery and Related department was obtained. After obtaining informed verbal consent from all patients with the definitive head injury admitted to neurosurgery ward of tertiary care centre such cases were included in the study.
Sample Size: 100
Sampling technique:
Convenient sampling technique used for data collection. All patients admitted in the neurosurgery department
Methods of Data Collection and Questionnaire-
Predesigned and pretested questionnaire was used to record the necessary information. Questionnaires included general information, such as age, religion, residential address, and date of admission. Medical history- chief complain, past history, general examination, systemic examination
Data on demographic profile of head injury patient, investigation, personal history, medical past history, treatment modalities, and clinical outcome data collected from patients admitted in neurosurgery ward. All the procedures and investigations conducted under direct guidance and supervision of guide. Proforma of head injury notes maintained.
Data entry and analysis: The data were entered in Microsoft Excel and data analysis was done by using SPSS demo version no 21 for windows. The analysis was performed by using percentages in frequency tables and $p<0.05$ was considered as level of significance using the Chi-square test

RESULTS AND OBSERVATIONS
Table 1: Distribution of cases according to Age (n=50)

Age	**Frequency**	**Percentage**
18-25	20	40%
26-33	15	30%
34-41	10	20%
42 and above	05	10%
Total	**50**	**50 (100%)**

The above table shows majority of cases presented in 18-25 years age group 20 (40%) followed by 15 cases (30%) in 26-33 years age group,10 in 34-41 years age group and 5 cases in 42 and above age group.

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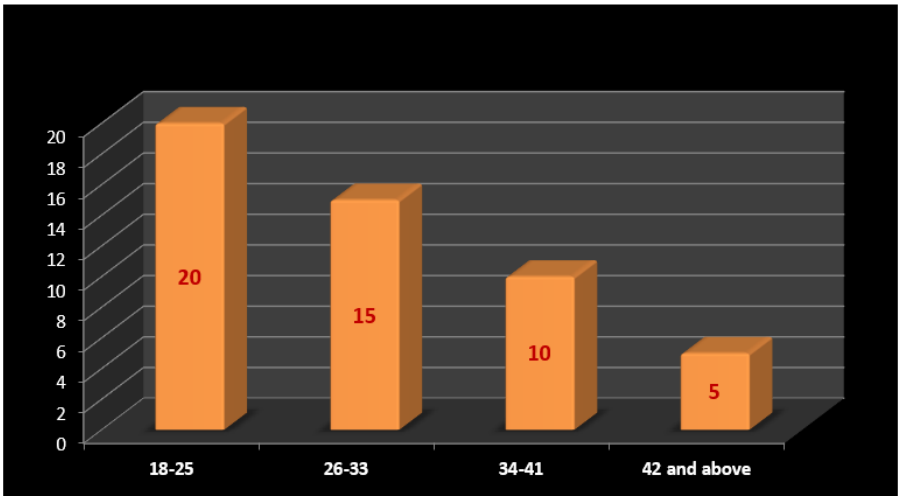

Figure 2: Distribution of cases according to Age (n=50)

Table 2: Distribution of cases according to challenges in management of head injury in pregnancy (n=50)

Maternal complication	Frequency	Percentage
Cognitive impairment	32	64%
Difficulties with sensory processing and communication	18	36%
Immediate seizures	05	10%
Hydrocephalus	01	2%
CSF leakage	04	8%
Cranial nerve injury	03	6%
Hemiparesis	01	2%

The above table shows majority of cases presented with cognitive impairment 32 cases followed by Difficulties with sensory processing and communication 18 cases, Immediate seizures 5, Hydrocephalus 1,CSF leakage 4, cranial nerve injury found in 3 cases and hemiparesis in 1 cases

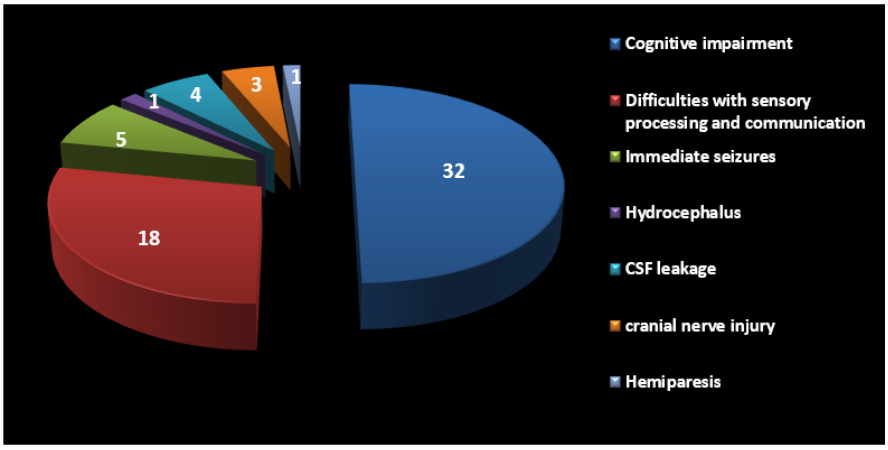

Figure 3: Challenges in management of head injury in pregnancy

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Table no 3: Complication to fetus and challenges in management of head injury in pregnancy (N=50)

Complication to fetus	Frequency	Percentage
Preterm	29	58%
Neonatal seizures	12	24%
Cerebral palsy	02	4%
LBW	25	50%
IUD	01	2%

The above table shows majority of cases found with preterm 29 cases followed by LBW 25 cases, neonatal seizures 12, cerebral palsy 2 and IUD in 1 case.

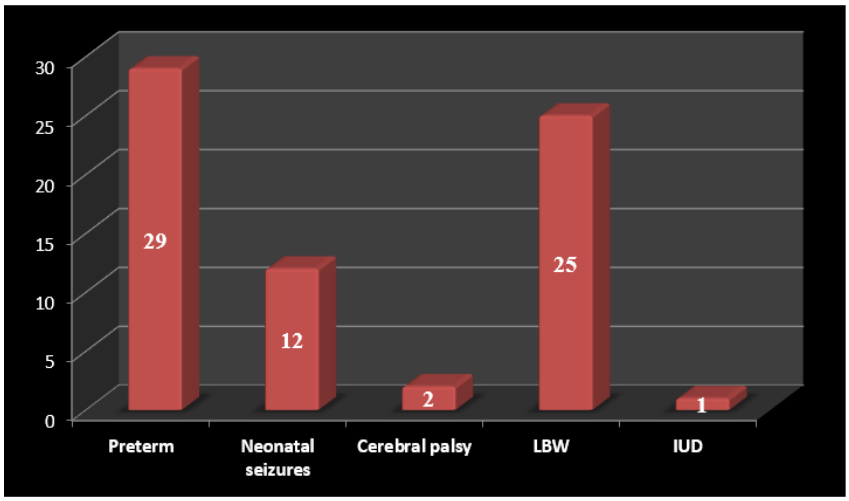

Figure 4: Complication to fetus and challenges in management of head injury in pregnancy (N=50)

DISCUSSION

In current study majority of cases presented in 18-25 years age group 20 (40%) followed by 15 cases (30%) in 26-33 years age group,10 in 34-41 years age group and 5 cases in 42 and above age group. similar finding observed in the study of Bharti N *et al.*[15] he reported that the most of cases found in 18-25 years age group.

In current study majority of cases presented with cognitive impairment 32 cases followed by Difficulties with sensory processing and communication 18 cases, Immediate seizures 5, Hydrocephalus 1,CSF leakage 4, cranial nerve injury found in 3 cases and hemiparesis in 1 cases Study by Leroy-Malherbe *et al.*[2] in their study of 18 patients with neurological deficiency and with a history of accidents during pregnancy, it was shown that the moderate disability in 34% (6), severe disability in 34% (6).

The neuroimaging was varied, ranging from normal in 17% (3) to injuries in 77% (14), of the most varied types: focal ischemic injury with congenital changes, ischemic injuries restricted to a vascular territory, diffuse ischemic injuries, periventricular leukomalacia, diffuse white matter abnormality, diffuse cortical and white matter atrophy, and a deceased patient had hemorrhagic lesions on pathological examination.

In current study majority of cases found with preterm 29 cases followed by LBW 25 cases, neonatal seizures 12, cerebral palsy 2 and IUD in 1 case.

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Laidler JA *et al.*[11] Presence of neurological deficits such as hemiparesis, neonatal seizures, cerebral palsy, hemorrhage or hydrocephalus were observed in children of mothers who suffered trauma during pregnancy.

A woman exposed to trauma, needing hospitalization during pregnancy, is under a 1.4 times higher risk of having a newborn with cerebral palsy when compared with a woman not exposed to trauma.[3] It was observed that fetal injuries are more frequent after trauma in advanced pregnancy, with fractures of the skull bones and intracranial hemorrhage in the fetus being the most common, leading to death in most cases.[6,8] Premature labor associated with trauma appears to be frequent, although it is rarely reported in the immediate post injury period. Diffuse axonal injury, as a result of strong accelerations/decelerations in the fetal brain, can result in the cessation of the growth of the head.[9]

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