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Original Research Article

Obstetric intensive care unit admission - clinical profile and outcome - a tertiary care hospital experience

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ABSTRACT

Background: Intensive Care Unit (ICU) admission is on rise in pregnant women due to factors including increasing maternal age, increasing rates and levels of obesity and other comorbidities. The present study was done to analyze admission rate, outcome and trends in women requiring peripartum admission to ICU.
Methods: In this retrospective study, peripartum admissions in obstetric ICU over the period of 6 months were studied. Demographics, comorbidities, diagnosis, ICU care, length of stay and outcome was analyzed.
Results: Out of 7489 deliveries during the study period, a total of 112 patients were admitted to ICU. Thus, the rate of ICU admission in our study was 1.49%. Most of the patients belonged to 31-35 years age group (37.5%) and were multigravida (83.9%). Severe pre-eclampsia and eclampsia (77.7%) was most common diagnosis at time of admission in ICU.47.5% of patients required ventilatory support. Majority of patients (51.8%) had short (<3 days) stay of admission. Mortality during the study period was 4.5%.
Conclusions: A multidisciplinary team approach including obstetrician and intensivist is appropriate in obstetric critical care units. Setting up of obstetric intermediate care units can lessen the burden. In addition to good antenatal care, timely referral, health education and training of health professionals may improve clinical outcome and better obstetric practice, especially in low resource countries like India.

Keywords: Intensive care unit, Outcome, Maternal mortality

INTRODUCTION

Every pregnancy is different and carries its own risks. Obstetric medicine is different from the general medicine because of the various physiological changes occurring in pregnancy. The physiological changes that occur during pregnancy include effects on the cardiovascular, endocrine, urinary, and respiratory systems. These changes may lead to severe pregnancy-related complications, resulting in adverse outcomes for the pregnant woman and the fetus.[1]

The majority of women remain healthy during pregnancy and childbirth.

A small number of women become so acutely unwell during pregnancy or childbirth that they require critical care support.[2] Nevertheless, there has been an increase in the number of women who become unwell around the time of childbirth, due to factors including increasing maternal age, increasing rates and levels of obesity and other comorbidities.[3]

Indication for Intensive Care Unit (ICU) admission may be elective, such as a planned admission for maternal congenital heart disease, or emergency, such as an admission for postpartum hemorrhage or acute respiratory failure. Women who become acutely unwell during pregnancy, labour and the postnatal period should have

immediate access to critical care, of the same standard as other sick patients, irrespective of location.

Admission to an ICU has recently been identified as: a marker of severe maternal morbidity by the American College of Obstetrics and Gynecology.[4] ICU admission remains rare for obstetric subjects in high-income countries, accounting for less than 1% of ICU admissions.[5,6] Whereas the figure is higher in developing countries, with admission rate as high as 7% in India and the maternal mortality ratio is also significantly higher in developing countries.[7]

Obstetric admissions to the ICU is an indirect indicator of maternal morbidity and mortality. Obstetric critical care has been defined as "the specialized management of critically-ill obstetric patients via an interdisciplinary approach in which the optimization of the clinical variables of pregnant women should be approximated to the maternal-fetal unit needs as a whole" Given the low number of pregnant women admitted to the ICU, knowledge on the optimal approach to management of critically ill pregnant mothers is limited.[8]

As any woman can become critically ill when pregnant, intensive care doctors, as well as obstetric anaesthetists, should be skilled in the resuscitation and stabilisation of sick pregnant women. In modern obstetrical care, a multidisciplinary approach with adequate risk stratification prior to pregnancy, early registration for delivery, and continuous antenatal care may help to reduce obstetric ICU admission rate.

METHODS

This study was a retrospective observational study done at Lalle Ded Hospital, a tertiary care Maternity Hospital associated with Govt Medical College Srinagar, India. The study period included 6 months i.e. from January 2020 to June 2020. All the consecutive patients admitted to obstetric ICU during this period were included in this study, after obtaining institutional ethical clearance. Data collected include demographic characteristics, obstetric and medical history, provisional diagnosis and interventions required in ICU (monitoring only, ventilator support). All the patients who were included in the study were followed up to note their outcome from the ICU. The outcome measures were recorded in terms of length of stay in ICU and any mortality in the ICU.

RESULTS

This retrospective observational study was conducted for a period of 6 months from January 2020 to June 2020. Out of 7489 deliveries during the study period, a total of 112 patients were admitted to ICU. Thus, the rate of ICU admission in our study was 1.49%. Maximum patients were in age group of 31-35 years (37.5%) followed by 25-30 years (33.9%). >35 years comprised 11.6% of study population.

83.9% patients were multigravida while only 16.1% were primigravida.

Table 1: ICU admissions.

ICU admission	No. of patients
Total deliveries	7489
Total ICU admissions	112
% age Of ICU admissions	1.49%

Table 2: Age distribution

Age in years	No. of patients	%
<25	19	17.0
25-30	38	33.9
31-35	42	37.5
>35	13	11.6

Table 3: Parity.

Parity	No. of patients	%
Primigravida	18	16.1
Multigravida	94	83.9

Table 4: Gestational period at admission.

Period of gestation (weeks)	No. of patients	%
<13	7	6.3
13-28	10	8.9
>28	87	77.7
Post-partum	8	7.1

Table 5: Provisional diagnosis.

Diagnosis	No. of patients	%
Severe pre-eclampsia/eclampsia	39	34.8
PPH	19	17
Placenta accreta/percreta	15	13.5
Severe anaemia with CCF	8	7.2
Abruption	5	4.4
Pulmonary edema	5	4.4
Congenital heart disease	5	4.4
Sepsis	5	4.4
Rupture ectopic	4	3.6
Rupture uterus	3	2.7
Epilepsy	2	1.8
Anaphylaxis	1	0.9
Acute fatty liver of pregnancy	1	0.9

Majority of patients i.e., 77.7% presented in third trimester to obstetric ICU. 7.1% patients presented in their postpartum period.

The provisional diagnosis on admission to obstetrical ICU were pregnancy related in majority of study population. Maximum patients i.e. 34.8% had severe pre-eclampsia/eclampsia followed by PPH (17%), adherent placenta (13.5%), severe anaemia (7.2%) and placental abruption (4.4%).

Table 6: ICU care required.

ICU care required	No. of patients	%
Ventilator support	53	47.3
For monitoring	59	52.7

Table 7: Length of stay in ICU.

No. of days in ICU	No. of patients	%
<3	58	51.8
3-7	45	40.2
>7	9	8

Table 8: Outcome in ICU.

Outcome	No. of patients	%
Recovered	99	88.4
Shifted	8	7.1
Death	5	4.5

Congenital heart disease and pulmonary edema was seen in 4.4% each. Ruptured ectopic and rupture uterus were also noted. Rare causes like acute fatty liver of pregnancy, epilepsy and anaphylaxis were also reported.

47.3% patients required ventilator support while 52.7% were admitted for monitoring. Majority of study population i.e. 51.8% had a short stay admission (<3 days).

88.4% patients recovered and were discharged while 7.1% required to be shifted to general ICU in view of need for prolonged ventilatory support. The maternal mortality rate in our study was 4.5%.

DISCUSSION

Obstetric ICU admissions are increasing now a days owing to factors like advanced maternal age, associated co-morbidities and obesity. Out of 7849 deliveries during study period, 112 were admitted in obstetric ICU making the rate of ICU admission in our study as 1.49%.

Pollock et al reported an overall incidence of obstetric ICU admission of 2.7 per 1000 deliveries.[9] In a study conduted by Farr et al, admission rate was 6.4 per1000 deliveries, corresponding to 1 admission per 156 deliveries.[10] Some reports from previous studies show an ICU admission rate that ranges from 0.1 to 1.7%, while other studies show an admission rate of 3.3%.[11-15] Majority of patients i.e. 71.4%, in our study group belonged to age group 25-35 years. Similar results were found in study done by Panda et al, where 73.9% of patients were in age group 20-35 years.[16]

Advanced maternal age seems to be associated with increased rate of obstetric ICU admission. Bhadade et al. and Cleary Goldman et al. found that increased maternal age is associated with hypertensive disorders of pregnancy, eclampsia, placental problems and maternal mortality.[17,18]

Majority of patients (83.9%) were multigravida and presented in their third trimester to obstetric ICU i.e. 77.7%. Similar observations were made in studies done by Farr et al and Joseph et al.[10,19]

In our study majority of patients had provisional diagnosis of severe pre-eclampsia/eclampsia (34.8%) which was followed by PPH (17%) and abnormally adherent placentae (13.5%). Obstetric heamorrhage, thus was a major risk factor associated with ICU admission in our study. Similar results were noted by Joseph et al in their study.[19] Other causes associated with obstetric ICU admission were severe anaemia, placental abruption and pulmonary edema. Pre-existing conditions like congenital heart disease were also seen in some patients. Ruptured ectopic and rupture uterus were also noted. Rare conditions like acute fatty liver of pregnancy and anaphylaxis were also reported. Thus, obstetric conditions constituted the majority cause for ICU admission.

Most of patients had <3 days duration of stay in ICU and required monitoring for recovery. This emphasises the need of an obstetric intermediate care unit so as to lessen the burden of an obstetric ICU.

Majority of the patients in our study recovered (88.4%) while 7.1% required shifting to a medical ICU owing to prolonged need for mechanical ventilation. The maternal mortality rate in our study was 4.5%, which is lower than the national statistics.[20] Among the 5 deaths in our study the prime cause was obstetric haemorrhage followed by severe pre-eclampsia/eclampsia. This may be due poor antenatal care, already anaemic multiparous patients and delayed referral to tertiary care center.

CONCLUSION

Obstetric ICU admissions are on rise now a days. The threshold of an insult required for ICU admission is low in obstetric patients compared to nonpregnant population. A multidisciplinary team approach including obstetrician and intensivist is appropriate in obstetric critical care settings. Setting up of obstetric intermediate care units can lessen the burden. In addition to good antenatal care, timely referral, health education and training of health professionals may improve clinical outcome and better obstetric practice, especially in low resource countries like India.

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