

Intensive Care Unit Admission of Obstetric Cases: A Retrospective Analysis in a Tertiary Care Center

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Abstract

Background: Intensive care unit admission of a mother is a critical marker of the severe maternal morbidity. In our study we assessed the prevalence of the pregnant and puerperal women's admission to the ICU, the reason for the need of the multidisciplinary care in a tertiary care center. **Material and Methods:** A retrospective 4-year records were analyzed from the ICU of all the pregnant women, who were admitted to the ICU in the ESIC hospital from 2013 to 2016. **Results:** Over the past 4-year period, a total of 13,182 women were delivered in our institute, of whom 92 (4.34%) women needed ICU care. Maternal mortality rate was found to be 0.03% (4 deaths) of the patients who were admitted in the ICU. 36 (39.1%) were in the age group between 20-24 years. 31 (33.6%) were the primigravidas. The commonest period of gestation was found to be at 37-40 weeks, with 36 cases (39.1%). Post delivery admission was 31 (33.6%). Severe anemia in 45 (48%) being the most common followed by, hypertensive disorders of pregnancy in 36 (39.1%) and, PPH topped the list being 31 (33.6%), heart disease in 4 (4.3%), and sepsis in 9 (9.7%). The cause of the maternal mortality was severe preeclampsia and HELLP in one patient, amniotic fluid embolism in another, uterine rupture in a previous 3 cesarean section in an elderly patient and one was of a referred patient in view of

intrauterine fetal demise and H1N1. **Conclusions:** Higher morbidity and mortality was noted in women with hemorrhage, which was found to be much higher than hypertensive disease of pregnancy and sepsis.

Keywords: Intensive Care Unit; Sepsis; Obstetric Hemorrhage; Preeclampsia; Maternal Mortality.

Introduction

The physiological changes in pregnancy, the altered metabolism, rapid deterioration of the mother which directly has an effect on the fetus makes the care needed in pregnancy very vital and need of the multidisciplinary care [1-2]. 99% of the maternal mortality in the world is from the developing countries. The 2010 year statistics, the WHO recorded the maternal mortality globally was 210 maternal deaths per 100,000 live births [3]. The socio economic status, facility for routine antenatal care, availability of the ICU care are the factors predicting the percentage of obstetric population requiring admission to the ICU which ranges from 0.08 to 0.76% of deliveries in developed countries [4-8] in comparison to a developing country which requires much higher percentage i.e. 0.13 to 4.6% [9-16].

Our country according to the 2010 statistics accounts for 19% of the global maternal mortality. Even though there is a reduction in the maternal mortality over the past decade the improvement is not adequate. Unsafe abortion leading to sepsis, hemorrhage and hypertension are the top three cause of maternal mortality and morbidity [17-20].

With the progression of the care provided

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in pregnancy a larger population of the patients are admitted to ICU in the reviewed period rather than earlier [21].

The need of the study is to analyze the characteristics of obstetric patients admitted to the ICU over the past 3 years, the medical background, epidemiology, antenatal and peripartum risks, durations of stay in the ICU, ICU interventions, and maternal and fetal outcomes.

Materials and Methods

Ours was a retrospective case series of obstetric patients admitted to the ICU of ESIC PG medical college and hospital, Bangalore, over a period of 3 years from 2013 to 2016. Pregnant and the women in their puerperal period i.e 42 days were included in the study. The data were collected from the ICU admission register and the patient information were tabulated. Various parameters like patient name, age, period of gestation, working diagnosis, relevant investigations, associated medical and surgical positive history were tabulated. The detailed treatment provided to the patient were analyzed, need of intubation and ventilation support, the blood transfusion, records of higher antibiotics administered, inotropic agent's usage and need of dialysis were recorded. Neonatal outcome in the form of the birth weight, 1 and 5 min APGAR and NICU admission were documented. The duration of stay in the MICU and discharge against medical advice were recorded.

The multidisciplinary approach to the patient and need of the super specialty care were recorded and the improvement in patient outcome due to timely active intervention was studied.

The Statistical analysis of the data was done using SPSS software. Comparisons between categorical variables were performed with Chi square test. $P < 0.05$ was taken as significant.

Results

Over a period of 4 years, there was 13182 obstetric admissions to the labour room. 92 women needed the admission to the intensive care unit. 98% of the cases were the inpatient cases. 36 (39.1%) patients were found to be aged between 20 -124 years, followed by 21 (22.8%) patients in the age group between 25 - 29 years. 45 (48.9%) women were in their third trimester followed by the postpartum admission to the ICU in 31 (33.6%). 31 (33.6%) women were the second gravida

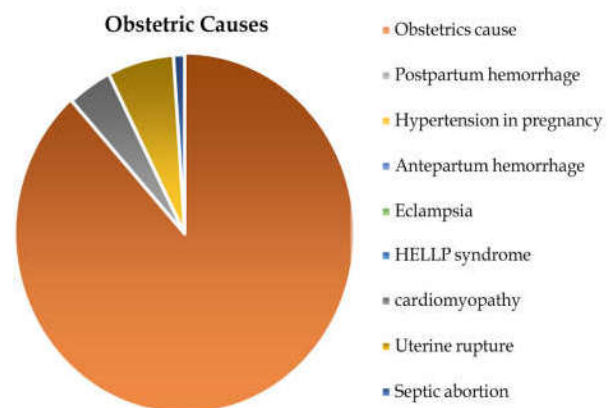
followed by the primigravidas in 29 (31.5%).

Predominant patients who needed the ICU were on emergency basis which constituted to 42.7%. the obstetric reason for the admission was noted in the 84 (91.3%) of cases and the non obstetrics indication in 8 (8.6%) patients.

The various primary diagnosis of these women ranged from the very common hypertension in pregnancy, postpartum hemorrhage to dengue fever. 12 women had no obstetrics or medical risk factors on admission to the labor room. 41 (44.5%) had more than one diagnosis even on admission, most of which was anemia. As depicted in the Table 2, hypertension in pregnancy was the commonest diagnosis constituting to 36 (33.1%), followed by ectopic pregnancy 16 (17.3%) and postpartum hemorrhage 31(33.6%). 44 (47.8%) of the cases underwent sections and 16 (17.3%) underwent laparotomy.

Of the 92 who were admitted in the ICU 52 (56.5%) needed intubation, predominately the women with high uncontrolled blood pressure. 42 (45.6%) needed blood transfusion, 40 (43.4%) needed FFP and 32 (34.7%) needed platelet transfusion. Inotropic support was needed by 43 (46.7%). 42 (45.6%) of the women had a duration of stay in the ICU for more than 72 hours with the maximum being 8 days (Table 4).

The number of maternal deaths was 4 which accounts for 0.03 % of obstetric patients admitted in ICU. The cause of the maternal mortality was sever preeclampsia and HELLP in one patient, amniotic fluid embolism in another, uterine rupture in a previous 3 cesarean section in an elderly patient and one was of a referred patient in view of intrauterine fetal demise and H1N1 (Table 5). 78.2 % were live births, and 27.1% % were neonatal intensive care admissions.



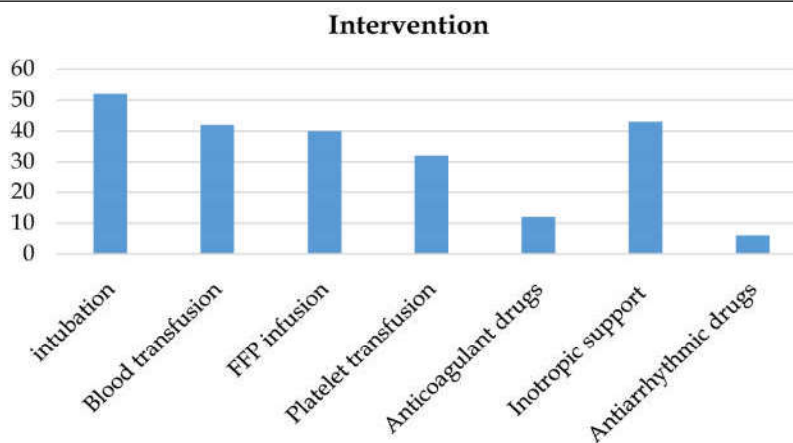
Graph 1: Distribution of cases according to obstetric reasons for ICU admissions

Table 1: Demographic parameters

Demographic parameters	Observation
Age (years)	Number of patients
<20	19 (20.6%)
20-24	36 (39.1%)
25-29	21 (22.8%)
30-34	11 (11.9%)
35-39	5 (5.4%)
>/=40	0 (0)
Duration of pregnancy	Number of patients.
1st trimester	10 (10.8%)
2nd trimester	6 (6.5%)
3rd trimester	45 (48.9%)
Postpartum	31 (33.6%)
Gravidity/parity	
G1/P1	29 (31.5%)
G2/P2	31 (33.6%)
G3/P3	19 (20.6%)
G4/P4	9 (9.7%)
G5/P5	3 (3.2%)
G6/P6	1 (1.08%)

Table 2: Distribution of cases according to obstetric and Non-obstetric reasons for ICU admissions

Obstetrics Cause	Number of Patient (%)	Non Obstetrics Cause	Number of Patient (%)
Postpartum hemorrhage	31 (33.6%)	Heart disease	4 (4.3%)
Hypertension in pregnancy	36 (39.1%)	Pulmonary edema	1 (1.08%)
Antepartum hemorrhage	5 (5.4%)	Pulmonary embolism	0
Eclampsia	7 (7.6%)	Viral hepatitis	0
HELLP syndrome	4 (4.3%)	Dengue fever	2 (2.17%)
DIC	7 (7.6%)	H1N1	1(1.08%)
Ectopic pregnancy	16 (17.3%)	-	-
cardiomyopathy	4 (4.3%)	-	-
Uterine rupture	6 (6.5%)	-	-
Septic abortion	1 (1.08%)	-	-



Graph 2: Intervention in the ICU

Table 3: Intervention in the ICU

Intervention	Number of patients (%)
intubation	52 (56.5%)
Blood transfusion	42 (45.6%)
FFP infusion	40 (43.4%)
Platelet transfusion	32 (34.7%)
Anticoagulant drugs	12 (13.04%)
Inotropic support	43 (46.7%)
Antiarrhythmic drugs	6 (6.5%)

Table 4: Duration of stay in the hospital

Duration in the hospital	Number of patient (%)
<= 24 hours	2 (2.1%)
25 - 48 hours	19 (20.6%)
49 - 72 hours	29 (31.5%)
72 hours	42 (45.6%)

Table 5: Cause of death

Cause of death	Number of cases (%)
Hemorrhagic shock	1 (0.007)
Multiple organ dysfunction syndrome	2 (0.015)
Sepsis	0
DIC (H1N1)	1 (0.007)

Discussion

The health care system of India aims to protect/improve maternal and child health, by means of antenatal, intrapartum, and postnatal services that are readily available at very low costs. Over the period of 4 years the ICU admissions were 4.34 % of the total admissions to the labor room, in comparison to the study conducted by Rathod et al. where the incidence is 1.94% [22] and between 0.5 to 0.9% in 4 studies by Kilpatrick, Mabie WC, Umo Etuk, Wheatley E. The higher rate of admissions to the ICU was noted as it is a tertiary care center and referrals due to the well equipped HDU, ICU and blood bank. The highest incidence was noted in women between 20 – 24 years which was 36 (39.1%) in comparison to the study conducted by Rathod et al [22] which was 56.20%. The second gravida had a higher incidence in comparison to the primi which was 33.6% versus 31.5%, whereas in the study conducted by Tang et al who had a higher incidence among the primigravida of 41% [21].

33.6% of the women were the postnatal phase which was comparably higher than a study conducted by Rathod et al (16.99%) [22]. The third trimester was the period of gestation which had the highest complication (48.9%), more so the complications which were associated with longer duration of the morbidity.

Women with previous cesarean delivery accounted for 33.6% of the total sections conducted, of whom 6 had previous 2 sections. Scar in the lower segment added more points to the admission to the ICU. Women who had a previous scar with risks like severe preeclampsia and heart diseases, who would be ideals for vaginal deliveries were delivered by section due to the previous scar. A primary effect to minimize the primary sections will reduce the rate of admission

to the ICU. Zwart JJ et al had reported previous cesarean in 14 % which was very close to that we found in our study [27].

12 women had no medical or obstetric risk factors. Of these 10 were primigravidas and 9 women underwent emergency section, the commonest indication being CPD and obstructed labour. The vigilant monitoring of the labor and timely diagnosis of CPD would have been an important factor in reducing the rate of emergency sections.

Major risk factors was hypertension in pregnancy (39.1%) was the commonest condition requiring ICU admission followed by Postpartum hemorrhage (33.6%). The other major conditions were severe anemia (33.6%), heart disease (4.3%), and sepsis (1.08%). Studies have found similar outcomes [2,5,10,14,28] in comparison to many studies in which obstetric hemorrhage was found to be the commonest [6,8,15,29].

We found the cardiac disease to be in 4.3% of the total population in comparison to various studies who have found the range to vary from 3.5 to as high as 18.3% [6,8].

Sepsis is widely found to be ranging from 2.4 – 18.3% in various studies, we found the rate to be 7.6%. A study conducted by Yuel et al reported a very high rate of 30.9% [14].

Cesarean delivery constituted 47.8% of women who underwent surgical procedures. Emergency sections constituted 81.1% of the total sections. Various studies have reported to the rate of section rate to vary from 50.7 to 78.5% [5,6,11].

The maternal death was in 4 patients (4.34%) of the total obstetric patients admitted in ICU and 0.03 % of deliveries among ICU patients. The cause of the maternal mortality were due to severe preeclampsia and HELLP, amniotic fluid embolism, uterine rupture

and H1N1. Mortality in this study was similar to the once noted in Tang et al and Leung et al [15,21].

Conclusion

A total of 0.69% of the total admission to the labor room needed ICU admission for further management. The importance of regular antenatal check up and routine screening of high risk conditions like anemia, gestational diabetes and hypertension prevents a number of complications. In a developing country like ours the need of training junior doctors, need of 24 hours round the clock faculty in the hospital and blood bank can make a massive difference in reducing the maternal and fetal morbidity. The delay in transport from the PHC to a well equipped center is also one of the most important attributing factor. The timely counteraction of the obstetric and medical complications in pregnant women, management of transport time and preventing morbid complication are the golden rules to prevent adverse outcome in mothers.

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