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Study of obstetric ICU admissions and maternal outcome

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Abstract
Analytical study of Intensive care unit (ICU) admissions during pregnancy is an accepted approach to identify severe risk factors for maternal morbidity and mortality. So analytical work up on obstetric ICU admissions in our department was done.
Objectives: To study the incidence of obstetric ICU admissions and to analyse the causes of obstetric ICU admissions, common indications, interventions and maternal outcome.
Materials and Methods: The study was an observational retrospective study on 100 random subjects admitted to Obstetric ICU of Government General Hospital/Rangaraya Medical College Kakinada during pregnancy or within six weeks postpartum from January 2015 to December 2016. Criterial factors were booking status, referral or inpatient shift to ICU, age, obstetric status, type of admission, primary diagnosis, associated medical and surgical condition, mode of delivery, details of supportive interventions and obstetric outcome.
Results: Total deliveries were 11284 in 12924 obstetric admissions in one year. The total admissions to the ICU were 483 obstetric patients (3. 73 %). Sample study was n=100. The mean maternal age was 24 ± 4. 2 years. Majority of the patients were Primipara (48%). The more common indications of ICU admission were hemorrhage (65%) eclampsia (18%). Transfusion of Blood and blood products was needed in 86. 8% of patients. 12% patients required mechanical ventilation. There were nine maternal deaths during the study period. The statistical analysis was done by using using SPSS 12. 0 fractional percentage and Chi-square test.
Conclusion: Obstetric haemorrhage with haemodynamic instability and eclamptic disorders are major causes of ICU admissions. Adequate antenatal care, screening, timely referral reduces ICU admissions and maternal mortality and morbidity.

Keywords: high risk pregnancy, ICU, mortality

Introduction
The obstetric patient may be afflicted with any surgical/medical condition necessitating intensive care unit (ICU) admission. There are however a number of pregnancy-specific conditions which account for the majority of critical care admissions [1] Understanding the epidemiology of severe obstetric morbidity and "near miss events" may help target interventions aimed at improving the full range of maternal outcomes. Analyzing intensive care unit (ICU) utilization during pregnancy is an accepted approach to identifying severe and "near-miss" maternal morbidity [2]. So analytical work up on obstetric ICU admissions in our department was done

Materials and Methods
The study was a observational study on 100 random patients admitted to Obstetric ICU of GGH/RMC Kakinada during pregnancy or within six weeks postpartum from January 2016 to December 2016. Sample size was calculated on a previous study conducted in tertiary care centre India [3] Using formula 4×P×(1-P)/L2 with absolute precision of 10, was rounded to 100. The data collected were type of admission, antenatal or postpartum, age, parity, obstetric status, primary diagnosis, associated medical and surgical condition, referral or inpatient shift to ICU, reason for ICU admission, mode of delivery, details of supportive interventions. The maternal and neonatal outcome were analysed. The obstetric ICU of the hospital is 8 bedded managed by the anesthetist and obstetrician with laboratory and blood-bank facilities, multidisciplenary faculty on call with transfer to central ICU requiring higher interventions. There is no High Dependency Unit (HDU) in our centre so all the high risk cases are managed in ICU.

Results
Total deliveries were 11284 in 12924 obstetric admissions in one year. The total admissions to the ICU were 483 obstetric patients (3. 73 %). Sample study was n=100. The mean maternal age was 24 ± 4. 2 years. Most of them were house wives (70%), Daily laborers 10% and others contribute to 20%. Majority of the patients were Primipara (48%). The more common indications of ICU admission were hemorrhage (65%) eclampsia (18%). Transfusion of Blood and blood products was needed in 86. 8% of patients. 12 % patients required mechanical ventilation. There were nine maternal deaths during the study period. Fetal wastage was23% as IUD 6%, stillbirths and perinatal deaths in peadiatric referrals17%. The statistical analysis was done by using using SPSS 12. 0 fractional percentage and Chi-square test.

Table 1

Case	Alive	Dead	Total
Booked	25	1	26
Unbooked	38	10	48
Referred	25	1	26
Total	91	9	100

Table 1 showing admissions mortality among unbooked cases was found to be high when compared to mortality among booked and referred cases. This difference was found to be statistically not significant on doing Chi square test (Chi Square= 4. 827) P value – 0. 089

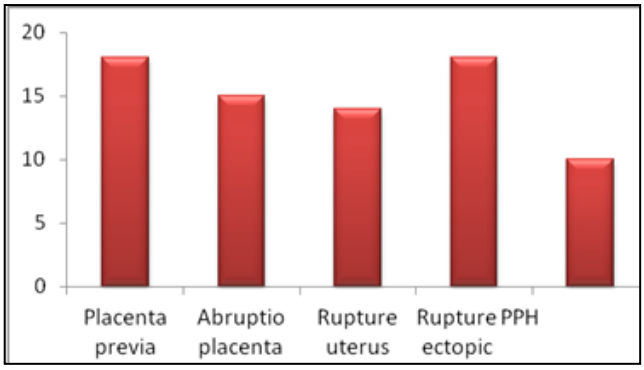

Fig 1: Causes of Obstetric Haemorhage

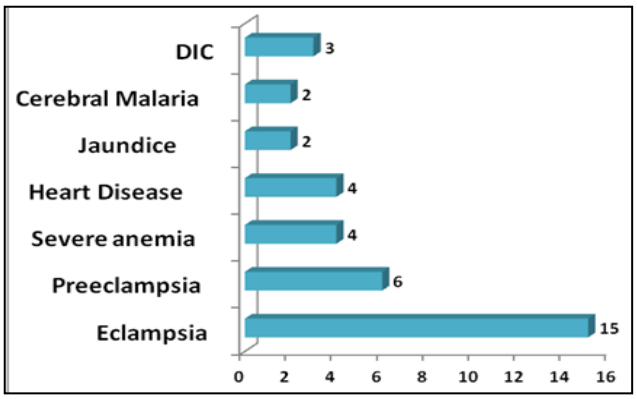

Fig 2: Other ICU Admissions & Preexisting Medical Disorders

Table 2: Showing the Surgical Interventions

Intervention	Number	Percentage
Cesarean Section	41	41%
Hysterectomy	4	4%
Laparotomy	16	16%

Table 3: Showing Causes of Maternal Mortality N=9

Antepartum hemorrhage		%
Placentaprevia haemorhagic shock	1	11%
Ruptured ectopic	1	11%
Abruptio Coagulation Failure Dic	1	11%
PPH	1	11%
Heart Disease-Severe Ms Pah	1	11%
Peripartum Cardiomyopathy	1	11%
Jaundice Hepatorenal Syndrome	1	11%
Cerebral Malaria	1	11%
Multiorgan Failure Dic	1	11%

Table 4: Showing interventions in ICU

S. No	ICU Interventions	Percentage
1	Blood and blood products	84%
2	Mechanical ventilation	12%
3	Inotropes	52%
4	Antihypertensives	23%
5	Anticonvulsants	15%

The duration of ICU stay varied from 2-4 days in 82 cases and more than a week in 14 cases. During the stay in ICU, complications from pyrexia to wound infections, sepsis ARDS occurred in 17%. Obstetric haemorhage (56%) mainly APH due to placenta previa and abruption, rupture uterus and ruptured ectopis. PPH is seen in 10 cases of which hysterectomy was done in 3 cases. Majority of admissions recovered with 9 maternal deaths.

Discussion

Any pregnant woman can develop life threatening complications with little or no advance warning. The complications of pregnancy and labor are essentially of two types- the first set of complications include obstetric complications like Postpartum Hemorrhage (PPH), Pre-eclampsia/Eclampsia (PE/E) etc. which require intensive obstetric care by specially trained providers, and the second set of complications include multi-organ involvement/failure which necessitates care provision by intensivist and super-specialists such as those from nephrology, neurology, cardiology, pulmonology etc [4]. This can be achieved with patient management at ICU. Understanding the epidemiology of severe obstetric morbidity and "near miss events" may help target interventions aimed at improving the full range of maternal outcomes. Analyzing intensive care unit (ICU) utilization during pregnancy is an accepted approach to identifying severe and "near-miss" maternal morbidity [5].

The rate of ICU admissions in this study was 3. 73 % of all obstetric admissions and 4. 29% of all deliveries. It varies from place to place and availability and admission to ICU. This is higher than other studies [5, 6] lesser than others [7-9] our centre has no HDU which could be a cause in increased rate. In the United States each year, 1 to 3 percent of pregnant women require critical care services, and the risk of death during such admission ranges from 2 to 11 percent (American Academy of Pediatrics and the American College of Obstetricians and Gynecologists, 2012). In our study ante natal and antepartum admissions were 52%, more than postpartum admissions probably due to risk identification, antepartum haemorhage and haemoperitoneum haemorhagic shock due to rupture uterus and ruptured ectopics with delayed admissions which correlates with few studies [10, 11], Obstetric hemorrhage (54%) was the commonest condition requiring ICU admission followed by hypertensive disorder of pregnancy (21%) which is nearer to study[12-16] The other major conditions were severe anemia (8 %), heart disease (6%), and sepsis (6%). Studies have found hypertensive disorders as the commonest condition [17-19].

Postpartum admissions were PPH and eclampsia, CVT, which

were 32% and were managed with medical and surgical modalities including hysterectomy in 4 cases with one mortality. Cardiac diseases accounted to 4% in these series with two maternal deaths including peripartum cardiomyopathy. Peripartum cardiomyopathy is a rare pregnancy-specific condition of uncertain aetiology which accounts for less than 1% of all cardiovascular events related to pregnancy [20].

The obstetric interventions included blood transfusion 84%, ionotropes in 52%, ventilator support in 12% apart from antihypertensives and convulsive nearer to study [21] Patients need ventilator support for a higher PaO2 or SpO2 than normal to reduce the risk of fetal hypoxia in a potentially compromised fetoplacental circulation [22] but lesser rate of ventilator support in other studies. Maternal morbidity accounted to 23% with pyrexia, wound infection, sepsis, multiorgan failure, renal failure, ARDS, pnumonitis. Maternal deaths were 9% in our sample study. Indirect maternal deaths were due to heart disease like severe mitral stenosis with PAH, peripartum cardiomyopathy, infective jaundice with septicemia and hepatorenal syndrome. multiorgan failure. This is nearer to other study [23] but lower than other studies [8, 12, 24].

Conclusion

ICU admission rate in our study is 3. 73 % accounts to 0. 38/1000deliveries.

Obstetric haemorrhage with haemodynamic instability and eclamptic disorders are major causes of ICU admissions the women with obstetric complications need access to quality maternal HDU and referal to ICU. It is suggested that dedicated obstetric ICUs or beds to detect and manage life threatening obstetric complications can reduce maternal mortality and morbidity

Limitations of Study

Small sample population and direct admissions to ICU without HDU

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