

Study of obstetric admissions in intensive care unit of a tertiary care hospital

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Abstract

Background: In modern medicine maternal death is a major concern for society. With a significant reduction in maternal deaths, now focus is shifted to mothers survived a life-threatening event. Reviewing critical cases can provide significant information about areas of improvement and is useful in identifying health system failures and assessment of quality of maternal health-care⁶. Evaluation of obstetric admissions to intensive care unit (ICU) is one of the ways to approach surveillance of critically ill women in pregnancy in a tertiary care facility⁷. The objective is to study the obstetric patients admitted to ICU and evaluate the maternal outcome in our tertiary care hospital. **Material and Methods:** Present study was a prospective observational study conducted in department of obstetrics and gynaecology, in patients during pregnancy, childbirth or within 42 days of termination of pregnancy, who needed the intensive care were included in the study. **Results:** After applying inclusion and exclusion criteria, total 182 patients were included in present study. Most common age group was 21-25 years (52%) followed by 26-30 years (27%). Most patients were primipara (41%) and parity 2(30%). Term (43%) and puerperal (24%) patients were most common. Majority of patients required ICU admission in post-partum period (64%). Majority of obstetric indications for ICU admissions were post-partum haemorrhage (31%), sepsis (19%), postpartum acute kidney injury (14%), pre-eclampsia (13%). Non-obstetric indications for ICU admissions were infections (dengue, hepatitis, swine flu, etc) (25%), heart disease (7%). The common causes of maternal mortality in present study were multiorgan dysfunction syndrome (27 %), sepsis (18 %), pulmonary thromboembolism (13 %) and hemorrhagic shock (11 %). **Conclusion:** Accessibility and comprehensiveness of obstetric care along with triaging and ICU care can improve maternal outcome. Availability, early admission and appropriate management of critical obstetrical patients to the ICU decreases maternal morbidity and mortality.

Key Word: Intensive Care Unit, pregnant woman, maternal mortality, maternal morbidity

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INTRODUCTION

In modern medicine maternal death is a major concern for society. Confidential enquiry into maternal deaths have revealed that there are still a significant number of maternal deaths associated with suboptimal care. According to World Health Statistics (WHS) 2016: From 1990 to 2015, the global maternal mortality ratio declined by 44 percent from 385 deaths to 216 deaths per 100,000 live births¹. Whereas, the maternal mortality ratio of India (2014-16) is 130 per 1,00,000 live births². With a

significant reduction in maternal deaths, now focus is shifted to mothers survived a life-threatening event. Maternal near-miss cases are defined as “a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy”³. These women with obstetric complications need access to quality maternal health services that can detect and manage life threatening obstetric complications. They need round the clock personalized care by skilled providers, essentially led by Obstetricians or Emergency Obstetric Care trained providers. For those women who have progressed to an adverse clinical condition where there is multi-organ involvement/ failure, the care has to be provided in an intensive care unit setting led by intensivist/super-specialists⁴. Availability, early admission and appropriate management of critical obstetrical patients to the ICU decreases maternal morbidity and mortality. The incidence of pregnant women admitted to intensive care unit (ICU) in developed countries is 2-4 per 1,000 deliveries as compared with 2-13.5 per 1,000 deliveries in developing countries⁵. Any pregnant woman can develop

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life threatening complications with little or no advance warning. Though pregnancy and labor are considered a physiological process, but they do possess the potential for catastrophic complications and that may develop in a matter of minutes. The diagnoses precipitating admission to critical care are predictable and include massive hemorrhage (> 2,500 ml loss), eclampsia, sepsis, thromboembolism, acute organ dysfunction (renal, hepatic, cardiac, respiratory, neurological) and anaesthesia-related morbidities such as aspiration, anaphylaxis and muscle relaxant-related problems. Reviewing critical cases can provide significant information about areas of improvement and is useful in identifying health system failures and assessment of quality of maternal health-care⁶. Evaluation of obstetric admissions to intensive care unit (ICU) is one of the ways to approach surveillance of critically ill women in pregnancy in a tertiary care facility⁷. The objective is to obstetric patients admitted to ICU and evaluate the maternal outcome in our tertiary care hospital.

MATERIAL AND METHODS

Present study was a prospective observational study conducted in department of obstetrics and gynaecology, Katuri Medical College and Hospital, Guntur. Study

RESULTS

After applying inclusion and exclusion criteria, total 182 patients were included in present study. Most common age group was 21-25 years (52%) followed by 26-30 years (27%). Despite a smaller number of overall patients from less than 20 years group, 13% mortality was noted from this group.

Table 1: Age distribution

Age in years	No of patients	percentage
< 20	23	13%
21-25	94	52%
26-30	49	27%
31-35	13	7%
> 35	3	2%

Most patients were primipara (41%) and parity 2 (30%).

Table 2: Obstetric index on admission

Parity	No of patients	percentage
1	75	41%
2	55	30%
3	34	19%
4 or more	18	10%

Term (43%) and puerperal (24 %) patients were most common.

Table 3: Gestational age on admission

Gestational age in weeks	No of patients	percentage
< 14 weeks	11	6%
15-28	5	3%
29-34	16	9%
35-36	28	15%
37-40	73	40%
41-42	5	3%
Puerperium	44	24%

Majority of patients required ICU admission in post-partum period (64 %).

period was 1 year. Institutional ethical committee approval was taken for present study.

Inclusion Criteria: Female patients during pregnancy, childbirth or within 42 days of termination of pregnancy, who needed the intensive care were included in the study.

Exclusion Criteria: Morbidity from accidental or incidental causes not related to pregnancy, e.g. morbidity from road traffic accident, suicide and poisoning.

After admission to ICU, patients were considered for study. Written informed consent was obtained from patients or from relatives for participation in present study. We noted demographic parameters, age, parity, diagnosis on admission, associated medical and surgical condition, reason for ICU admission, any surgical procedure performed, antenatal or postnatal admission, details of treatment given like ventilator support, blood and blood component transfusion, ionotropic support, and dialysis. The neonatal outcome was noted in terms of death and neonatal intensive care admissions. All relevant lab details were noted. Follow-up was kept till discharge from hospital. The total duration of stay was noted. The maternal mortality and its cause were noted. Data was entered in Microsoft excel sheet and analysed. Statistical analysis was done using descriptive statistics.

Table 4: admission to ICU

	No of patients	percentage
Antepartum (more than 20 weeks)	49	27%
Postpartum	118	64%
Ectopic	6	3%
Abortion	7	4%
Molar	2	1%

Majority of obstetric indications for ICU admissions were post-partum hemorrhage (31%), sepsis (19%), postpartum acute kidney injury (14%), pre-eclampsia (13%). Non-obstetric indications for ICU admissions were infections (dengue, hepatitis, swine flu, etc.) (25%), heart disease (7%).

Table 5: Indications for admission in ICU

Indication	No of patients	Percentage
Obstetric		
Post-partum hemorrhage	57	31%
Sepsis	34	19%
Postpartum acute kidney injury	25	14%
Pre-eclampsia	24	13%
DIC	15	8%
Eclampsia	13	7%
Uterine perforation	11	6%
Puerperal sepsis	11	6%
Abruptio	7	4%
HELLP syndrome	5	3%
Ruptured ectopic	5	3%
Placenta previa	4	2%
Uterine rupture	4	2%
Other		
Infections (Dengue, hepatitis, swine flu, etc.)	46	25%
Heart disease	13	7%
Severe anemia	9	5%

Cesarean delivery (43%), uterine artery ligation (32%), bilateral internal iliac artery ligation (19%), peripartum hysterectomy (16%) were common surgical procedures done in patients admitted in ICU.

Table 6: Surgical procedures

Surgical procedures	No of patients	percentage
Cesarean delivery	78	43%
Uterine artery ligation	59	32%
Bilateral internal iliac artery ligation	35	19%
Peripartum hysterectomy	29	16%
Ectopic pregnancy	12	7%
B-Lynch suture	12	7%
Hysterotomy	11	6%
Evacuation of products of conception	8	4%
Cervical tear suturing	7	4%
Pelvic hematoma	6	3%
Manual removal of placenta	6	3%
Isthmic cervical opposition stitch	5	3%
Repair of rupture uterus	4	2%
uterine Inversion	2	1%

Majority of patients required ICU stay less than 5 days (74%).

Table 7: Duration of stay in ICU

Duration of stay	No of patients	percentage
less than 48 hrs.	35	19%
2 days to 5 days	99	54%
6 days to 10 days	37	20%
more than 10 days	11	6%

The common causes of maternal mortality in present study were multiorgan dysfunction syndrome (27 %), sepsis (18 %), pulmonary thromboembolism (13 %) and hemorrhagic shock (11 %).

Table 8: Causes of maternal mortality

Causes	No of patients	percentage
Multiorgan dysfunction syndrome	19	27%
Sepsis	13	18%
Pulmonary thromboembolism	9	13%
Hemorrhagic shock	8	11%
Acute pulmonary edema	5	7%
Hepatic encephalopathy	5	7%
Intracranial hemorrhage	4	6%
Congestive cardiac failure	3	4%
Uremia	3	4%
Acute pneumonia	2	3%

DISCUSSION

As noted by the WHO, “There is a story behind every maternal death or life-threatening complication”⁸, understanding the epidemiology of severe obstetric morbidity and “near miss events” may help target interventions aimed at improving the full range of maternal outcomes. Obstetrical patients admitted to ICU forms a critical part in assessing maternal morbidity and mortality inclusion of critically ill patients (near-miss) in maternal death enquiry can better inform the quality of obstetric care at different levels of health care delivery at more frequent intervals. Various ICU scoring systems are used to determine the degree of severity and risk of mortality⁹. These include the simplified acute physiology score (SAPS), the mortality prediction model, the standardized hospital mortality ratio, and the acute physiology and chronic health evaluation (APACHE II). Simplified acute physiological score (SAPS II) and APACHE score are frequently used scores. But these are not able to accurately predict the mortality in obstetric population. Because obstetric patients are relatively young and the physiological alteration in pregnancy causes higher scores in the absence of any pathology. So, such scores are not useful in obstetric practice¹⁰. We noted that majority of the patients were from age group of 21-25 years (52 %) with a mean age of 24.43 years. Sharma *et al.* in their study noted 45.58% patients from age group 21-25 years¹¹. The commonest gestational age was 37-40 weeks (40 %), followed by puerperal patients (24 %) and 35-36 weeks (15%). Major obstetric complications are commonly during or immediately after delivery i.e. in term and puerperal patients. Apart from postpartum hemorrhage and high-risk ANC patients (severe preeclampsia, heart disease, HELLP syndrome), delivery in the presence of medical or obstetric complication can be a potential risk factor for ICU admission. 24 % patients were referred post-partum for conditions such as postpartum hemorrhage, complications during cesarean section, disseminated intravascular coagulation. HELLP

syndrome, severe preeclampsia, eclampsia, other medical disorders such as heart disease, uncontrolled diabetes, etc. Naturally unsupervised deliveries, traditional approaches during birth, failure to use of uterotonics and underlying anemia continue to make PPH responsible for almost 28% of maternal mortality in India. It has been observed that anemia and poor nutrition contribute to the risk of hemodynamic compromise arising from blood loss during delivery and this increases the maternal morbidity. Regarding hypertensive patients requiring HDU care, the probable reasons appeared to be lack of timely diagnosis and inappropriate management coupled with ignorance of life-threatening complications like HELLP and eclampsia⁶. Majority of admission in ICU were postpartum (64%). Antenatal admissions were 27 %. Post-partum hemorrhage, infections and medical disorders were common causes. Most studies reported postpartum admissions as the majority¹² while some studies have reported a majority of antepartum admissions^{13,14}. We noted that the associated medical disorders contributed to 77% of the antepartum admissions while obstetric disorders comprised 76% in the postpartum period. These observations are comparable to an earlier study by Karnad *et al.*¹⁵ We noted 71 maternal deaths in 182 ICU admitted obstetric patients (39%). Mortality in this study high compared to other studies done in India^{16,17,18}. The commonest causes of maternal mortality were multiorgan dysfunction syndrome (27 %), sepsis (18 %), pulmonary thromboembolism (13 %) and hemorrhagic shock (11 %). Multiorgan dysfunction has been reported as the commonest cause of mortality in some studies¹⁹. Irrespective of the primary disease, multiorgan failure commonly occurs in pregnancy as an end result¹⁵. According to Lueng *et al* who did a 10-year retrospective review, major obstetric hemorrhage 18 (27.7%) and pregnancy-related hypertension with its complications 17 (26.2%) were the two main primary diagnoses at the time of admission. Both are associated with increased risk of

maternal morbidity and mortality. The mortality rate was found to be higher in the hemorrhage group (44.4%) as compared to the hypertension group (35.2%). Early detection and timely appropriate intervention might avoid or minimize the effects of such complications. Among patients with obstetric hemorrhage, majority had postpartum as compared to antepartum hemorrhage. Knowledge of characteristics and outcome of disease involving this group of patients is the first step towards achieving prevention and reduction of maternal morbidity and mortality²⁰.

CONCLUSION

Accessibility and comprehensiveness of obstetric care along with triaging and ICU care can improve maternal outcome. Availability, early admission and appropriate management of critical obstetrical patients to the ICU decreases maternal morbidity and mortality.

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