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ORIGINAL RESEARCH

Study of clinical course, outcome and causes of mortality among obstetric patients admitted to post anaesthesia care unit at a tertiary hospital

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ABSTRACT

Background: Present study was aimed to study clinical course, outcome and causes of mortality among obstetric patients admitted to post anaesthesia care unit at a tertiary hospital. **Material and Methods:** Present study was hospital based prospective observational study, conducted in obstetric patients (antepartum beyond 20 weeks of pregnancy up to 6 weeks of postpartum) who undergone surgical intervention and needs PACU admission. **Results:** Majority of the patients were in the age group of 21-25 years (52.4%), mean age of the patients was 24.68 ± 3.82 years. The mean duration of ICU stay was 5.31±2.25 days in our study. The mean SAPS II score was 55.26±18.52. The most common indication for post anesthesia care unit (PACU) admission was hemorrhage (36.2%) followed by hypertensive disorder of pregnancy (31.4%) & cardiovascular diseases (17.1%). The clinical course of management included mechanical ventilation (73.3%), inotropes for (44.8%), transfusion of blood and blood products and ICU intervention (27.6%). 77 (73.3%) patients were discharged while 28 (26.7%) patients died in our study. The main cause of maternal death was Multi-organ Dysfunction Syndrome (MODS) (68.1%), followed by Disseminated Intravascular Coagulation (DIC) (17.6%), cardiorespiratory arrest (10.7%) and septic shock (3.6%). The Duration of ICU Stay (5.83 ± 1.98 days vs. 3.89 ± 2.39 days; $p<0.05$) SAPS II Score (63.09 ± 14.57 vs. 33.71 ± 8.18; $p<0.05$) was significantly higher in discharged patients compared to died patients. The requirement of inotropes (28.6% vs. 89.3%; $p<0.05$) and transfusion of blood and blood products (19.5% vs. 60.7%; $p<0.05$) was significantly lower in discharged patients compared to died patients. **Conclusion:** Full adoption of safe motherhood initiative that is close observation of pregnancy, improvement in antenatal care, early identification of complications, outlining protocols for admission to ICU will be a major step to decrease maternal morbidity as well as mortality.

Keywords: obstetric patient, mortality among obstetric post anaesthesia care unit, safe motherhood initiative

INTRODUCTION

Although postpartum critically ill obstetric patients are often admitted to the intensive care unit (ICU), the necessity of this practice is doubted.[1] Instead, the high- dependency unit has emerged as an alternative facility.[2,3] However, establishing such a unit in a hospital where intensive care facilities already exist may also prove unnecessary.[4] In view of the increasing need for intensive care, optimal utilization of intensive care facilities should be pursued.

The post-anaesthesia care unit (PACU) may represent a suitable alternative to the high dependency unit, since the characteristics of high-risk postpartum obstetric patients usually allow early recovery if optimal monitoring and medical treatment are readily applied.[1] The post anaesthetic care unit (PACU) provides postoperative high-dependency or intensive care for high-risk surgical patients in an area separate from the general intensive care unit (ICU).

A number of risk prediction models have been developed for outpatients, hospitalized patients, and those who are critically ill. The simplified acute physiology score (SAPS),[5] acute physiology and chronic health evaluation score (APACHE I, II, III, IV), the mortality prediction model (MPM)[6] and sequential organ failure assessment (SOFA) scores[7]

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were originally designed to predict mortality in a general adult intensive care unit (ICU) population. Present study was aimed to study clinical course, outcome and causes of mortality among obstetric patients admitted to post anaesthesia care unit at a tertiary hospital.

MATERIAL AND METHODS

Present study was hospital based prospective observational study, conducted in department of anaesthesiology, at XXX medical college & hospital, XXX, India. Study duration was of 3 years (July 2018 to June 2021). Study was approved by institutional ethical committee.

Inclusion criteria

- Obstetric patients (antepartum beyond 20 weeks of pregnancy up to 6 weeks of postpartum) who undergone surgical intervention and needs PACU admission, relatives willing to participate in present study

Exclusion criteria

- Age of the patient 15 years or less.
- No consent

Study was explained to relatives in local language & written informed consent was taken. Once the patients were enrolled for the study, a thorough history and physical examination was done as per proforma.

The study evaluated indications for transfer of these obstetric patients to PACU. Simultaneously evaluation of these obstetric patients was done in terms of clinical course outcome and cause of mortality by using preformed proforma. Outcome was noted as patients survived or not. Clinical course included management strategies like need of Mechanical ventilation, Inotropic support, ICU intervention, Need of blood and blood product transfusion, etc. Cause of mortality in case of death of patient was noted. Utilization rate of PACU by obstetric patient was calculated at the end of study. For this total no. of patients of all other surgical departments admitted in PACU during study period were noted. Prediction of mortality (30-day mortality) was done by using SAPS II score.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi- square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

RESULTS

A hospital based prospective, observational study was conducted with 105 patients to evaluate indications and outcome of obstetric admissions to post anaesthesia care unit. Majority of the patients were in the age group of 21-25 years (52.4%), mean age of the patients was 24.68 ± 3.82 years. Majority of the patients were primigravida (55.2%) while 47 (44.8%) patients were multigravida. 16 (15.2%) patients were direct admissions while 89 (84.8%) patients were referred from other hospitals/health centers. Delivery route was Caesarean Section in 61 (58.1%) patients and Normal Vaginal Delivery was performed in 44 (41.9%) patients. The mean duration of ICU stay was 5.31±2.25 days in our study. The mean SAPS II score was 55.26±18.52.

Table 1: General characteristics

Characteristics	No. of patients (n=105)	Percentage
Age group (in years)		
18-20	13	12.4%
21-25	55	52.4%
26-30	31	29.5%
>30	6	5.7%
Mean Age (in years)	24.68 ± 3.82	
Gravida		
Primigravida	58	55.2%
Multigravida	47	44.8%
Booking Status		
Direct	16	15.2%
Referral	89	84.8%
Mode of Delivery		
Caesarean Section	61	58.1%
Normal Vaginal Delivery	44	41.9%
Mean duration of ICU stay (days)	5.31 ± 2.25	
mean SAPS II score was	55.26 ± 18.52	

The most common indication for post anesthesia care unit (PACU) admission was hemorrhage (36.2%) followed by hypertensive disorder of pregnancy (31.4%), cardiovascular diseases (17.1%), endocrinal disease

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(10.5%) and neurological disease (4.8%).

Table 2: Distribution of patients according to Indications for PACU admission

Indication for PACU admission	No. of patients (n=105)	Percentage
Hemorrhage	38	36.2%
Hypertensive disorders in pregnancy	33	31.4%
Cardiovascular diseases	18	17.1%
Endocrinal disease	11	10.5%
Neurological disease	5	4.8%

The clinical course of management included mechanical ventilation (73.3%), inotropes for (44.8%), transfusion of blood and blood products and ICU intervention (27.6%).

Table 3: Distribution of patients according to Clinical course of management

Clinical course of management	No. of patients (n=105)	Percentage
Mechanical ventilation	77	73.3%
Inotropes	47	44.8%
Blood and blood products	32	30.5%
ICU Intervention	29	27.6%

77 (73.3%) patients were discharged while 28 (26.7%) patients died in our study.

Table 4: Distribution of patients according to Outcome

Outcome	No. of patients (n=105)	Percentage
Discharged	77	73.3%
Died	28	26.7%

The main cause of maternal death was Multi-organ Dysfunction Syndrome (MODS) (68.1%), followed by Disseminated Intravascular Coagulation (DIC) (17.6%), cardiorespiratory arrest (10.7%) and septic shock (3.6%).

Table 5: Distribution of (n=28) patients according to Causes of Maternal Mortality

Causes of Maternal Mortality	No. of patients (n=28)	Percentage
Multi-organ Dysfunction Syndrome (MODS)	19	68.1%
Disseminated Intravascular Coagulation (DIC)	5	17.6%
Cardiorespiratory arrest	3	10.7%
Septic shock	1	3.6%

The mean age of discharged and died patients was comparable (24.58 ± 3.97 years vs. 24.93 ± 3.43 years; $p>0.05$) and there was comparable primigravida (59.8% vs. 42.9%) and multigravida (40.2% vs. 57.1%) patients. There was significantly higher number of booked patients (19.5% vs. 3.6%; $p<0.05$) and caesarean section delivery (66.2% vs. 35.7%) in discharged patients compared to died patients. The Duration of ICU Stay (5.83 ± 1.98 days vs. 3.89 ± 2.39 days; $p<0.05$) SAPS II Score (63.09 ± 14.57 vs. 33.71 ± 8.18; $p<0.05$) was significantly higher in discharged patients compared to died patients. The requirement of inotropes (28.6% vs. 89.3%; $p<0.05$) and transfusion of blood and blood products (19.5% vs. 60.7%; $p<0.05$) was significantly lower in discharged patients compared to died patients.

Table 6: Comparison of patients with and without arrhythmia post CABG

Parameters	Discharged (n=77)		Died (n=28)		P Value
	N	%	N	%	
Age (years)	24.58 ± 3.97		24.93 ± 3.43		>0.05
Gravida					
Primigravida	46	59.8%	12	42.9%	>0.05
Multigravida	31	40.2%	16	57.1%	
Booking Status					
Direct	15	19.5%	1	3.6%	<0.05
Referral	62	80.5%	27	96.4%	
Mode of Delivery					

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Caesarean Section	51	66.2%	10	35.7%	
Normal Vaginal Delivery	26	33.8%	18	64.3%	<0.05
Duration of ICU Stay	5.83 ± 1.98		3.89 ± 2.39		<0.05
SAPS II Score	63.09 ± 14.57		33.71 ± 8.18		<0.05
Clinical course of management					
Mechanical ventilation	58	75.3%	19	67.9%	>0.05
Inotropes	22	28.6%	25	89.3%	<0.05
Blood and blood products	15	19.5%	17	60.7%	<0.05
ICU Intervention	26	33.8%	3	10.7%	>0.05

DISCUSSION

A hospital based prospective, observational study was conducted with 105 patients to evaluate indications and outcome of obstetric admissions to post anaesthesia care unit. Though pregnancy and labor are considered a physiological process the potential for catastrophic complications is constant and may develop in a matter of minutes.

In the present study, majority of the patients (52.4%) were in the age group of 21-25 years & mean age of the patients was 24.68 ± 3.82 years. This is similar to the studies of Harde M *et al.*,[8] Gombar S *et al.*,[9] and Khergade M *et al.*,[10] In our study, majority of the patients were primigravida (55.2%) while 47 (44.8%) patients were multigravida. This is comparable to the studies of GombarS*et al.*,[9] and HardeM*et al.*,[8]GombarS*et al.*,[9] study showed out of all admissions, 82 (54.3%) women were primigravida. It was observed in our study that the mean duration of ICU stay was 5.31±2.25 days in our study. This is in concordance to the studies of HardeM*et al.*[101] (3.34 ± 3.511 days)., Bhadade R *et al.*,[11] and Gombar S *et al.*,[9] In the present study, the mean SAPS II score was 55.26±18.52. Accurate predictive scores in the PACU guide in providing aggressive management in those predicted for a poor outcome and also lead to better productive utilization of the limited resources. HardeM*et al.*,[8] found that observed mortality was 6.557%, which was lower than predicted mortality (15.6%) by APACHE II score.

It has been observed that when obstetric patients are admitted for medical disorders, the predicted mortality rate (PMR) correlates with the observed mortality rate (OMR). However, in patients with obstetric disorders, the OMR is much lower than the PMR. This overestimation of the risk could be attributed to reversibility of certain obstetric pathologies like preeclampsia and hemorrhage if there is effective and timely management.

GombarS*et al.*,[9] retrospective study reported SAPS II score was 62 (55-68) versus 34.00 (28-46) in non-survivor and survivor women, respectively. Togal T *et al.*,[12] study on Obstetric admissions to the intensive care reported SAPS II score system accurately predicted data of ICU admissions with almost 100% sensitivity as the average SAPS II score was 44.56 ± 16.88. This was probably because SAPS II score underestimated mortality at low score and accurately predicted mortality with higher score.

In our study, the most common indication for post anesthesia care unit (PACU) admission was hemorrhage (36.2%) followed by hypertensive disorder of pregnancy (31.4%), cardiovascular diseases (17.1%), endocrinal disease (10.5%) and neurological disease (4.8%). Harde M *et al.*,[8] Gombar S *et al.*,[9] and Khergade M *et al.*,[10] noted similar observations in their studies.

Clinical recognition of the unique needs of the critically ill obstetric patients have received much attention in an attempt to assess the need for dedicated critical care facilities.[13] The provision of maternal intensive care varies considerably worldwide with very few obstetric units having an ICU located within the labor and maternity ward.[13, 14]

Although obstetric hemorrhage is the significant cause for ICU admission, early surgical intervention, systemic use of oxytocin, appropriate fluid replacement, blood transfusions, and correction of coagulopathies possibly contributed to a better outcome. GombarS*et al.*,[9] retrospective study observed common indications of ICU admissions were hypertensive disease of pregnancy 51 (33.77%), sepsis 41 (27.15%), and hemorrhage during pregnancy 37 (24.50%). However, ICU admission of 41 (27.15%) women with puerperal sepsis and/ or infection on admission with coexisting conditions.

KhergadeM*et al.*,[10] observed that indications directly related to complications of pregnancy represented the most frequent causes of OCCU admission such as hemorrhagic conditions (20%), followed by sepsis (18.8%) (puerperal sepsis 16%, septic abortions 2.8%), and hypertensive disorders (15.6%). It is noteworthy that anemia contributed to as many as 17.6% of the OCCU admissions.

It was observed in the present study that the clinical course of management included mechanical ventilation in 77 (73.3%) patients, inotropes for 47 (44.8%) patients, transfusion of blood and blood products in 32 (30.5%) patients and ICU intervention in 29 (27.6%) patients. This finding was consistent with the studies of HardeM*et al.*,[8]Munnur U *et al.*,[15] and Devabhaktuni P *et al.*,[16]

HardeM*et al.*,[8] prospective observational study observed thirty-one (50.8%) patients required packed red blood cells (packed cells [PC]) and fresh frozen plasma (FFP) transfusion and 13 patients required platelet transfusion (21.3%) and the difference in total transfusions between survivors and non-survivors was not significant.

Reasons for ICU admission of obstetric patients can

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be categorized into one of the following groups: Conditions related to pregnancy-hypertensive disorders of pregnancy, hemorrhage, aspiration syndromes, amniotic fluid embolus, acute fatty liver, infections etc.; Medical diseases that may be aggravated during pregnancy- congenital heart diseases, rheumatic and non-rheumatic valvular diseases, cardiomyopathy, pulmonary hypertension, anemia, renal failure etc.[17]

In the present study, the main cause of maternal death was Multi-organ Dysfunction Syndrome (MODS) (68.1%) followed by Disseminated Intravascular Coagulation (DIC) (17.6%), cardiorespiratory arrest (10.7%) and septic shock (3.6%). This is similar to the studies of Harde M *et al.*,[8] Gombar S *et al.*,[9] and Khergade M *et al.*,[10]

No efforts should be spared in the management of critically ill obstetric patients because their outcomes are often much better than expected from the initial severity of illness. Low socioeconomic status, suboptimal medical care, lack of education, and myths regarding antenatal checkup may contribute to increased maternal morbidity and mortality. Measures regarding maternal awareness, curbing suboptimal medical care, and early referral is required to safeguard these women who are otherwise healthy individuals.

CONCLUSION

Full adoption of safe motherhood initiative that is close observation of pregnancy, improvement in antenatal care, early identification of complications, outlining protocols for admission to ICU as well as for management of severe hypertension, hemorrhage and common comorbid conditions and prompt intensive care will be a major step to decrease maternal morbidity as well as mortality. It is preferable to closely monitor for a few hours a high-risk obstetric patient with an uneventful delivery rather than manage complications that could have been prevented.

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