

# PATTERN AND OUTCOME OF OBSTETRIC ADMISSIONS TO THE SURGICAL INTENSIVE CARE UNIT – A TEN YEARS STUDY

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## ABSTRACT

*Objective* To identify characteristics, indications for admission, interventions and outcome of critically ill obstetric patients admitted to the Surgical Intensive Care Unit (SICU).

*Study design* Retrospective descriptive study.

*Place & Duration of study* Surgical Intensive Care Unit (SICU) of Jinnah Postgraduate Medical Centre, Karachi, from February 2000 to January 2010.

*Methodology* The data of consecutive obstetric patients admitted to SICU was reviewed. The characteristics, indications for admission, intervention and outcome were assessed. The data related to demographics, obstetric history, pre-existing medical problems, indications for SICU admission, intervention required, length of stay and outcome of SICU admission were collected by retrospective review of medical records. Statistical analysis was done using SPSS software.

*Results* A total of 152 obstetric patients required SICU admission. The total number of admissions into Surgical Intensive Care Unit was 152/4500 for ten years. This accounts for 3.4% of all SICU admissions. Most patients were young (median age of 28.5 years  $\pm$ 6.1) and stayed in SICU for an average of 4.61 days. Fifty-eight (38.2%) patients were admitted because of haemorrhagic disorders including postpartum haemorrhage – PPH (17.76%), antepartum haemorrhage – APH (7.89%), ruptured uterus (12.5%), ruptured ectopic pregnancy (1.32%). The hypertensive disorder of pregnancy was found in 55 (36.2%) patients including pregnancy induced hypertension – PIH (34.21%), eclampsia (26.9%), severe pre-eclampsia (4.61%), HELLP syndrome (5.26%), and cerebrovascular accident – CVA (3.29%). Ventilatory support was required in 88.16% (n 134) patients. In majority of patients, direct arterial (88.82%) and central venous pressure monitoring (68.42%) was carried out. Inotropic support was given to 50% of patients.

*Conclusions* The two most common indications were obstetric haemorrhages and hypertensive disorders of pregnancy. Appropriate antenatal care is important in preventing obstetric complications.

*Key words* Obstetrics- emergencies, Critical illness-obstetrics, Assisted ventilation.

## INTRODUCTION:

Management of critically ill obstetric patients in intensive care unit is a challenge. Such patients are usually young, of child bearing age and mostly healthy. Maternal mortality and morbidity are

important quality assurance indicators.<sup>1</sup> Pregnancy, delivery and puerperium can be complicated by severe maternal morbidity necessitating Intensive Care Unit (ICU) admission. Management of the critically ill obstetric patient is very complex and requires cooperation of obstetricians and intensivists/anaesthetists.<sup>2</sup>

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According to the World Health Organization (WHO), “there is a story behind every maternal death or life threatening complication, and understanding the lessons to be learnt can help to avoid such

outcomes.”<sup>3</sup> Although obstetric patients form a significant proportion of ICU admissions in developing countries,<sup>4,5</sup> there are only very few studies from these countries reporting on critical illnesses in pregnancy.<sup>6,7,8</sup> The primary objective of the present study was to evaluate the characteristics and outcome of the obstetric admissions to our SICU in the setting of a tertiary care hospital.

#### **METHODOLOGY:**

This was a retrospective descriptive study of consecutive obstetric patients admitted to the SICU of Jinnah Postgraduate Medical Centre (JPMC), Karachi over a 10 years period from February 2000 to January 2010. JPMC is a tertiary care teaching hospital. Surgical ICU is seven bedded, multidisciplinary facility, admitting 400-450 patients on an average, per year. Obstetric admissions were identified using the computerized database of Medical Record & Statistical Section (MRSS). The protocol was approved by the ethics committee of the hospital.

Data retrieved contained age, parity, co-morbidities, obstetric history, mode of delivery, vital signs and Glasgow coma scale (GCS) on admission to the ICU. Patients' disease severity was measured by Simplified Acute Physiology Score (SAPS II).<sup>9</sup> Other data retrieved for each patient pertaining to ICU interventions were: mechanical ventilation, use of central or arterial lines, blood products/transfusions, haemodialysis, radiological examinations, antihypertensive treatment, inotropic support, and use of magnesium sulphate. Other information retrieved was length of ICU stay and outcomes of patients.

The data was analyzed on SPSS version 13.0. The qualitative variables are presented by their frequencies along with percentage. The quantitative variables (scales measurements) are presented by their mean SD values. The mean difference in SAPS II between survival and expired was compared by Student's t test.

#### **RESULTS:**

During 10 years period a total of 152 obstetric patients were admitted through referral from Obstetrics and Gynaecology Departments of JPMC, representing 3.4% of total ICU admissions. The median ICU stay was 2 days (SD 7.589). The baseline characteristics of 152 patients are shown in table I. The mean age of the patients was 28.5 years (SD 6.1) years. Most of the patients were admitted in the postpartum period. The most common mode of delivery was emergency

caesarean section. Major obstetric haemorrhages (n=58, 38.2%) and hypertensive disorders of pregnancy (n=55, 36.2%) were the most common cause of admission. Table II shows the diagnoses for Intensive Care Unit admissions.

PPH (n=27, 17.76%) was the most common indication among haemorrhages; most common underlying cause of PPH being placenta previa. Other haemorrhagic indications were uterine rupture (n=19, 12.5%), APH and abruptio placentae (n=12, 7.89%).

Hysterectomies were carried out in ten patients where bleeding could not be controlled. Pregnancy induced hypertension was seen in 34.2% patients. Seven (4.61%) patients presented with severe pre-eclampsia and 41 (26.97%) patients had eclampsia. Eight (5.26%) patients were diagnosed as HELLP syndrome (had associated haemolysis, elevated liver enzymes and low platelet count). Another 36.2% patients had hypertensive disorders of pregnancy and among these 58% patients died. They were admitted with severe eclampsia and respiratory failure and required ventilatory support. Five of these patients had suffered intracranial haemorrhage.

Seventeen (11.18%) patients presented with complication like disseminated intravascular coagulation (DIC) and one (0.66%) patient with peripartum cardiomyopathy. Twelve (7.9%) patients were admitted with surgical complications like intestinal perforation, acute renal failure and burst abdomen. There were 38 (25.0%) cases of sepsis-related and/or sepsis. Ten (6.58%) cases presented with septic abortion and 25 (16.45%) with puerperal sepsis. One patient presented with chorioamnionitis and two with wound infection. Four (2.63%) patients were admitted to the ICU due to anaesthetic complications. All of them had delayed recovery after general anaesthesia.

Majority of the patients had more than one reason for ICU admission. The mean SAPS II was significantly higher  $39.45 \pm 4.5$  vs  $19.77 \pm 3.6$  ( $p=0.001$ ,  $t=22.34$ ) in those who died, compared to survivors. Anaemia (haemoglobin < 7.0 gm/dl) was found in 38.8% of patients.

Invasive mechanical ventilation was needed in 123 (80.92%) women. Mean duration of mechanical ventilation was 4 days. Ninety one (74.0%) of mechanically ventilated patients expired. Inotropic support was given in 76 (50%) and renal dialysis used in 9 (5.92%) patients. Arterial line was inserted

in 135 (88.82%) and central venous catheter in 104 (68.42%) patients. 64% patients received blood and blood products.

A total of 104 (68.4%) patients died. This represents 51% of 295 total maternal deaths during the same period (Database of MRSS). Prenatal care was an important predictor of outcome. There were 57/81

deaths (70.4%) who had not received prenatal care and 17/25 deaths (68%) who received prenatal care. The mortality was independent of prenatal care when tested by Fisher's exact test (F=0.05, p=0.88)

**DISCUSSION:**

Obstetric patients admitted to ICU in present study accounts for a small proportion of total admissions.

**Table I: Characteristics of Women in the Study**

<b>Age (years)</b>	28.5 ± 6.1 (15 - 42)	
<b>Medical history</b>	15 (9.87 %)	
Diabetes mellitus	2 (1.32%)	
Cardiac disease	3 (1.97%)	
Anaemic failure	59 (38.8 %)	
Cerebral malaria	5 (3.28 %)	
Hepatitis B	3 (1.97 %)	
Pulmonary tuberculosis	3 (1.97 %)	
Sepsis	1 (0.66 %)	
Severe anaemia	1 (0.66 %)	
<b>Pregnancy related history</b>		
Gravidity	3.05 ± 2.7 (1 - 11)	
Parity	3.96 ± 2.4 (0 - 10)	
Weeks of gestation	33.1 ± 7.06 (1 - 41)	
<b>Antenatal care</b>		
Booked case	24 (15.8 %)	
Un-booked case	128 (84.2 %)	
<b>Mode of delivery</b>		
Emergency caesarean section	51 (33.55 %)	
Elective caesarean section	2 (1.3 %)	
Instrument assisted	11 (7.23 %)	
Normal vaginal delivery (include 05 home deliveries)	46 (30.26 %)	
<b>Time of admission</b>		
Antepartum	110 (72.4 %)	
Postpartum	42 (27.6 %)	
<b>Mode of admission</b>		
Elective admission	2 (1.3 %)	
Emergency admissions	150 (98.7 %)	
<b>SAPS II</b>	33.24 ± 10.6 ( 13 - 48)	
SAP score of survival (n=48)	19.77 ± 3.6	t=22.34
SAP score of expired (n=104)	39.45 ± 4.5	p=0.001
<b>Outcome</b>		
Survival	48 (31.6%)	
Expired	104 (68.4 %)	
<b>Length of ICU stay (days)</b>	4.6 ± 7.5 ( 1-43) Median 2 days	

**Table II: Main cause of admission in ICU**

Hypertensive disorders of pregnancy	55 (36.2%)
Pregnancy induced hypertension	52 (34.2 %)
Eclampsia	41 (26.9%)
HELLP syndrome	8 (5.26 %)
Severe pre-eclampsia	7 (4.61 %)
Cerebro vascular accident	5 (3.29 %)
<b>Haemorrhages</b>	<b>58 (38.2%)</b>
Immediate postpartum (PPH)	27 (17.7 %)
Uterine rupture	19 (12.5 %)
Antepartum haemorrhages (APH)	12 (7.89 %)
Ruptured ectopic pregnancy	2 (1.32 %)
<b>Embolisms</b>	
Amniotic fluid embolism	0 (0 %)
Pulmonary embolism	0 (0 %)
<b>Sepsis/Sepsis related</b>	<b>38 (25.0%)</b>
Puerperal sepsis	25 (16.45 %)
Septic abortion	10 (6.58 %)
Wound infection	2 (1.32 %)
Chorioaminonitis	1 (0.66 %)
Septicemia during labor	0 (0 %)
UTI/RTI	15 (9.8 %)
<b>Surgical complications</b>	<b>12 (7.9%)</b>
ARF	6 (3.49 %)
Intestinal perforation	5 (3.29 %)
Burst abdomen	1 (0.65 %)
Peritonitis	0 (0 %)
DIC	17 (11.18 %)
Anaesthetic complication	4 (2.63 %)

Patients were of younger age group with haemorrhages as the leading cause. The reported frequency in literature ranged from 16-53%.<sup>1,9-16</sup> Postpartum haemorrhage due to uterine atony in multiparous women was common. The admission rate for pregnancy induced hypertensive disorders in this study is also comparable with some published studies reporting a frequency of 14-50%.<sup>17-20</sup> Puerperal sepsis was the third common diagnosis. Prolonged labour and neglect appeared to be the root cause. There were 10 cases of septic abortion. Majority of them developed multiorgan failure and died.

Cerebral malaria accounted for five of our ICU admissions. In women residing in areas where falciparum malaria is endemic, the normal change

of the immune response to a predominant TH<sub>2</sub> type during pregnancy, results in loss of acquired immunity against plasmodium falciparum,<sup>21</sup> hence malaria tends to be more severe in pregnant women and mortality may be as high as 25%.<sup>22</sup> Renal failure in this series was due to a combination of pre-eclampsia, disseminated intravascular coagulation, postpartum haemorrhage and shock.

Bacterial sepsis and disseminated intravascular coagulation due to obstetric disorders were responsible for most cases of haematological failure. Community acquired pneumonia due to abdominal sepsis was the common cause of respiratory failure. Majority of them developed multiorgan failure and died. Provision of clean and safe delivery services can decrease infection related morbidity and mortality in almost 83% of deliveries that take place at home by untrained traditional birth attendants.<sup>23</sup> Cardiovascular failure occurred due to obstetric haemorrhages and severe anaemia. In one patient it was due to peripartum cardiomyopathy.

A total of 123 (80.92%) patients received invasive mechanical ventilation which was the most common reason for transfer to ICU. This ventilatory support was required mostly in patients suffering from eclampsia. This finding is consistent with the study of Bhagwanjee S et al, who reported respiratory failure as the commonest organ failure in eclamptic patients.<sup>5</sup>

There is a marked difference in mortality in this study as compared to developed world due to several reasons. Most (84.2 %) of the patients in this study did not attend prenatal clinics and were un-booked. Poor socioeconomic conditions also contribute to the outcome. According to Pakistan Reproductive Health and Family Planning Survey 2000-01, 59.5% of rural women did not receive pre-natal care and 86.5% delivered at home by untrained birth attendants.<sup>24</sup> Munner et al reported marked differences in medical diseases, organ failure and intensive care needs between a developed and a developing country.<sup>14</sup> He has identified how medical and obstetric disorders and their outcomes were affected by social customs, traditions, economics and patterns of endemic infections.

#### **CONCLUSION:**

Haemorrhage and pregnancy induced hypertensive disorders followed by sepsis were major reasons for admission to SICU. The mean SAPS II was significantly higher in those patients who died compared to survivors.

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