

Maternal Admission to ICU: An Experience in a Tertiary Care Hospital of Kashmir Valley

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Abstract: *Obstetric patients get admitted to the ICU approximately at 0.1 -0.9% times of all deliveries. Knowledge of diseases affecting these patients and their outcome is essential for better care. This study aims at evaluating the occurrence, indications, course, interventions and outcome of obstetric patients admitted to the ICU of a tertiary care hospital.*

Keywords: ICU, Post partum hemorrhage, Mechanical ventilation, Blood and blood products

1. Introduction

Management of critically ill obstetric women at an ICU is a challenge to both physicians and obstetricians. Obstetric patients get admitted to the ICU approximately at 0.1 -0.9% times of all deliveries [1, 2, 3, 4]. Overall maternal death rate in the ICU varies from 3.4-21% [5, 6,7,8]. While most pregnant women requiring intensive care survive, many sustain considerable morbidity and represent Near miss Mortality [9,10]. 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 mortality [11]. This study attempts at evaluating the occurrence, indications, course, interventions and outcome of obstetric patients admitted to the ICU of a tertiary care hospital over a period of 2 ½ years from March 2013 to August 2015. Both Obstetric and Non obstetric causes and the impact of antenatal care on ICU admissions were assessed.

2. Materials and Methods

Lalla Ded Hospital, an associated hospital of the Government Medical College, Srinagar, is the only tertiary care Obstetrics and Gynaecology Hospital in the Kashmir valley. It caters to approx 20,000-25,000 deliveries annually, receiving referral from all the other hospitals of the valley. Critically ill women, either before or after delivery are cared for in this hospital. It has one ICU with facilities for intubation, ventilation, CVP monitoring and establishment of arterial lines, but for invasive radiological procedures and major arterial emboliation CT angio / VQ scan the patients have to be shifted to the Sri Maharaja Hari Singh (SMHS) hospital, which is having all the above facilities.

This was a retrospective hospital based study conducted for a period of 2 ½ years from March 2013 to August 2015. All pregnant women admitted to the hospital (antenatal and postnatal upto 6 weeks) were included in the study. The number of above women who needed ICU admission was noted. The demographic details, indications for ICU admission, any inadequacy of antenatal care, co-morbidities, obstetric features (ante partum history, gestational age, antenatal abnormalities, mode of delivery, vital signs and

other pregnancy complications) were noted on admission to the ICU. The causes of admission to ICU were classified as Obstetric and Non-obstetric causes. Obstetric disorders were defined as pregnancy-related condition which occurred during pregnancy or within 42 days post partum period. Non-Obstetric conditions were defined as other medical or surgical conditions that were not pregnancy-related. For each patient data pertaining to ICU interventions like mechanical ventilation, use of blood and blood products, use of inotropes, anticonvulsants and antihypertensives were noted. In addition duration of stay in ICU and outcome including shifting for ward observation, shifting to SMHS hospital for further treatment and number of deaths were noted. Criteria for admission to the obstetric ICU are given in Table 3.1. No ICU scoring system like APACHE and SAPS were used because obstetric patients are relatively young and physiological alterations during pregnancy can cause higher scores because of any pathology. In general, most women with major complications are admitted to ICU. In addition women who are not deemed fit for observation in post operative ward are also observed in the ICU as we lack a dedicated functional HDU. Decisions for transfer and treatment are made by senior residents or faculty members depending upon the condition of the patients.

3. Tables

Table 3.1: Criteria for admission to obstetric ICU

- Severe Pre-eclampsia or eclampsia
- Severe Haemorrhage / coagulation disorders
- Peripartum hysterectomy
- Inversion uterus
- Acute fatty liver of pregnancy
- Sepsis
- Surgical or anesthesia complications
- Medical or Surgical disorders
- Diabetic ketoacidosis, Thyrotoxicosis
- Severe Asthma, Pneumonia, Complicated Cholecystitis
- Pancreatitis
- Mechanical ventilation
- Inotropic drugs
- Life threatening arrhythmia
- Coma

Table 3.2: Primary reason for ICU admission in 586 pregnant women

Diagnosis	Number (%)
Obstetric causes	471(80.37%)
Haemorrhage	187(31.9%)
APH	31 (5.2%)
PPH	142 (24.2%)
Ectopic pregnancies	14(2.3%)
Hypertensive Disorders	
Severe PE / Eclampsia	133 (22.6%)
Rupture Uterus	30 (5.1%)
Sepsis	17 (2.9%)
Post LSCS relaprotomy/hematoma	20 (3.4%)
Post LSCS for monitoring	67(11.4)
Obstructed Labour	5 (0.85%)
Post D&C Bleeding	12 (2.04%)
Non obstetric causes	115 (19.62%)
Heart Disease	36 (6.1%)
Respiratory Disease	23 (3.9%)
Anaemia	17 (2.9%)
Seizure Disorder	15 (2.55%)
Liver Disease	8 (1.5%)
Diabetes	8 (1.36%)
AIDP	4 (0.85%)
Pancreatitis	2 (0.34%)
Stroke	1 (0.17%)
Ileus	1 (0.17%)

Obstetric complications constituted almost 80.3% (471) of the admissions. Obstetric Hemorrhage and Hypertensive disorders were the most frequent complications (n=320, 67.9%) for which ICU care was required. Post partum hemorrhage accounted for 24.2% of the total admissions to ICU, but among all patients of obstetric hemorrhage it was responsible for 75.9% (n=142) of admissions to ICU.

Of the Non Obstetric complications (n=115, 19.62%), cardiopulmonary disease, anemia and seizure disorders (79.13%,n=91) were most commonly seen in women who were admitted for ICU care. Underlying Heart diseases were responsible for 31.3% (n=36) of the women admitted to ICU.

Among the 471 women with obstetric complications 89.17% (n=420), were admitted in postpartum period while of the 115 women with Non obstetric complications 69.56% (n=80) needed admission to ICU before delivery (Table 3.3).

Table 3.3: Time of admission in patient with obstetric complications and non obstetric complications

ICU Intervention	Number of Cases (%)
Mechanical ventilation	100(17.13%)
Blood and blood products	244(45.2%)
Inotropes	175(30%)
Antihypertensives	133(22.6%)
Anticonvulsants	80(13.8%)
only observation	67(11.43%)

Table 3.4: ICU Interventions performed

Time of admission	Obstetric complications n=471	Non obstetric complications n=115	Total ICU admissions n=586
Postnatal	420(89.17%)	35(30.43%)	455 (77.64%)
Antenatal	51(10.82%)	80(69.56%)	131 (22.35%)

As many women were admitted because of obstetric hemorrhage, rupture uterus and anemia, the most common ICU interventions were use of blood and blood products (n=244, 45.2%) and inotropes(n=175, 30%). Sixty-seven (11.43%) women were not well enough for ward observation and were admitted to ICU for observation. The majority of these patients had unexplained tachycardia after surgery and they were under observation in ICU for 8 hours on an average. Hundred women (17.13%) required mechanical ventilation and 25 (4.26%) were transferred to SMHS Hospital for further management. These women either needed dialysis or were shifted for the management of medical/ surgical co morbidities after delivery. The complications encountered during the ICU stay were as in Table 3.5

Table 3.5: Complications during ICU stay

Complications during ICU stay	Number of cases (%)
DIC	105(17.9%)
Acute Renal Failure	95 (16.2%)
ARDS	82 (13.9%)
Pulmonary Edema	40 (6.8%)
Hepatic Encephalopathy	05(0.8%)

Of the total number of women thirty (5.11%) expired. Among these twenty one (70%) died due to obstetric complications and seven (30%) died due to Non Obstetric complications. Among the women who died due to obstetric complications the commonest cause of death was irreversible shock following severe hemorrhage (n=19, 90.47%). The other two developed fulminant sepsis and succumbed to it. The seven women with Non Obstetric complications expired due to hepatic failure (n=4, 57.1%), cardiogenic shock due to uncorrected cyanotic heart disease (n=1, 14.2%), pancreatitis (n=1, 14.2%) and stroke (n=1, 14.2%). The rest of the women (n=526, 89.76%) were shifted back to the wards after their condition stabilized.

4. Discussion

During this study period obstetric admission to the ICU represented 0.9% of all deliveries. This is comparable with other studies in which an ICU admission of 0.5 to 0.9% of all deliveries has been observed (1, 2, 3, 4). The relatively higher admission rate in our study might be due to the lack of a functional HDU due to which patients not suitable for ward observation were transferred to the ICU. Only 22.35 % (n=131) of the admissions to the ICU were in the ante partum period, which is comparable to that observed in earlier studies (22.1% to 62.4%) (12,13). Obstetric complications accounted for the majority of ICU admissions (n= 471 ,80.37%) as compared to Non Obstetric conditions(n=115, 19.62%) . In a similar study Vasquez et al (13,14) also reported Obstetric complications to be a major cause of admission to ICU. However, while Obstetric complications contributed to 89.17 % (n=420) admissions in the post partum period, it was observed that Non Obstetric complications contributed to 69.56% (n= 80)of admissions in antenatal period. This is in agreement with the observations of an earlier study by Karnad et al in 2004 (15). Majority of the women who needed admission to the ICU were not booked at our hospital (n=549, 93.68%). Amongst the women booked at our hospital thirty seven (6.31%) needed

to be admitted to ICU. Most of these women had an antenatal diagnosis of Placenta praevia and had chosen to get antenatal care at a tertiary care facility. In a study conducted by Deepti Verma it was also observed that unbooked women may have more complications resulting in increased need for ICU care (16). As has been seen in earlier reports (12, 16) major obstetric hemorrhage (31.9 %) and pregnancy related hypertension with its complications (22.6%) are the two main conditions that necessitate ICU admission. Cardiac disorders contributed to 6.1% (n=36) of the antenatal admissions to ICU. This could be because better care of rheumatic heart disease means that more women with heart disease become pregnant. But it has been reported; women with heart disease are high risk for mortality during pregnancy and need multidisciplinary care (17). Blood and blood products were required in majority of cases (n=244, 45.2%) as has been seen in earlier studies (13). Most of the women had obstetric hemorrhage and needed blood transfusion and inotropic support till their condition stabilized. Mechanical ventilation was used in (n=100, 17.13%) of cases which is lesser than other studies(1,8,13). This could be because due to the lack of a functional HDU. 67 women (11.43%) were admitted in ICU for monitoring only, thus increasing the number of admissions where no ICU intervention was needed. The main complications encountered during ICU stay were Acute Renal Failure, Disseminated Intravascular Coagulation (DIC) and ARDS which is similar to other studies (13). Among Obstetric patients the death rate in our ICU was 5.11 % which is comparable to that reported in other studies (5, 6,7,8). The death rate was higher (70%) among patients admitted for Obstetric as compared to Non Obstetric conditions. The reason of death in majority of the women was Irreversible hypovolemic shock, similar to the study by Vasquez et al (14). Among the women who died majority (93.33%, n=28) were referred from peripheral hospitals. This high mortality rate can be explained because of late referral from peripheral centers.

5. Conclusions

The most common reasons for ICU admission in this study were Obstetric hemorrhage, Hypertension and its complications and Cardiac disorders in pregnancy. An analysis of the reasons for admission to ICU may help to modify the hospital practices and result in better care in the form of a multidisciplinary team approach which is mandatory in the case of obstetric emergencies. Timely referral, health education and training of health professionals may improve clinical outcome by early recognition of high risk pregnancies. Establishment of functional HDU may help in earlier admission of critically ill patients for better observation. It may also reduce the burden of admissions to ICU, as HDU can be used for observation of patients not fit for ward observation. Awareness should be created among the population regarding the importance of adequate antenatal care ,detection of danger signs of various obstetric complications and need for contacting medical facilities in case of emergency situations.

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