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Original Article

Critical care in obstetrics - scenario in a developing country

Yuel Veronica Irene[1], Kaur Vaneet[2], Kaur Gurvinder[3], Andappan Arun[4], Afzal Lalita[5].

[1] Lecturer, [2]Professor, [3]Resident, [4]Resident, [5]Professor

Department of Anaesthesiology, Christian Medical College and Hospital, Ludhiana (Punjab) 141 008.

Abstract

Objectives : To assess the maternal morbidity during pregnancy, delivery and postpartum period, needing hospitalization and admissions in intensive care unit (ICU), interventions required, and their outcome. *Methods :* During the three year period, from 1st July 2002 to 30th June 2005, 55 obstetric patients were admitted to the ICU. Cases were reviewed in detail including age, parity, reason for ICU admission, clinical features, response to interventions and maternal outcome. *Results :* Twenty-five antepartum, 27 postpartum, and three postabortal cases made up the total of 55 cases. Mean maternal age was 26.89±8 years, 29% were primigravidas and 71% multigravidas. The length of stay in the hospital ranged from 1 to 15 days. Severe anemia, postcesarean problems, puerperal sepsis, pregnancy induced hypertension, eclampsia, and cortical vein thrombosis were the main reasons for ICU admissions Renal failure, coagulopathy, and respiratory dysfunction were the main organ failures. All women required ventilatory support. Specialized interventions like dialysis, multiple transfusions of blood and blood products, and surgical interventions were also required. 43.63% (24/55) women died, most of them due to multi-organ dysfunction. *Conclusions :* Invasive hemodynamic monitoring and ventilatory support were the two main interventions. Improving quality of care before and after admission to ICU may reduce maternal morbidity.

Key words : critical care, obstetrics

Introduction

Pregnancy is often associated with serious illness and many women with acute organ failures require admission in the intensive care unit (ICU) [1]. It is estimated that approximately 0.07-0.8% of all pregnant women will develop conditions that would require admission to the ICU[2]. The maternal mortality rate reported from the ICUs, in the literature is around 21 per 100,000 deliveries, however, in the obstetric ICU, the admission rate is 25%.

Maternal mortality continues to be high in India and in other developing countries. In India 80,000 women lose their lives during their reproductive years with the maternal mortality reaching an appalling high figure of 437 deaths per 100,000 live births and many of these women require specialized care which cannot be provided in the general ward[3]. Care of these critically ill pregnant women presents a unique challenge while dealing with the disease and its therapy since two individuals with vastly different physiologies are simultaneously affected. There are also women who are at risk of developing multiorgan failure. Management of such women in a well-equipped ICU improves maternal survival, reducing the mortality to a considerable extent.

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Correspondence :
Dr. Veronica Irene Yuel
Department of Obstetrics and Gynecology
Lutheran General Hospital
Alcott Gardens
Rajahmundra (Andhra Pradesh) 533101.
Tel. 09985163592 Email : veron_irene05@yahoo.com

The present study was undertaken to review 3 years obstetric admissions to the intensive care unit and analyze the primary causes for admission, the clinical features, the interventions and the final outcome.

Methods

The present study was undertaken in the Department of Obstetrics and Gynecology. In this three-year retrospective study from 1st July 2002 to 31st June 2005, 55 women, who were admitted to the ICU during pregnancy, irrespective of gestation period, and within 42 days after delivery were included. Records of these cases were reviewed for details like age, parity, reasons for ICU admission, clinical features, organ failures, maternal outcome after ICU care, mortality, and reason for mortality.

Results of investigations including complete hemogram, blood grouping and typing, blood sugar, serology for syphilis, all viral markers, routine urine examination, ultrasonography, chest radiograph, coagulation profile, renal function tests, liver function tests, vaginal and cervical swabs etc. were studied.

Data thus obtained was analyzed.

Results

In three years there were 5093 obstetric admissions of which 55 (1.07%) women were admitted to the ICU. Of the 55 admissions, 35 (63.63%) were emergency referrals and 20 (36.37%) were booked with our hospital. 45.45% (25 women) were antepartum, 5.45% (3 women) had ruptured ectopic pregnancy and the rest were either postpartum or postabortal.

Mean maternal age was 26.89±8 years, the youngest being 19 and the eldest 42 years of age. Twenty-nine percent (16 women) were primigravidas (Table 1). Majority of the women who were admitted postpartum were delivered at home by dais.

The length of hospital stay ranged from 1 to 15 days; 40% patients stayed for 2 days, 15.2% for 3 days, 0.7% for 7 days and the rest for a fortnight.

Severe anemia was the commonest indication for ICU admission, being present in 38.18% (21 patients). 34.55% (19 women) were shifted to ICU following lower segment cesarean section. 30.9% (17 patients) were admitted with puerperal sepsis. Severe pregnancy induced hypertension / eclampsia was the reason in 21.82% (12 women). 16.36% (9 women) had cortical vein thrombosis. 12.73% (7 women) each were admitted for complications of intrauterine fetal death and hepatic encephalopathy. 9.09%. (5 patients) each had septic abortion and ectopic pregnancy (Table 2).

Table 1. Age and parity.

Age (Years)	Parity n=55				Total
	P0	P1	P2	P3	
<19	1				1
20-25	9	10	1	1	21
26-30	6	10	6	3	25
31-35	-	1	1	2	4
>35	-	1	1	2	4
Total	16	22	9	8	55

A significant number of women had associated organ dysfunction. Majority of patients i.e. 49% (27 patients) had renal failure. Coagulopathy and respiratory dysfunction were the next common dysfunctions seen. 9 patients (16.36%) had multiorgan failure (Table 3).

All the women admitted to the ICU required ventilatory support. Majority of them also required specialized interventions like dialysis, and multiple transfusions of blood and blood products. Twenty four women had surgical intervention - 14 had cesarean section before admission to ICU, five underwent exploratory laparotomy after admission to ICU - one for secondary PPH, one for abdominal hemorrhage following a hysterectomy performed outside for PPH and three for peritonitis following septic abortion. Another five underwent laparotomy for ruptured ectopic pregnancy and were postoperatively shifted to ICU for intensive care (Table 4).

Most of the maternal deaths in our study were due to multiorgan dysfunction. Sepsis was the next common cause of death followed by anemia. One patient died due to DIC. Three patients died due to direct causes like pulmonary embolism and acute fatty liver of pregnancy. Three women died due to medical disorders like cardiac disease, hypertension and pulmonary tuberculosis (Table 5).

Table 2. Primary cause for ICU admission.

Cause	No. of Patients	%
Severe anemia	21	38.18
After cesarean delivery	19	34.55
Puerperal sepsis	17	30.9
Severe pregnancy induced hypertension/eclampsia	12	21.82
Cortical vein thrombosis	9	16.36
Intrauterine fetal death	7	12.73
Hepatic encephalopathy	7	12.73
Septic abortion	5	9.09
Ectopic pregnancy	5	9.09
Postpartum hemorrhage	4	7.27
Abruptio placentae	4	7.27
Rupture uterus	3	5.45
Bronchopneumonia	3	5.45
Placenta previa	3	5.45
Seizure disorder	2	3.64
Pulmonary embolism	2	3.64
Heart disease	2	3.64
Pneumothorax	1	1.82
Portal hypertension	1	1.82

Table 3. Major Organ Dysfunction.

Organ dysfunction	Number	Percent
Renal	27	49
Coagulatory	9	16.36
Respiratory	9	16.36
Neurological	5	9.09
Cardiovascular	4	7.27
Hepatic	1	1.8
Multi-organ	9	16.36
Nil	11	20

Table 4. Treatment given in ICU.

Treatment	Number	Percent
Ventilatory support	55	100
Blood transfusion	40	72.72
Fresh frozen plasma transfusion	34	61.82
Dialysis	30	54.54
Platelets transfusion	15	27.27
Surgical intervention	24	43.64

Table 5. Primary cause of maternal death.

Cause of death	Number	Percent
MODS	9	16.36
Sepsis	4	7.27
Severe anemia	4	7.27
Other direct causes	3	5.45
Medical causes	3	5.45
Hemorrhage	1	1.8
Total	24	43.63

Discussion

The critical care aspects in obstetrics are varied and demand that critical care practitioners have a thorough knowledge of fetal and maternal changes in physiology as pregnancy progresses. Pregnancy can affect every organ-system and organ-specific conditions[4]. This study was therefore undertaken to review all critically ill obstetric patients for their presentation, diagnosis, organ failures, treatment, and mortality. Mean maternal age was 26.89±8 years, the youngest was 19 and the eldest 42 years of age. Sheela et al[5] have reported mean maternal age of 24 years, which is comparable to that in our study. Majority of women in our study were multigravidas similar to that reported by Sheela et al[5].

Severe anemia (38.18%), need for ventilation after cesarean section (34.55%), puerperal sepsis (30.9%), severe PIH or eclampsia (21.82%), cortical vein thrombosis (16.36%), IUFD and hepatic encephalopathy (12.73%) each, septic abortion and ruptured ectopic pregnancy (9.09%) each, and PPH and abruptio placentae (7.72%) each, were the common primary factors for admission to the ICU in our study. Other

studies have reported almost similar reasons for admission of obstetric patients to ICU[3,5-7].

A significant number of patients had associated organ dysfunction; renal failure being present in 49% (27 patients). Coagulopathy and respiratory dysfunction were the next common dysfunctions. 16.36% (9 patients) had Multi-organ Dysfunction (MODS). Maternal morbidity was much more than mortality and consisted of need for ventilatory support in all the cases, dialysis for majority of them, multiple transfusions of blood and blood products, and surgical interventions as per the indication. Various studies have also observed these organ dysfunctions requiring similar therapeutic measures[1,3,5,6].

The average duration of stay of patients in the ICU ranged from one day to 15 days. Baskett and Sternadel[8], have reported a mean stay of 13 days in the ICU.

The number of organs failed directly reflects on the mortality. As the number of organs failed increases so does the mortality. This is reflected in our study where all patients with MODS died, while mortality was less in women who had less number of organs involved. This is also highlighted in different studies[3,5].

Maternal mortality in our study was 43.63% which was high as compared to that reported from the developed countries[1,9]. This is because majority of our population belongs to the rural areas from where timely hospitalization and intervention is delayed.

Majority of the complications and deaths are preventable by essential antenatal care at domiciliary and peripheral levels[5]. Presence of skilled health care staff and trained birth attendants at deliveries result in early referrals in cases of complications, and thus prevention of most of the maternal deaths.

Care of the critically ill pregnant patient requires a true multidisciplinary approach for optimal outcomes[4]. Early referral to a tertiary care center coupled with invasive hemodynamic monitoring and ventilatory support improves the outcome of such patients[6]. Maternal-fetal medicine specialist is a step towards the betterment of such obstetric patients. This specialist is a member of a health care team who possesses expertise in the management of the high risk pregnancy, has advanced knowledge of obstetrics, medical, genetic, and surgical complications in the mother, fetus and the newborn, and can directly provide his services to critical care settings aimed at improving the outcome of the critically ill obstetric patients[10].

Conclusion

Majority of ICU admissions are preventable. Invasive hemodynamic monitoring and ventilatory support are the two main interventions. Improving quality of care before and after admission to ICU may reduce maternal morbidity.

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