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Original Article

Why do obstetric patients go to the ICU? A 3-year-study

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ABSTRACT

Background: Pregnant women are at risk to develop complications due to illness related to pregnancy or due to aggravation of pre-existing disease. These patients also require critical care and ICU admissions in some cases. To determine the current spectrum of diseases in an obstetric population resulting in admission to the intensive care unit (ICU) at a tertiary care hospital.

Methods: A retrospective case series study and analysis of data from obstetric patients admitted for critical care management.

Results: 0.26% of the total obstetric patients admitted to the hospital required ICU admissions. 46% of patients were admitted to ICU for ventilator support. Pre-eclampsia and obstetrical hemorrhage were the common diagnosis for these patients.

Conclusion: Critically ill obstetric patients require a team approach of the obstetrician, anesthesiologist and intensive care specialist for the optimal care of these patients.

Introduction

Obstetric patients are generally young, fit and in good physical shape, yet the potential for catastrophic complications is real. Regardless of the therapeutic advances of the last century, maternal morbidity and mortality continue to occur.[1,2] Changes take place in the maternal physiology to fulfill the needs of her health, fetus and the newborn, during the pregnancy and puerperium. These changes present an exclusive challenge, to the obstetric team, when these patients develop complications and need intensive care.[1–3] Antenatal period, intra-partum period and puerperium can be complicated by aggravation of a pre-existing illness, complications of the delivery or – the pregnancy itself leading to severe maternal morbidity necessitating intensive care unit (ICU) admission. Management of these patients requires cooperation of obstetrician and intensivist/anesthesiologist.

This study was undertaken with the objective to ascertain the prevalence, causes and outcome of critically ill obstetric patients admitted to the intensive care unit (ICU).

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Materials & methods

A retrospective study was carried out from 01 Jun 2007 to 31 May 2010 in a tertiary care hospital & teaching institute of armed forces. A 900 bedded hospital with 80 beds in the Department of Obstetrics and Gynecology. The hospital has an 18 bedded multidisciplinary ICU for medical, surgical, cardiac and obstetric patients. Neonatal ICU is a separate entity. The hospital is a referral center for cases from various peripheral hospitals of the armed forces and local civil hospitals.

The ICU in our set-up is managed by the anesthesiologists, but the decision of admitting the patients to ICU is governed by the obstetric team. All critically ill obstetric patients who require hemodynamic monitoring and vasopressor support, invasive or non-invasive ventilator care and also patients with severe organ dysfunction are admitted to the ICU. Medical and surgical consults are taken as and when required.

Results

All obstetric patients admitted to the ICU from 01 Jun 07 to 31 May 2010 were studied retrospectively. A total of 35 obstetric patients were admitted to ICU during this period. On admission to the ICU, etiologic factors leading to the need for critical care were analyzed. A detailed study was made of their management and outcome. The collected data has been shown in the Tables 1–5.

During the study period there were a total of 13,432 admissions for the obstetric reasons and the hospital had a total of 6592 deliveries. These admissions included patients who were admitted to the hospital for antenatal complications, deliveries, abortion and its complications, ectopic pregnancy, obstetric hemorrhage, complications of the puerperium. The analysis shows 0.26% of the total obstetric patients admitted to the hospital required ICU admissions. When calculated for the no. of deliveries 0.47% of patients admitted for the delivery required critical care in our center. During this period there were a total of 4213 admissions in ICU, thus indicating that obstetric patients accounted for 0.8% of all the ICU admissions.

Table 1 – Patient characteristics.

Characteristics	Number (N = 35)	%
Age		
<20 yrs	3	8.7
21–25 yrs	12	34.2
26–30 yrs	16	45.6
31–35yrs	3	8.7
>35 yrs	1	2.8
Parity		
Primigravida	24	68.5
Multigravida	11	31.5
Hospital admission		
Direct	30	85.7
Referral case	5	14.3
ANC attendance		
Yes	28	80.0
No	7	20.0

Table 2 – Timing of admission.

Time	N = 35 (%)
Ist trimester	1 (2.8)
IInd trimester	1 (2.8)
IIIrd trimester	13 (37.2)
Post-partum	16 (45.8)
Others	
Post-abortal	2 (5.7)
Ectopic pregnancy	2 (5.7)

The age of the patients ranged from 18 to 37 yrs and majority of the patients were between 20 and 30 yrs of age. Approximately 2/3 of the patients, admitted to the hospital were primigravidae. The data showed, that most of the patients were admitted to the ICU during the IIIrd trimester and during the immediate post-partum or post-abortal period. 14% of the patients admitted to our hospital, requiring ICU admissions were referred from other hospitals for tertiary care. 20% of the patients admitted to ICU had no previous antenatal care.

46% of patients were admitted to ICU for ventilator support alone and 23% were hemodynamically unstable, rest 31% were hemodynamically unstable and also had respiratory insufficiency requiring mechanical support (Table 2).

Pre-eclampsia and its complications were the primary patient diagnosis for the patients admitted to ICU in 48.5% of the cases. Obstetrical hemorrhage (abruption, PPH, rupture uterus) was responsible for 31% of admissions. One patient was admitted with electrolyte disturbances arising out of intractable vomiting, she was on further investigation diagnosed as CNS aneurysm with intracranial hemorrhage and died later.

28.5% of the patients requiring admissions to ICU died due to their illness. Liver failure constituted 3.5% of the admissions. Hepatic failure during pregnancy due to any cause had 100% mortality in our study. Two cases were due to viral hepatitis ending in fulminant hepatitis; the cause for the third could not be ascertained. The patient admitted to ICU with fever, developed pancytopenia of unknown cause and later died. Both the patients admitted with puerperal sepsis and one with septic abortion died, indicating that the infection still plays an important role in maternal morbidity and mortality. Both the patients admitted with post-abortal complications had features of infection, thereby showing the need for stricter implementation of the MTP Act and the need to provide easily available safe abortion services in our country.

Table 3 – Indications for ICU admissions.

Indication	N = 35 (%)
Respiratory insufficiency	16 (45.7)
Hemodynamic instability	8 (22.8)
Both	11 (31.5)

Table 4 – Primary patient diagnosis.

Etiology	N = 35 (%)
Pre-eclampsia & its complications	
Severe pre-eclampsia	5 (14.4)
Eclampsia	4 (11.4)
HELLP syndrome	2 (5.7)
Abruption	4 (11.4)
Obstetrical hemorrhage	
Post-partum hemorrhage	5 (14.4)
Rupture uterus	2 (5.7)
Puerperal sepsis	2 (5.7)
Heart disease	1 (2.8)
Liver failure	3 (8.7)
Complications of abortion	2 (5.7)
Ectopic pregnancy	2 (5.7)
Fever	1 (2.8)
Drug reaction	1 (2.8)
Intractable vomiting	1 (2.8)

Discussion

Pregnancy represents a unique alteration in physiology that usually proceeds to completion without complications. In certain circumstances conditions arise that require intensive care with invasive monitoring and ventilator support. These complications may arise out of any pre-existing medical condition like rheumatic heart disease as in our study, renal conditions etc or due to any obstetric condition arising out of the pregnancy.

In our study, 0.26% of the total obstetric patients required ICU admission, which was similar to various other studies as shown. Richa et al in their study found the frequency of admissions was 0.24% of deliveries.[4] Muench et al showed critical care was required for 1.3% of 2565 women admitted for deliveries.[5] Bibi et al showed in their study, 30 (1.3%) obstetric patients of 2224 deliveries were transferred to ICU.[6]

Hypertensive disorders in pregnancy and their complications are the prime reasons for the maternal morbidity with obstetrical hemorrhage and infection also plays a major role. Pre-eclampsia is the major reason for ICU admissions in our study (48.5%). Madan et al in their study, said common indications for ICU admission were, pre-eclampsia (OR): 2.8, abruption (OR: 8.9), acute renal failure (OR: 22.1).[7] Hypertensive disorders of pregnancy (50%) and sepsis (17%) were the two main obstetrical conditions responsible for maternal illness in a study by Bibi.[6] Pre-eclampsia, obstetric hemorrhage and sepsis were the indications for critical care in 26%, 20% and 26% respectively. Richa et al[4] Pre-eclampsia (62.0%) and obstetric hemorrhage (18.3%) were the most common reasons for ICU admission in a 12-year-study by Keizer.[8]

Our study shows that the 46% of patients had respiratory insufficiency and required ventilator support while 31% patients had both, the hemodynamically instability and requirement of mechanical ventilation. A study by Sriram found, mechanical ventilator support was required by 61% of the patients and 38% had hemodynamic instability.[9] Bibi in their study, showed 40% of the patients required critical care for hemodynamic instability.[6]

Our study had 4 patients who were admitted due to infective causes – puerperal and post-abortal sepsis. Three patients succumbed to their illness, indicating that the infection is still a major role in maternal morbidity and mortality in our country. The same has been seen in studies by Osinaike and Bibi.[2,6]

This study had a mortality of 28.5% which was similar to Bibi et al,[6] while Sriram had nil mortality experience in their study[9] and Suleiman had maternal mortality of 10%.[10] 20% of our patients had no access to previous antenatal care and thus emphasizing the need for regular and proper antenatal care to decrease maternal mortality. 83% of our patients admitted to ICU presented in the third trimester or in the post-partum period, indicating that this is the most critical period during the pregnancy.

Table 5 – Patient diagnosis related to outcome.

Diagnosis	Survived	Died
Pre-eclampsia & its complications	14	1
Obstetrical hemorrhage		
Post-partum hemorrhage	5	–
Rupture uterus	1	1
Puerperal sepsis	–	2
Heart disease	1	
Liver failure	–	3
Complications of abortion	1	1
Ectopic pregnancy	2	–
Fever	–	1
Drug reaction	1	
Intractable vomiting	–	1

Conclusion

Availability of good obstetric care is the cornerstone to decreasing maternal mortality. Early assessment and intervention of critically ill obstetrical patients and the provision of separate ICU care for them, through a team approach involving obstetricians and anesthesiologists is ideal. All residents of obstetrics and gynecology should have short mandatory training phase in critical care.

Intellectual contribution of authors

Study concept: Surg Cdr Sushil Chawla.
Drafting & manuscript revision: Surg Cdr Sushil Chawla, Col B C Nambiar, Col M Nakra.
Statistical analysis: Col A Marwaha, Col Raju Agarwal.
Study supervision: Surg Cdr Sushil Chawla, Brig S Mohan, Col M Nakra, Col BC Nambiar.

Conflicts of interest

All authors have none to declare.

REFERENCES

1. Tempe A, Wadhwa L, Gupta S, et al. Prediction of mortality and morbidity by simplified acute physiology score II in obstetric intensive care unit admissions. *Indian J Med Sci*. 2007;61:179–185.
2. Osinaike B, Amanor-Boadu S, Sanusi A. Obstetric intensive care: a developing country experience. *Internet J Anesthesiol*. 2006;10.
3. Okafor UV, Aniebue U. Admission pattern and outcome in critical care obstetric patients. *Int J Obstet Anesth*. 2004;13:164–166.
4. Richa F, Karim N, Yazbeck P. Obstetric admissions to the intensive care unit: an eight-year review. *J Med Liban*. 2008;56:215–219.
5. Muench MV, Baschat AA, Malinow AM. Analysis of disease in the obstetric intensive care unit at a university referral center: a 24-month review of prospective data. *J Reprod Med*. 2008;53:914–920.
6. Bibi S, Memon A, Sheikh JM, et al. Severe acute maternal morbidity and intensive care in a public sector university hospital of Pakistan. *J Ayub Med Coll Abbottabad*. 2008;20:109–112.
7. Madan I, Puri I, Jain NJ, et al. Characteristics of obstetric intensive care unit admissions in New Jersey. *J Matern Fetal Neonatal Med*. 2009;22:785–790.
8. Keizer JL, Zwart JJ, Meerman RH. Obstetric intensive care admissions: a 12-year review in a tertiary care centre. *Eur J Obstet Gynecol Reprod Biol*. 2006;128:152–156.
9. Sriram S, Robertson MS. Critically ill obstetric patients in Australia: a retrospective audit of 8 years' experience in a tertiary intensive care unit. *Crit Care Resusc*. 2008;10:124–128.
10. Al-Suleiman SA, Qutub HO, Rahman J. Obstetric admissions to the intensive care unit: a 12-year review. *Arch Gynecol Obstet*. 2006;274:4–8.