



An Evaluation of Admission Pattern And outcome In Critically Ill Obstetric Patients: Two-Year Review In A Tertiary Care Centre

KEYWORDS

Obstetric patients, Intensive care unit, APACHE II score, Mortality

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ABSTRACT *Objective: To evaluate the performance of the APACHE II score for the prediction of mortality in women with primary obstetric pathologies and those with coincidental pathologies while pregnant, using a high-quality clinical database of admissions to general intensive care unit.*

Methods: This was an observational and prospective study conducted on Critically ill obstetric patients who required intensive care and/or required mechanical ventilation transferred in intensive care unit (ICU) from obstetrics and gynaecology department. A total of 120 patients were included.

Results: Majority of patients were between 21-30 years. Most of obstetric admissions to ICU were following emergency surgery or nonsurgical with very few admissions following elective surgery. Pregnancy induced hypertension and its complications (eclampsia, HELLP syndrome, coagulopathy), obstetric haemorrhage and pelvic sepsis accounted for most of the obstetric indications. The ICU mortality rate was 21. Multiorgan dysfunction syndrome was the main cause of death. Overall Apache II score was 16 ± 8 and Apache II predicted mortality was observed to be 28%.

Conclusion: There was poor performance of APACHE II scoring system in the ICU obstetric subpopulation. APACHE II score over predicted mortality rate in critically ill obstetric patients.

INTRODUCTION

In India 80,000 women lose their lives during their reproductive years with the maternal mortality reaching an appalling high figure of 301 deaths per 100,000 live births¹.

Many of these patients require specialised care which can not be provided in the general wards. Intensive care units have been developed for cardiac, renal, paediatric and neonatal care. With the advent of invasive haemodynamic monitoring technology approaches to critical care in obstetric patients, particularly those with preeclampsia, have received significant attention².

Patients admitted to the ICU are scored based on numerous criteria to try and predict their outcome. Several scoring systems have emerged over recent years in an attempt to quantify the relationship between the severity of the pathologic disease and outcome. Several scoring systems have emerged over recent years in an attempt to quantify the relationship between the severity of the pathologic disease and outcome in obstetric patients in general ICUs and found to overestimate^{3,6}, underestimate⁷ and accurately predict^{8,9} mortality.

We evaluated the performance of the APACHE II score for the prediction of mortality in women with primary obstetric pathologies and those with coincidental pathologies while pregnant, using a high-quality clinical database of admissions to general intensive care unit.

MATERIAL AND METHODS

This was an **observational and prospective study** conducted on the obstetric patients admitted in 8 bed **intensive care unit** (managed by the Department of Anaesthesiology and Critical Care) of a tertiary care hospital. The study was approved by the Ethical Committee of the Institute and the consent was taken from each participant before enrolling in the study.

Methods

Study population

Critically ill obstetric patients who required intensive care and/or required mechanical ventilation transferred in ICU from obstetrics and gynaecology department were included. The exclusion criteria were those not requiring mechanical ventilation and managed in postoperative ward separately from the labor ward. A total of 120 patients were included.

Assessments

The patients were thoroughly examined, investigated and detailed history was taken at the time of inclusion. Their demographic profile, admission diagnosis, **APACHE II score (Acute Physiology and Chronic Health Evaluation II)**, co-morbid conditions and ICU length of stay (LOS) and maternal mortality were recorded. The expected mortality rate was calculated according to APACHE II scores and **outcome related to mortality & recovery was carefully noted down and observed.** Patients were followed

up and monitored closely during their stay in ICU. Close watch was kept to see and prevent the development of any complication.

Definitions

Shock: The shock was defined as reduction of 40 mm Hg of systolic BP from baseline despite adequate fluid resuscitation, along with presence of perfusion abnormalities that might include oliguria, lactic acidosis, or acute altered mental status

ARDS: ARDS was defined as hypoxemic respiratory failure ($\text{PaO}_2 < 60$ mm Hg with a $\text{FiO}_2 > 60$ %) requiring mechanical ventilation, in which the chest roentgenogram showed bilateral alveolar infiltrates and the pulmonary artery capillary wedge pressure was less than 18 mm Hg.

Maternal mortality was considered as death occurring during pregnancy or with in 6 weeks of delivery, in agreement with the International Classification of Diseases version 10.

Apache II Scoring System

The APACHE II system is the most commonly used severity of illness scoring system in North America. Age, type of ICU admission (after elective surgery vs. non surgical or after emergency surgery), a chronic health problem score, and 12 physiologic variables (the most severely abnormal of each in the first 24 h of ICU admission) are used to derive a score. The predicted hospital mortality is derived from a formula that takes into account the APACHE II score, the need for emergency surgery, and a weighted, disease-specific diagnostic category.

Data Analysis

Categorical data are displayed as percentages. Continuous data are reported as mean \pm SD, or as median and inter quartile range (IQR). The comparisons were performed with an Unpaired t-test for continuous normally distributed data. For multiple comparisons, one-way analysis of variance test was used. Categorical variables were analysed by Chi square test. p-value <0.05 was considered significant. All the analysis was carried out on SPSS 16.0 version (Chicago, Inc., USA).

RESULTS

Majority of patients were between 21-30 years. Most of obstetric admissions to ICU were following emergency surgery or nonsurgical with very few admissions following elective surgery. Pregnancy induced hypertension and its complications (eclampsia, HELLP syndrome, coagulopathy), obstetric haemorrhage and pelvic sepsis accounted for most of the obstetric indications. Most obstetric patients were admitted to ICU in postpartum period. Antepartum admissions accounted for 11% of all obstetric admissions and 89% of critically ill obstetric patients were admitted in postpartum period. Out of 120 obstetric patients admitted to ICU, 26 (21.7%) expired. The ICU mortality rate was 21 (Table-1).

Multiorgan dysfunction syndrome was the main cause of death followed by Intracranial haemorrhage and hypovolemic shock mainly due to major obstetric hemorrhage (APH, PPH) (Table-2).

Almost half of patients had one or more organ failures with respiratory failure being most common followed by cardiovascular system failure. Mortality in patients with organ failure was maximum in patients with nervous system failure

(Table-3).

Out of 120 patients, ARDS developed in 19 patients during their stay in ICU. Puerperal sepsis, septic abortion and community acquired pneumonia were main underlying causes in majority of ARDS cases (Fig.1).

70 patients required mechanical ventilation during their stay in ICU. Most frequent indication for mechanical ventilation were acute respiratory failure & haemodynamic failure followed by impaired consciousness and postoperative ventilation (Fig.2).

Overall Apache II score was 16 ± 8 and Apache II predicted mortality was observed to be 28%. The antenatal care was received by 12% patients and mechanical ventilation was required among 58% patients. ARDS was developed in 16% patients and shock was in 25% (Table-4).

DISCUSSION

In this study, the disease process responsible for the complication requiring ICU admission was directly related to the pregnancy in 102 (85 %) of obstetric patients admitted to ICU. Pregnancy induced hypertension & its complications (eclampsia, HELLP syndrome, coagulopathy), obstetric haemorrhage & pelvic sepsis account for most of these obstetric indications in the present study. Consistent with previous studies¹⁰⁻¹³, most admissions occurred in the postpartum period (89%) as compared to antepartum admissions⁶, with hypertensive disorders of pregnancy and major haemorrhage as main obstetric causes. Mortality in hypertensive disease of pregnancy was 20 %, all deaths occurred in patients not receiving antenatal care in the present study.

In the present study, observed maternal ICU mortality rate was 21.7% while APACHE II predicted mortality rate was 28 %. As previously shown in most reports^{6,9,10,12} of critically ill obstetric patients, APACHE II score over predicted mortality.

In this study, the main causes of death were MODS (38.5%), intracranial haemorrhage (23.1%) and hypovolemic shock (23.1%). The incidence of ICH, a well known risk factor for mortality in peripartum period^{6,9,10,12}. MODS was quite prevalent in this study similar to other studies^{3,4,14-15}. Use of mechanical ventilation was frequent in this study and most frequent indications were acute respiratory failure & haemodynamic failure.

ARDS developed in 16 % of patients which was mainly associated with sepsis, CAP and septic abortion in this study. Nevertheless, mortality related to ARDS in this group of patients still remains lower than general ICU patients (40-60 %). Lower age, fewer underlying diseases and in some cases, rapid resolution of illness after delivery might explain these differences.

We observed 25% of patients had shock, equally distributed between major haemorrhage and septic causes. Antenatal care was clearly deficient in this study. In addition, antenatal care was strikingly less frequent in non-survivors. This is an important and modifiable risk factor for a bad outcome.

CONCLUSION

There was poor performance of APACHE II scoring system in the ICU obstetric subpopulation. APACHE II score over predicted mortality rate in critically ill obstetric patients.

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Table-1: Profile of obstetric patients admitted in ICU

	No. (n=120)	%
Age in years		
11-20	14	11.67
21-30	84	70
31-40	20	16.67
41-50	2	1.67
Surgical Vs Non-surgical		
Following emergency surgery	62	52
Non surgical patients	52	43
Following elective surgery	06	5
Indication for admission		
Pre eclampsia	30	25.0
Eclampsia	20	16.7
HELLP	6	5.0
Ante partum haemorrhage	19	15.8
Post partum haemorrhage	11	9.1
Ruptured ectopic pregnancy	8	6.7
Septic Abortion	4	3.3
Puerperal sepsis	4	3.3
Antepartum vs Postpartum		
Antepartum	13	11.0
Postpartum	107	89.0
Mortality rate		
Survivor	94	78.3
Non survivor	26	21.7

Table-2: Cause of maternal death

Primary cause of death	Deaths No. (%)	Primary Diagnosis	Death No.
MODS	10 (38.5)	Pre eclampsia	3
		Eclampsia	2
		Peritonitis	2
		Puerperal sepsis	2
		Septic abortion	1
ICH	6 (23.1)	Eclampsia	2
		Subarachnoid haemorrhage	2
		Intracerebral haemorrhage	2
Hypovolemic shock	6 (23.1)	Obstetric haemorrhage	4
		Ruptured ectopic	1
		Coagulation abnormality	1
Respiratory failure	4 (15.4)	ARDS	3
		CAP	1

Table-3: Distribution of Organ Failure

Failure Organ	No. of Patients (%)	Mortality (%)
Respiratory	30 (38.0)	18.0
Cariovascular	20 (25.3)	16.0
Haematologic	10 (12.7)	29.0
Renal	9 (11.4)	15.0
Neurologic	8 (10.12)	63.0
Hepatic	2 (2.5)	0.0

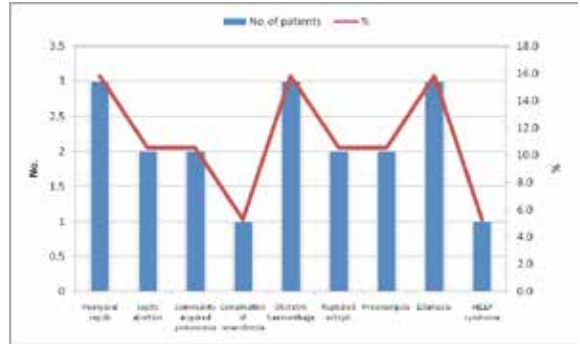


Fig. 1: ARDS in obstetric patients in ICU

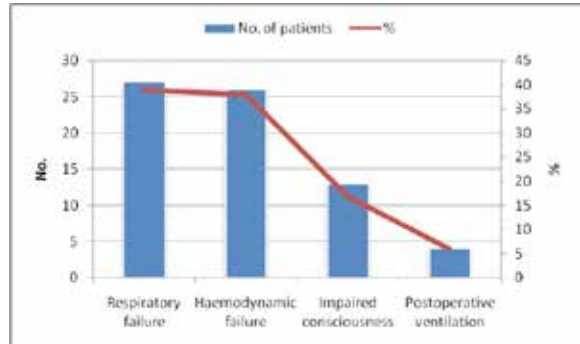


Fig.2: Indications for mechanical ventilation

Table-4: General characteristics of patients and principal diagnosis

Characteristics	All	Hypertensive disease	Major haemorrhage	Ruptured ectopic	Septic abortion	CAP
Patients, no	120	50	30	8	4	3
Age	25±8	24±9	30±7	28±6	29±8	27±7
Apache II Score	16±8	12±6	14±7	14±7	22±6#	20±6
Apache II predicted mortality (%)	28.0	20.0	25.0	24.0	45.0	38.0
Mortality observed (%)	26 (21.7)	7 (14.0)	4 (13.0)	1 (12.5)	1 (25.0)	1 (33.0)
Antenatal care (%)	15 (12.0)	5 (10.0)	4 (10.0)	2 (25.0)	0 (0.0)	0 (0.0)
Mechanical ventilation (%)	70 (58.0)	18 (36.0)	18 (60.0)	4 (50.0)	2 (50.0)	2 (67.0)
ARDS (%)	19 (16.0)	6 (12.0)	3 (10.0)	2 (25.0)	2 (50.0)	1 (33.0)
Shock (%)	31 (25.0)	5 (10.0)	18 (60.0) #	1 (12.0)	1 (25.0)	0 (0.0)
ICU LOS, days	6 (3-11)	5 (3-7)	4 (3-10)	5 (3-8)	7 (4-14)	18 \$@ (10-20)

#p<0.01 vs hypertensive disease, *p<0.01 vs major haemorrhage, \$p<0.001 vs major haemorrhage, @p< 0.001 vs hypertensive disease

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