Maternal Outcome of Admitted Obstetric Patient in Intensive Care Unit of Dhaka Medical College Hospital, Bangladesh

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Abstract

Background: *The obstetric patient may suffer with any surgical/ medical condition necessitating intensive care unit (ICU) admission. When admission ctiteria is fulfilled then early admission to Intensive Care Unit can reduce the maternal mortality.*

Aim: *To observe the causes of Intensive Care Unit admissions, interventions, complications and maternal outcome.*

Materials and Methods: The study was a prospective longitudinal study conducted in the ICU of Dhaka medical college hospital Dhaka Bangladesh. The study period was 01/05/ 2019 to 30/04/2020. All the patient who had obstetric related complication were enrolled in this study. Data was collected from patient, patient's attendants, patient's clinical parameter and hospital documents (history sheet, investigation sheet and treatment sheet) and written in the pre-formed data sheet. The information obtained was type of admission, antenatal or postpartum, age, parity, obstetric status, primary diagnosis, associated medical and surgical condition, referral or inpatient shift to ICU, reason for ICU admission, mode of delivery, details of supportive interventions, complications.

Results: *The total admissions to the ICU were 272 obstetric patients. The mean maternal age was 24 ± 4. 2 years. Most of them were house wives (70%), daily laborers 10% and others contribute to 20%. Majority of the patients were multipara (68%). The more common indications of ICU admission were septic shock (26%) antepartum eclampsia (21.6%), hypovolemic shock (17%), post-partum eclampsia (8%), AKI following LUCS (8.8%), Peripartum cardiomyopathy (5. 8%).Highest number of patient (58.08%) come from obstetric ward and lowest number patient (4.41%) from medicine ward. 55.88 % patients required mechanical ventilation and mean duration of mechanical ventilation is 3 days. The duration of ICU stay varied from 2 -5 days in 191 cases ,6 to 10 days in 40 cases and more than 31days in 1 cases. Transfusion of Blood and blood products was needed in 66. 8% of patients and 11.39% patient required haemodialysis. 75 patient developed complications among those septicaemia (21 patient) was the highest, 11 patient AKI ,13 patient ARDS, 9 patient DIC and 4 patient pneumothorax. The survival rate is 61.01%.*

Conclusion: *Septic shock was the major cause of ICU admission. About two third patients discharged alive.*

Key wards: *Maternal outcome; Critical care; Obstetric patient.*

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Introduction

Critically ill obstetric patients are always a challenge to Intensive Care Unit (ICU) physicians and account for as much as 7% of the ICU admissions in developing countries, while they account for a smaller proportion in developed countries.[1] The care of these patients poses a challenge in our environment due to the need for highly specialized care and equipment where the people are still grappling with poverty, ignorance and scarcity of skilled attendants. Admission of obstetric patients occurs approximately at 0.1- 0.9% of the deliveries.[2] The overall maternal death rate in the ICU varies from 3.4-21%.[3] Inadequate knowledge about the illness and infrequent admission of the obstetric patients results in high mortality and morbidity. WHO states that, "there is a story behind every maternal death or life-threatening complication".[4] So a better knowledge of the spectrum, characteristics, and outcomes of the disease involving this group of patients is the first step towards achieving prevention and hence, reduction of both maternal morbidity and mortality.[5] Maternal mortality is a primary health care indicator that reflects the health care adequacy of a country. It remains unacceptably high in many developing countries like Bangladesh unlike the developed nations and many pregnant women in these countries require critical care during pregnancy and need intensive care support. This difference is very likely related to improved socioeconomic conditions, availability of comprehensive antenatal, obstetric, anaesthetic and intensive care services, as well as access to more advanced treatment modalities in the developed countries.[5] The primary objective of this study is to evaluate the reason of admission, pattern of surgical & other interventions and maternal outcome of obstetric patients admitted into the intensive care unit (ICU) of the Dhaka medical college hospital.

Materials and Methods

The study was a prospective longitudinal study conducted in the ICU of Dhaka medical college hospital Dhaka Bangladesh. The study period was 01/05/2019 to 30/04/2020. All the patient who were admitted in the ICU and had obstetric related complication were enrolled in this study. Total 272 patients were admitted in the ICU during the study period. Data was collected from patients, patient's attendant, patient's clinical records and hospital documents (history sheet, investigation sheet and treatment sheet) and written in the pre-formed data sheet. Then data was analyzed in SPSS.

Results:

Table I

Age distribution of patients

Age (year)	Number	Percentage	Mean age (Years)	(SD)
≤20	81	29.77	24.80	(4.2)
21-30	133	48.89		
31-40	54	19.85		
41-51	04	1.47		

Table II

Indication for admission in ICU

Diagnosis	No of patient	Percentage of total pt	Survive	Percent of survival	Death
Septic shock following D & C	22	8.00	13	59.09	9
Septic shock following NVD	17	6.25	12	70.58	5
Septic shock with IUD	14	5.14	8	57.14	6
Septic shock following LUCS	20	7.32	10	50.00	10
Pre eclamsia	4	1.47	4	100	0
Antepartum eclampsia with LUCS	59	21.69	37	62.71	22
Postpartum Eclampsia with LUCS	24	8.82	18	75	6
Hypovolemic shock due to ruptured ectopic pregnancy with laparotomy	16	5.82	9	56.25	7
Hypovolemic shock due to ruptured uterus with laparotomy	4	1.47	1	25	3

Table II

Indication for admission in ICU

Diagnosis	No of patient	Percentage of total pt	Survive	Percent of survival	Death
Hypovolemic shock due to LUCS	16	5.88	10	62.50	6
Hypovolemic shock due to PPH	12	4.41	6	50	6
Peripartum cardiomyopathy	16	5.88	10	62.50	6
Pregnancy with valvular heart disease	7	2.57	3	42.85	4
Pregnancy with anaemic heart failure	3	1.10	2	66.66	1
AKI following LUCS	35	12.86	20	57.14	15
Delayed reversal from anesthesia	2	0.73	2	100	0
Hypersensitivity to Anaesthetic drug	1	0.366	1	100	0

Highest number of patients admitted in the ICU due to Septicemia, then pre-eclampsia, then eclampsia, then hypovolemic shock and others.

Table III

Causes of death

Cause	Total patient	Number of death	Percentage**(%)**
Septic shock	73	30	41.58
Antepartum eclamsia	59	22	37.28
Postpartum eclamsia	24	6	25.00
Hypovoemic shock	48	22	45.83
Peripartum cardiomyopathy	16	6	37.50
Valvular heart disease	7	4	57.14
Anaemic heart failure	3	1	33.33
AKI following LUCS	35	15	42.85

Septic shock antepartum eclamsia an Hypovolemic shock are the major causes of death.

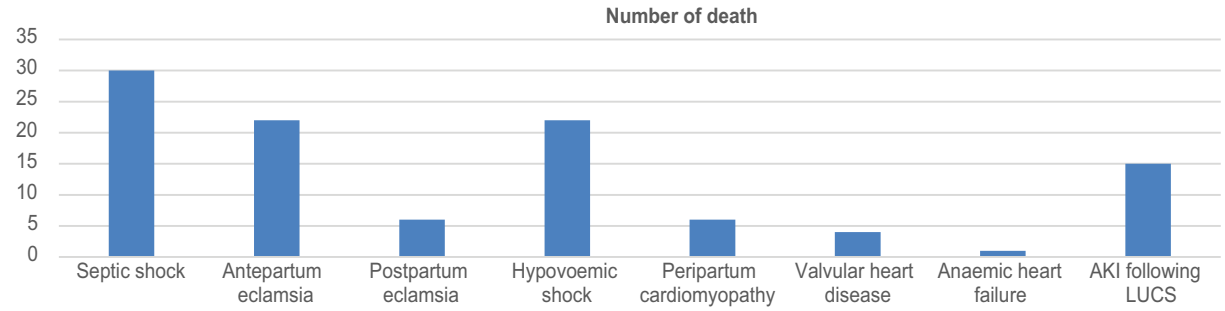

Fig.-1: *Causes of death*

Table IV

Referring ward to ICU

From	No of pt	Percentage (%)	Survive	Percentage (%)	Death	Percentage(%)
Obstetric ward	158	58.08%	99	62.65	59	37.34
Post operative ward	60	22.05	34	56.66	26	43.33
Operation theatre	25	9.19	14	56.00	11	44.00
One stop emergency center (OSEC)	17	6.25	12	70.82	5	29.41
Medicine ward	12	4.41	4	33.33	5	41.66

Most of the patients were referred from obstetric ward and least from medicine ward.

Table V

Duration of ICU stay

Number of patient	Duration	Mean duration(days)
12	<1 day (24 hours)	5.00
191	1 - 5 day	
40	6 - 10 day	
20	11 - 15 day	
5	16 - 20 day	
2	21 - 25 day	
1	26 - 30 day	
1	> 31 day	

Maximum patient required short duration (1 to 5 days) of ICU stay, highest duration of ICU stay was more than 31 days.

Intervention required:

Table-VI

Mechanical ventilation: Mean duration mechanical ventilation 3 days.

		Survive	Percentage	Death	Percentage
Ventilation required	152	56	36.84%	106	63.15%
Non ventilation	120	120	100%	00	00%
Dialysis required	31 (11.2%)	21	67.74%	10	32.25%

Among the patients 31(11.2%) required dialysis and 21 patients were survived.

Table VII: Complications during ICU period:

Outcome:

Results

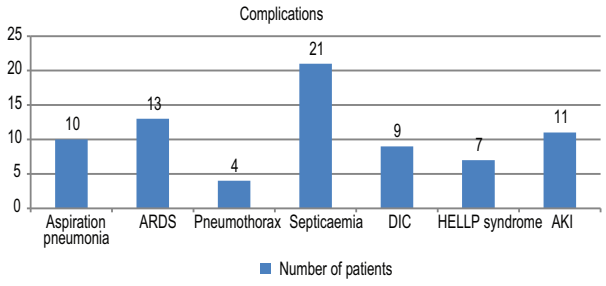

Fig.-2: *Among the patients is the highest number patient developed septicemia, then ARDS, then AKI, then aspiration pneumonia, then DIC, then HELLP syndrome, then pneumothorax.*

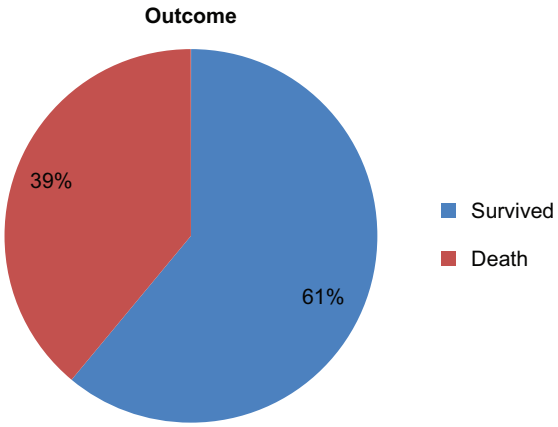

Fig.-3: *Among the admitted patient in ICU, survival was 61% and death rate was 39%.*

The total admissions to the ICU were 272 obstetric patients. The mean maternal age was 24 ± 4. 2 years (Table I). Most of them were house wives (70%), daily laborers 10% and others contribute to 20%. Majority of the patients were multipara (68%). The more common indications of ICU admission were septic shock (26%) antepartum eclampsia (21.6%), hypovolemic shock (17%), post-partum eclampsia (8%), AKI following LUCS (8.8%), Peripartum cardiomyopathy (5. 8%).Highest number of patient (58.08%) come from obstetric ward and lowest number patient (4.41%) from medicine ward (Trable IV). 55.88% patients required mechanical ventilation and mean duration of mechanical ventilation is 3 days. The duration of ICU stay varied from 2 -5 days in 191 cases,6 to 10 days in 40 cases and more than 31days in 1 cases (Table-V). Transfusion of Blood and blood products was needed in 66.8% of patients 11.39% patient required haemodialysis. 75 patient developed complications among those septicaemia (21 patient) was the highest, 11 patient AKI, 13 patient ARDS, 9 patient DIC and 4 patient pneumothorax (Figure 1). The survival rate is 61% and death rate is 39%. Frequency of deaths high among Vulvular heart disease(57.14%), Hypovolemic shock (45.83%), AKI following LUCS (42.85%), Septic shock(41.58%) peripartum cardiomyopathy (37.50%), Antepartum Eclamsia (37.28%), Anaemic heart failure (33.33%), Postpartum eclamsia (25.00%).

Discussion

Any pregnant woman can develop life threatening complications with little or no advance warning. The complications of pregnancy and labor are essentially of two types the first set of complications include obstetric complications like Postpartum Hemorrhage (PPH), Pre eclampsia/Eclampsia (PE/E) etc. which require intensive obstetric care by specially trained providers, and the second set of complications include multi organ involvement/failure which necessitates care provision by intensivist and super specialists such as those from nephrology, neurology, cardiology, pulmonology etc.[26] This can be achieved with patient management at ICU. Understanding the epidemiology of severe obstetric morbidity and "near miss events" may help target interventions aimed at improving the full range of maternal outcomes. Analyzing intensive care unit (ICU) utilization during pregnancy is an accepted approach to identifying severe and "near-miss" maternal morbidity.[27]

During the study period total 7312 patients were admitted in the obstetric ward which was recorded from obstetric ward admission registered book and total 272 obstetric patients was admitted in ICU. The rate of ICU admissions in this study was 3.73% of all obstetric admissions. It varies from place to place and availability and admission to ICU. This is higher than other studies[6, 27] lesser than others.[7-9] In the United States each year, 1 to 3 percent of pregnant women require critical care services, and the risk of death during such admission ranges from 2 to 11 percent (American Academy of Pediatrics and the American College of Obstetricians and Gynecologists, 2012). In our study antenatal and antepartum admissions were 62% which is more than postnatal, which is more than study.[23] But in this study antepartum haemorhage and haemo-peritoneum, haemorhagic shock due to rupture uterus and ruptured ectopic with delayed admissions which correlates with few studies.[10,11,23] In our study, the more common condition requiring ICU admission were septic shock (26%) followed by antepartum eclampsia (21.6%), hypovolemic shock(17%), post-partum eclampsia (8%), AKI following LUCS(8.8%), Peripartum cardiomyopathy(5.8%) which is nearer to study.[12-16,23] The other major conditions were vulvular heart disease(2.57%), anaemic heart failure (1.11%), delayed reversal of anaesthesia, Anaesthetic drug hyper-sensitivity. Studies have found hypertensive disorders as the commonest condition.[17-19] In this study cardiac diseases accounted to 9% which more than other study.[23] 2.57% was vulvular heart disease in these series with 4 maternal deaths and 5.88% peripartum cardiomyopathy patients with 6 maternal deaths. Peripartum cardiomyopathy is a rare pregnancy-specific condition of uncertain aetiology which accounts for less than 1% of all cardiovascular events related to pregnancy.[20]

In this study most of the patients (58.8%) came from obstetric ward followed by post-operative ward (22%), operation theatre (9.1%), one stop emergency center (6.25%) and medicine ward (4,4%). In our study, interventions included blood transfusion 66.3%, inotropes in 72%, mechanical ventilator support in 55% and haemodialysis 11.39% apart from antihypertensive and anticonvulsive nearer to study.[21] The mean duration of mechanical ventilation was 3 days. The duration of ICU stay varied from 2 -5 days in 191 cases ,6 to 10 days in 40 cases and more than 31days in 1 cases (Table-V). Patients need ventilator support for a higher PaO_2 or SpO_2 than normal to reduce the risk of fetal hypoxia in a potentially compromised feto-placental circulation.[22] The survival rate is 61.01% and death rate is 38.97%. In this study the patient who required mechanical ventilation survival rate was 36.84%. where non ventilated patient's survival rate was 100%.

During the study period 31 patients required haemodialysis, among them 21 patients survived and 10 patients died. Maternal mortality accounted to 38.97% with pyrexia, wound infection, sepsis, multiorgan failure, renal failure, ARDS, pnumonitis which is more than the study.[23] Indirect maternal deaths were due to heart disease like severe mitral stenosis with PAH, peripartum cardiomyopathy, infective jaundice with septicemia, hepatorenal syndrome and multiorgan failure. This is nearer to other study.[24] but higher than other studies.[8,12,25]

Conclusion

Obstetric patients admitted into the ICU, especially the unbooked patients had severe morbidities and a high mortality rate. Septicemia, Obstetric haemorrhage with haemodynamic instability and eclamptic disorders are major causes of ICU admissions. Septicemia is the highest complication after admission to ICU.

Limitations of Study

1. This prospective observational study was conducted in a single center government tertiary hospital in the centre of the capital of Bangladesh hence, the results cannot be generalized.
2. It is a short duration of study, only 12-month study.
3. Small sample population and direct admissions to ICU without HDU.

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