

Obstetric Admissions into the Intensive Care Unit in a Sub-urban University Teaching Hospital

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Aims: Intensive care medicine is relatively young in developing countries and there are few studies showing obstetric utilization of the facilities in Intensive Care Units (ICU) in many developing nations. We sought to determine the ICU utilization by obstetric patients in our hospital, assess the spectrum of diseases necessitating admissions, the intervention required and outcome of such admissions.

Methods: A 5 year retrospective review of all obstetric admissions into the ICU from January 2003 to December 2007. Subjects were included if they were admitted during pregnancy up to 42 days post partum. Data obtained included demographics, obstetric history, pre-existing medical problems, admission diagnosis, indication for ICU admission, intervention in the ICU and outcome.

Results: Obstetric cases accounted for 1.5 % of total admissions into the ICU. These also represented 0.2% of total hospital deliveries. All the patients were admitted post partum. Eclampsia was the commonest primary obstetric diagnosis (58.8%) with neurological dysfunction as the commonest indication for ICU admission. Mortality rate among admitted cases was 41.2%.

Conclusions: Obstetric patients form a small population of a third world multi-disciplinary ICU but mortality among this group was high. It is recommended that large obstetric units should establish their own ICUs with standard facilities which will facilitate improved care of critically ill pregnant women and thereby improve the outcome.

Keywords: Developing countries, intensive care medicine, obstetrics

INTRODUCTION

Women who get pregnant are often young and in their reproductive years with pregnancy and labour usually progressing uneventfully in the majority of them. Sudden complications occurring during the period are often the main causes of maternal morbidity and mortality. Most complications cannot be predicted and therefore occur as emergencies but they can be successfully managed provided women reach functional quality obstetric services in time. Thus when they become critically ill, they should be actively managed to ensure their survival. This may require their admission into the intensive care unit (ICU). Management of such women then becomes multidisciplinary, involving anaesthesiologists, obstetricians, nurses and neonatologists. There are few reports of such admissions into our ICUs in developing countries. We sought to determine the ICU utilization by critically ill obstetric patients in our hospital, to assess the spectrum of diseases necessitating admissions, the interventions required and the outcome of such admissions in our hospital.

METHODS

The obstetric unit of the Obafemi Awolowo University Teaching Hospital, Ile - Ife delivers approximately 1500 patients annually and has a Caesarean section(C/S) rate of about 25%. The commonest indications for Caesarean section in the hospital are repeat C/S, failure to progress in labour and fetal distress. The hospital has a six bedded multi-disciplinary ICU which is managed by anaesthesiologists. The unit has facilities for ventilatory support, non-invasive cardiovascular monitoring, haemofiltration and is close to the dialysis unit of the hospital. The unit is run by trained ICU nurses who are available on a 24 hour basis. The admission criteria into our ICU for any patient include the need for respiratory support or intensive therapy. The decision for admission is often taken by the Senior Registrar/Consultant in the ICU.

Case notes of all obstetric admissions into the ICU from January 2003 to December 2008 were reviewed retrospectively. Subjects were included if they were admitted during pregnancy up to 42 days postpartum. Data obtained

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included demographics, obstetric history, pre-existing medical problems, admission diagnosis, indication for ICU admission, intervention in ICU and outcome. The data were analyzed using the Statistical Package for Social Scientists (SPSS) version 10.0. A p-value <0.05 was taken as significant.

RESULTS

There were seven thousand, one hundred and sixteen (7116) deliveries during the same period with 14 obstetric ICU admissions (0.2%). The total ICU admissions were eight hundred and ninety eight (898) with obstetric cases representing 1.5% of the admissions. The demographic information of the admissions is as shown in Table 1.

Table 1. Obstetric patients' demographic data

	Mean (SD)	Range
Age (Years)	29.07 ±	15 - 37
Parity	6.22	1 - 4
Maternal ICU stay (days)	2.0 ± 1.04	3 hours - 8 days
Gestational age (weeks)	3.0 ± 2.48	29 - 40
Patients booked for antenatal care (%)		50
Mode of delivery		4
Spontaneous vaginal delivery (SVD)		10
Caesarean section		

Table 2. ICU admissions data of all patients

S/ N	Obstetric diagnosis	Indication for ICU admission	ICU Management	Outcome	Organ failure
1	Cephalo-pelvic disproportion	Post-op respiratory distress	ETT; oxygen Not ventilated	Survived	1
2	Eclampsia	Prolonged recovery from anaesthesia	ETT; oxygen/sedation Not ventilated	Died	1,2
3	Previous C/S with multiple pregnancy	Hypovolemic shock	Inotropes /Fluids Not ventilated	Survived	3
4	Post partum eclampsia	Post cardiac arrest coma	Inotropes Ventilated	Died	1,2,3
5	Obstructed labour	Post- operative eclampsia	ETT/oxygen/ antihypertensive	Survived	2,4
6	Fetal distress	Aspiration pneumonia/Post-operative resp distress	Bronchodilators Ventilated	Survived	1
7	Heart disease in pregnancy	Congestive Cardiac Failure	Ventilated/inotropes	Died	1,2,3
8	Post partum eclampsia	Acute renal Failure/Aspiration pneumonitis	Dialysis/ ETT/ Bronchodilators	Died	1,4
9	Fetal distress	Post-operative respiratory distress	Bronchodilators/ETT	Survived	1
10	Post-partum eclampsia	Post-partum haemorrhage/Shock	Sedation/Fluids/ Inotropes	Died	1,2,3,4
11	Diabetes with severe pre-eclampsia	Pulmonary embolism	Post resuscitation ventilation	Died	1,2,3,4
12	Placenta praevia/ Acquired diaphragmatic hernia	Post operative respiratory distress/ Post-partum haemorrhage	Oxygen/ Fluids	Survived	3
13	Morbid obesity (BMI= 40.69) with obstructed labour	Post partum eclampsia /Difficult Intubation	ETT/oxygen/sedation	Survived	1,2
14	Severe pre-eclampsia	Prolonged recovery	ETT/oxygen/sedation	Survived	2

Note: Organ dysfunction: 1 = Respiratory, 2 = Neurological, 3 = Cardiovascular, 4 = Renal, ETT = Endotracheal intubation

The patients were young women of low parity. All patients were admitted in the post partum period. Ten were admitted following caesarean section and 4 following normal delivery. Caesarean sections were done under general anaesthesia in the ten cases. The duration of stay in the unit was short (mean = 3.0 ± 2.48 days). Fifty percent (7/14) of admissions were unbooked and probably did not receive any antenatal care. Pre-eclampsia / Eclampsia was the commonest primary obstetric diagnosis (n = 10; 58.8%). Neurological dysfunction following this was the most frequent reason for admission. Three patients had severe post- partum haemorrhage resulting in shock. Other diagnoses made are as shown in Table 2.

Intensive care unit management

Table 2 shows the management the patient received in the ICU. All the pre-eclamptic /eclamptic patients had received diazepam as sedative or anticonvulsant for their management before admission. These patients were noted to have prolonged recovery time from anaesthesia. Those with neurological dysfunction and depressed respiration were intubated to maintain airway patency. Four of the patients were mechanically ventilated for periods ranging from 3 hours to 4 days. Three of those ventilated died within 48 hours of their admission. Three patients required antihypertensive treatment and

two required inotropes to sustain the cardiovascular system. Direct arterial line, central venous pressure and central wedge pressure are not routinely monitored in our ICU.

Mortality

Table 3 shows the causes of death in the ICU. Mortality was significant among the unbooked patients. Five of the seven unbooked patients died in the ICU compared to only one of the seven booked patients. The latter had severe cardiac disease (NYHA 4) with twin pregnancy and went into premature labour at 29 weeks gestation. She was delivered by caesarean section under general anaesthesia. Overall mortality was 41.2%. Parity was not found to be contributory to their mortality. Post mortem revealed intracranial haemorrhage as the cause of death in one of the patients who died from eclampsia. Post mortem was not done in all the other cases.

Table 3. Causes of mortality

Cause of death	Total (n)
Congestive cardiac failure	1
Eclampsia	4
Pulmonary embolism	1
Total	6

DISCUSSION

Our review has indicated that a total of 14 (0.2%) obstetric cases out of 7,116 deliveries were admitted into the intensive care unit during the study period. These accounted for 1.5% of total ICU admissions. The women were mainly young patients with low parity who were admitted in the post partum period following either obstetric or anaesthetic complication. Eclampsia was the commonest reason for admission. Mortality in the ICU was very high. Previous studies from developed countries have shown that between 0.1% – 0.9% of women develop pregnancy related complications which require admission into the ICU.¹ However the few studies in Nigeria have shown higher rates. Imarengiaye *et al*/reporting anaesthesia related complications following caesarean delivery found that 1.1% of such patients required ICU admission.² In a study from Ibadan, 1.4% of deliveries required ICU admission during a 5-year period.³ An American study reported an Intensive care unit utilization for obstetric patients in academic medical centres as high as 0.9% and a mortality rate in the ICU as high as 29%.⁴ In a South African study which looked at both gynaecological and obstetric admissions, obstetric cases accounted for 13.5% of the ICU admissions.⁵ One study which has looked at both the number of hospital deliveries and ICU admissions showed that admissions into the ICU was represented by 0.2% of all deliveries which accounted for 1.6% of all ICU admissions.⁶ When we compared all these with our results, we conclude that the obstetric unit utilization of the ICU in our centre is quite low.

The indications for ICU admissions in this study include the known causes of severe maternal morbidity and mortality in West Africa: eclampsia and haemorrhage.⁷ These are also factors which carry high case fatality rates, reflecting the poor quality of obstetric care generally available in most parts of the sub-region.⁷ Majority of the patients (10/14) were admitted after emergency delivery for an obstetric complication of their labour. Similar studies have also shown that most admissions followed emergency caesarean deliveries.^{2,7,8} This therefore suggests that women who have emergency operative deliveries have a higher chance of developing further complications which may necessitate ICU admission.

Eclampsia was the commonest indication for admission. Mortality was also highest among them. This is similar to the findings in some other studies in developing countries.^{2,6,8} Thus the high incidence of the condition in pregnancy in developing countries gives some cause for concern. Eclampsia occurs frequently in developing countries, especially near term and is more likely in pregnant women with no antenatal care.⁹ It is still one of the leading causes of maternal mortality and morbidity all over the world. It is estimated that 5-10% of pregnancies are complicated by pre-eclampsia.¹⁰ The attending maternal mortality is reported as 40 - 60%. In developed countries with better facilities and improved antenatal care, the incidence has reduced significantly. The complication of the condition such as acute renal failure and intracranial haemorrhage are usually the causes of death as reflected in this study. Therefore, an antenatal service with aggressive management of pre-eclampsia particularly in labour is to be encouraged. The provision of an elaborate and intensive care unit for eclamptic patients especially in certain designated areas of labour suites with excellent nursing care would be helpful.

It is now accepted worldwide that Magnesium sulphate is the anticonvulsant of choice in preventing and treating eclamptic fits.¹¹ It reduces cerebral ischaemia and results in a significant reduction in the need for maternal ventilation and ICU admissions. Magnesium sulphate halves the incidence of eclampsia, but the threshold for giving magnesium sulphate to a pre-eclamptic woman is uncertain.¹² However this agent in general is given in severe cases. The use of this agent has just commenced in our hospital this year. It was not in use during the period under review.

Haemorrhagic shock was also another indication for admission. Haemorrhage has been noted to be a direct cause of severe maternal morbidity. Case fatality ratios for haemorrhage varied from 1.9% for ante-partum or peri-partum haemorrhage to 3.7% for abruptio.³ Poor management of haemorrhage (including the use of syntocinon) was considered to have contributed to the maternal deaths from haemorrhage or ruptured uterus in the current reports of Confidential enquiries into Maternal

and Child Health in the United Kingdom.¹³ In a previous study on blood loss during caesarean section, major blood loss (> 1L) was reported in 7.6% of the patients.¹⁴ Placental abnormalities and pre-eclampsia were diagnoses associated with increased transfusion and major blood loss risk in that study. It has been recommended that women who at risk of massive haemorrhage should be managed in units with direct access to blood transfusion and critical care.¹³ These cases require Consultant obstetrician and consultant anaesthetist involvement with additional obstetric and anaesthetic help.

The indications for mechanical ventilation in four patients were extreme restlessness, a Glasgow coma scale of <8 (unconsciousness), pulmonary aspiration, pulmonary oedema and multiple organ impairment. Three of these four patients who subsequently died had already developed multiple organ failure before admission (> 3 organ system failure). The only patient who survived after ventilation was a case of aspiration pneumonitis. This is similar to what has been reported about ventilator therapy in least developed countries. Ventilator therapy in developing countries is associated with very high mortality rates (58-74%) except for mechanical ventilation in the immediate post-operative phase.¹⁵

The overall mortality rate in this study was 41%. Most of the patients who died had already incurred complications, with one or more organ failure before admission. The high mortality rate in obstetric patients in the ICU has been said to be similar to findings in Surgical Intensive Care patients admitted from other disciplines.⁵

CONCLUSIONS

we have found that obstetric admissions form a small proportion of a third world multi-disciplinary intensive care population but the mortality among them is high. To reduce this, we recommend that large obstetric units establish their own intensive care units and provide standard facilities in order to improve all aspects of care of our pregnant women.

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