Intensive Care Unit Admissions During the Puerperium in Ibadan

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Abstract

Context: Intensive care unit (ICU) admissions of parturients are rare and is about 0.2% of total number of maternities per year in the United Kingdom (UK) compared to 1.1% reported from a teaching hospital in Benin, Nigeria.
Objective: This study sought the indications and outcome of critically ill obstetric patients admitted into the intensive care unit (ICU) of the University College Hospital (UCH), Ibadan, Nigeria in the year 2001.
Study Design, setting and subjects: Descriptive study involving 21patients admitted into the ICU, University College Hospital, Ibadan, between 1st January to 31st December 2001. Data was prospectively collected from each obstetric patient admitted
Results: The total number of deliveries during the year was 1,132 and 21 patients required admission into the ICU (1.86%). The median age was 26 years with a range of 20 35years. Eighteen patients (81%) were admitted post-emergency caesarean section or exploratory laparatomy. Eclampsia accounted for 47.6% (10/21) of the admissions, followed by severe haemorrhage from ruptured uterus 33.3% (7/21). Ten patients died giving a mortality rate of 47.6% in this series of obstetric patients admitted into the ICU.
Conclusion: The admission rate of obstetrics patient into the ICU in Ibadan is 1.86%, this may be reduced by an improvement in the management of hypertensive disease of pregnancy and reducing the incidence of ruptured uterus through health education of parturient with high risk pregnancies on the need to have monitored ante-natal care and delivery.

Keywords: Obstetric, ICU admissions, Indications, Outcome [Trop J Obstet Gynaecol, 2005, 22: 56-59]

Introduction

The expanded facilities of the Intensive Care Unit (ICU) of the University College Hospital (UCH), Ibadan, has stimulated the referral of critically ill obstetric patients from the Labour Ward for further care. Hitherto, such ill patients were managed in a High Dependency Unit like section of the Labour Ward. Care then was limited to clinical observation and manual monitoring, oxygen and drug therapy. It is well known however that the major causes of maternal morbidity and mortality the world over are Eclampsia and haemorrhage. In making a recommendation on this state, the fifteenth triennial audit of the Confidential Enquiries into Maternal Deaths (CEMD 1994 - 1996) emphasized the need for early access of the critically ill parturient to intensive care facilities. In Nigeria there is paucity of ICU facilities yet obstetric patients are admitted into the few available.

Life-threatening conditions occurring in the obstetric patient in Nigeria includes hypertensive diseases in pregnancy, haemorrhage and complications of obstructed labour. Eclampsia or pre-eclampsia is the most common indication for ICU admission in a study from Benin, Nigeria[2] and in a series studied at South Carolina, USA[6], similar findings had also been reported However, the rate of admission to an ICU from obstetric units has been noted to depend on existence of a High Dependency Unit (HDU) within such units. [4] Obstetrics units without a functional HDU would expect a higher rate of admission to ICU than units with HDU facilities.

We present a review of our experience with critically ill pregnant patients admitted into the Intensive care Unit (ICU) of the University College Hospital, Ibadan, Nigeria in the year 2001.

Materials and Methods

The records of all obstetrics patients admitted into ICU, UCH, Ibadan between 1st January to 341st December, 2001 were reviewed prospectively. The following data were obtained on admission to the ICU: maternal age, gestational age, parity, indication for ICU admission, total days spent in ICU and need for mechanical ventilation. The obstetricians jointly managed the patients with the anaesthetic teams.

Results

The total number of deliveries during the year 2001 was 1,132 and 21patients required ICU admission (1.86%). The median age was 26years, with a range of 20 35years. Nine patients were primigravida (42.86%) while twelve patients were multigravida (57.1%). Nineteen patients were at term (>36weeks gestation) while 2 patients were at a gestation of 28weeks and 33weeks respectively. Nineteen patients (90.4%) were

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not registered for antenatal care at the UCH, Ibadan but were referred from private or general hospitals or mission houses for management of complications during labour. The two patients who registered for antenatal care at UCH were the patients with sickle cell anaemia. Eighteen patients were admitted post emergency caesarean section or exploratory laparotomy depending on the diagnosis. All operations were done under general anaesthesia either using balanced anaesthesia technique, or total intravenous anaesthesia using ketamine. The median duration of stay in the ICU was 48hours (range less than 24hours 21days). There were ten deaths, giving a mortality of 47.6% and one case of major morbidity (acute renal failure). The diagnosis, indication for and outcome of admission into ICU are shown in Table 1.

Table 1

The Diagnosis, Indication for and Outcome of ICU Admissions

Diagnosis	Indication for ICU Admission	Frequency	% of Total	Outcome
Eclampsia	GCS of 8 or less or Respiratory Insufficiency	10	47.6%	3 deaths
Ruptured Uterus	Severe haemorrhage/hypotension	7	33.3%	5 deaths
Sickle Cell Anaemia (HbSS)	Sequestration Crises / Monitoring	2	9.5%	1 death
Abruptio placenta (APH)	Severe Haemorrhage	1	4.8%	Died
Prolonged Obstructed Labour	Puerperal Sepsis/ Aspiration pneumonitis	1	4.8%	Survived
Total		21	100%	

ICU Management and Outcome

Monitoring: Continuous electrocardiogram (ECG), pulse oximetry, non-invasive automatic blood pressure monitoring and routine clinical observation were employed in all patients.

Invasive monitoring including central venous pressure monitoring and direct arterial monitoring was desirable; however these could not be instituted due to lack of facilities for such in our center.

Eclampsia: Ten patients had eclampsia, the age range was 20 31years. There were 6 primigravidas and 4 multiparous patients. Medical management included intravenous infusion of diazepam and one patient had magnesium sulphate therapy. All the patients were intubated using cuffed endotracheal tubes, however, 7 patients required mechanical ventilation and 3 patients had oxygen therapy via the endotracheal tubes. Six of the ventilated patients had Caeserean delivery and one had spontaneous vaginal delivery.

One of these patients who required ventilatory support had acute renal failure for which she had haemodialysis and require a stay in ICU for 3weeks. She was later discharged to the ward and home subsequently. 3 deaths were recorded among this group of patients. Haemolysis, elevated liver enzymes and low platelets (HELLP syndrome) was not recorded in any of this patient. In addition, arterial blood gas (ABG) analysis could not be done in these patients because of non-function of the ABG machine during the time this study was carried out.

Ruptured Uterus: Seven patients had ruptured uterus, age range 21 35years. There was one primigravida at 28weeks gestation who was involved in a road traffic accident. She had exploratory laparatomy and repair of uterine tear. She required ventilatory support for 48hours and was discharged to lying-in ward and subsequently home. The remaining six patients were multiparous at term referred from private or general hospital on account of prolonged labour but found to have ruptured uterus on admission into UCH labour ward. They were resuscitated with intravenous fluid using Normal saline, Hartman's solution and Isoplasma before blood became available. The estimated range of blood loss was 1.5litres to greater than 3litres. Two patients had dopamine infusion as inotropic support and frusemide on account of pulmonary oedema. One patient required mechanical ventilation and the rest had oxygen therapy via facemasks. Five patients required exploratory laparatomy and hysterectomy and one had laparatomy and repair of uterine tear. 5 deaths were recorded in this group, all deaths due to unavailability of sufficient blood units for transfusion.

Sickle Cell Anaemia: There were two patients, both aged 28years. The two patients were the only registered patients of the obstetric unit. These patients were multiparous and at 36weeks gestation, both had caesarean section on account of fetal distress.

Blood was available for transfusion in one of the patient who was later transferred to ICU for oxygen therapy and

electronic automated monitoring on account of acute sequestration crises. The other patient had severe sequestration crises after the operation; crossmatched blood was not available immediately for transfusion. She was transferred into the ICU for fluid resuscitation and monitoring, she died within 24hous of admission.

Ante-partum haemorrage (Placenta abruption): A twenty -year old patient, had placenta abruption at 33weeks gestation. She had emergency classical C/S under general anaesthesia. She was resuscitated with crystalloids and blood transfusion and was transferred to ICU for oxygen therapy and automated electronic monitoring of vital signs. She died within few hours of admission.

Prolonged Obstructed labour: A thirty-one year old patient who had prolonged obstructed labour, C/S and aspiration pneumonitis post delivery. She was transferred into ICU for mechanical ventilation. In addition, she had analgesics, antibiotics and fluid administration. She required dopamine infusion for inotropic support. She made quick recovery and was weaned off ventilator with 48hours and transferred to the lying-in ward from where she was discharged home.

Discussion

In the developed countries of the world, maternal mortality rate is on the decline while it has remained high in developing countries such as Nigeria. The Confidential Enquiries into Maternal Deaths (CEMD) in the United Kingdom (UK) which has been on-going since 1952 remains the gold standard in audit of obstetric practice in the world [6]. Recent report from 1994 1996 put the maternal mortality rate at 12.2 per 100,000 maternities in the UK and emphasis was on the access of critically ill parturient to intensive care facilities when assessing standards of obstetric care. Nigeria has a one of the highest maternal mortality rate in the world 800 to 1000 per 100,000 maternities (WHO). Intensive Care for obstetric patients is an emerging facility for the critically ill pregnant patient in Nigeria; Imarengiaye et al [5] reported an ICU admission rate of 1.1% of deliveries over a ten year period at University of Benin Teaching Hospital, Benin, Nigeria. The admission rate of 1.86% over a year period in this analysis is close to the figure quoted in the report from Benin, Nigeria.

Eclampsia and obstetric haemorrhage remains the main causes of maternal mortality worldwide, including Nigeria [6-9]. As revealed in this analysis, 47.6% of the patients admitted into the ICU had severe eclampsia, three of these patients died in the ICU of respiratory failure. In their series of obstetric admission into ICU at the Medical University of South Carolina, Collop et al [10] reported eclampsia and pre-eclampsia in 30% of their patients (6/20) while Graham et al [1] in the UK reported an incidence of 46%. The incidence of 47.6% in this analysis is quite high and suggests thst improvement in the management of hypertensive disease of pregnancy could reduce the number of patients admitted into ICU on account of Eclampsia. Such improvement would include early diagnosis, prompt referral of such patients to a hospital with better facilities, appropriate airway management and oxygen therapy in patients who develop Eclampsia. Early and prompt involvement of the anaesthetist in the management of these patients would also be beneficial.

Factors that have been reported to contribute to maternal mortality in Nigeria include poor antenatal care [9], which often leads to delivery at home or mission houses with the attendant problem of prolonged obstructed labour, risk of uterine rupture and severe antepartum or postpartum haemorrhage[11]. In this analysis, 5deaths (50%) resulted from complications of ruptured uterus as five of the seven patients with ruptured uterus died. In a twelve-year review of ruptured uterus in Ibadan, Konje et al [12] reported an incidence of 0.60% or 1:167.Uterine rupture remains a common cause of maternal morbidity and mortality for which declining economy and rising influence of religion had been blamed for its high incidence in Nigeria [11,12]. There is therefore a need for increase public awareness on the danger associated with delivery in unorthodox places and in hospital with poor facilities, particularly in women with high risk pregnancies.

Sickle cell anaemia is a common genetic disorder in Nigeria with at birth prevalence of 2% [13]. There were 2 patients with sickle cell anaemia in this series with death recorded in one patient. This patient had severe sequestration crises following Caesarean delivery and lack of compatible blood for transfusion contributed to the demise of the patient. Anaemia resulting from acute haemorrhage had been identified as a significant cause of maternal death [14]. Correction of hypovolaemia with intravenous fluids such as crystalloid and plasma volume expander would maintain the blood volume pending availability of blood for transfusion, and these fluids should be readily available in maternity units. There is a need to improve blood transfusion services with more volunteers recruited to donate blood free. The risk of HIV transmission should be a serious concern; therefore, all blood units should be adequately screened for HIV and hepatitis virus at the various levels of health care delivery.

Aspiration of gastric contents as occurred in one of the patients in this series is a recurrent factor in anaesthesia-

related complication following caesarean delivery under general anaesthesia. The relative safety of modern anaesthetic technique including the wide spread use of regional anaesthesia for caesarean delivery have significantly reduced anaesthetic related complications. Despite this safety, complication such as aspiration of gastric contents still occur [5] as some parturient prefer to be under general anaesthesia while be operated upon and in other women general anaesthesia is the only feasible technique. Prophylactic measures advocated include the use of non-particulate antacids and H_2 blocker [15, 16]. Ranitidine, an example of H_2 blocker is readily available in our hospital for prophylaxis and was employed in the patient that aspiration pneumonitis. Silent regurgitation during the induction of general anaesthesia could have occurred in this patient. The patient however made rapid recovery.

The proportion of obstetric patients requiring admission into ICU in this series was 1.86% compared to 0.75% for Homerton Hospital, London (1989 1993)[17]. Availability of a High dependency unit (HDU) in the labour ward of our hospital, where patient requiring intensive monitoring and oxygen therapy could be managed is desirable as this may reduce the number of patients requiring transfer to the ICU. The HDU has been noted to play a significant role in managing critically ill parturient and reduce requirement for ICU admission[18]. Our hospital ICU is expected to provide critical beds for all units in the hospital including medical, all surgical specialties, accident and emergency, and the obstetrics and gynaecology units, hence there is intense demand for an ICU bed with great competition and pressure on the staff.

The mortality in this series was 47.6% compared to 5.12% (2/39) 2 in the series from United Kingdom. The high mortality observed in this study could be attributed to factors such as delayed in referral, lack of appropriately trained staff, and delay in involvement of other specialist doctors in the management of the critically ill patients, dearth of monitoring facilities, equipments, and poor laboratory support including blood transfusion services. An improvement in all the factors highlighted above is strongly advocated to improve outcome of the critically ill parturient in our hospitals.

In conclusion, the management of parturient with life-threatening obstetric complications demands a multidisciplinary approach including support from the anaesthetist and the haematologist. This multidisciplinary approach had been noted to improve the outcome of critically ill patients and has been recommended by reports on maternal mortality. Health education including proper antenatal care with delivery in hospital or maternity units with qualify obstetricians and other support staff would improve the outcome of hypertensive disease of pregnancy and reduce the incidence of avoidable obstetric haemorrhage.

References

1. Graham S and Luxton M. The requirement of intensive care support for the pregnant patient population. *Anaesthesia*, 1989; 44: 581 584.
2. Umo-Etuk J, Lumley J, Holdcroft A. Critically ill parturient women and admission to intensive care: a 5-year review. *Int J Obstet Anaesth*, 1996; 5: 79 84.
3. Lapinsky SE, Kruczynski K, Seaward GR, Farine D, and Grossman RF: Critical Care Management of Obstetric Patients. *Can J Anaesth*, 1997; 44: 325 329.
4. Khor LJH, Jeskins G, Cooper GM and Paterson-Brown: National obstetric anaesthetic practice in the UK 1997/1998. *Anaesthesia*, 2000, 55: 1168 1172.
5. Imarengiaye CO, Otoide VO, Ande AB, Obiaya MO: Anaesthesia related complications following caesarean delivery necessitating Intensive Care Unit admissions in a tertiary center. *Afr J Med Med Sci*, 2001, 30: 229 232.
6. Why mothers die. *Report on Confidential Enquiries into maternal deaths in the UK* 1994 1996. London: TSO, 1998.
7. Kaunitz AM, Hughes JM, Grimes DA, Smith JC, Rochat RN, Kafrissen ME: Causes of maternal mortality in the United States. *Obstet Gynecol*, 1985; 65: 605 612.
8. Robinson APC and Lyons G: Morbidity and Mortality from obstetric anaesthesia in the 1990s. *Curr Opin Anaesth*, 1999; 12: 277 281.
9. Chukuebelu WO and Ozumba BC. Maternal mortality at the University of Nigeria Teaching Hospital, Enugu: A 10-year survey. *Trop J Obstet and Gynaecol* (Special edition), 1988; 1: 23 29.
10. Collop NA and Sahn S.A. Critically illness in pregnancy. An analysis of 20patients admitted to a medical intensive care unit. *Chest*, 1993; 103: 1548 1552.
11. Etuk SJ, Itam IH, and Asuquo EE. Morbidity and mortality in booked women who deliver outside orthodox health facilities in Calabar, Nigeria. *Acta Tropica*, 2000; 75(3): 309 313.
12. Konje JC, Odukoya OA and Ladipo OA. Ruptured uterus in Ibadan- A twelve year review. *Int J Gynecol Obstet*, 1990; 32: 207 213.
13. Akinyanju O. Issues in the management and control of sickle cell disorder (Guest editorial). *Archives of Ibadan Medicine*, 2001; 2(2): 37 41.
14. Fenton PM: Blood transfusion for Caesarean section in Malawi. *Anaesthesia*, 1999; 54: 1055 1058.
15. Thorburn J and Moir DD: Antacid therapy for emergency Caesarean section. *Anaesthesia*, 1987; 42: 352 355.
16. Mcauley DM, Moore J, McCaughey W, Donnelley BD, Dundee JW: Ranitidine as an antacid before elective Caesarean section. *Anaesthesia*, 1983: 38: 108 114.
17. Wheatley E, Farkas A and Watson D. Obstetric admissions to an ICU. *Int J Obstet Anaesth*, 1996; 5: 221 224.
18. Ryan M, Hamilton V, Bowen M, Mckenna P: The role of a high-dependency unit in a regional obstetric hospital. *Anaesthesia*, 2000: 55, 1155 1158.