Case Report

Intensive Care Management of Multi-Systemic Complications Following Major Postpartum Haemorrhage in a Resource-Limited Setting: A Case Report

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Abstract

Postpartum hemorrhage with its attendant systemic complications can pose a challenge in the developing world, resulting in morbidity and mortality. We present a case of an unbooked 38-year-old para-3 woman, who had elective Cesarean section at term on account of placenta praevia type IV under spinal anesthesia in a private facility. She developed major obstetric hemorrhage that necessitated massive blood transfusion and emergency hysterectomy. She was managed in the intensive care unit for 43 days and remained unconscious for 35 days. She developed many systemic complications that necessitated a multi-disciplinary management with a favorable outcome. She was transferred to the general ward where she spent 30 days before she was discharged home in a satisfactory condition.

Keywords: Favourable outcome; Intensive care; Management; Postpartum haemorrhage

Introduction

Obstetric hemorrhage has continued to be a chief cause of maternal deaths in Nigeria and other developing countries.[1] Postpartum hemorrhage (PPH) is among the top three causes of maternal deaths worldwide.[2] PPH has been defined as bleeding per vaginam of >500 ml following vaginal delivery or an estimated blood loss >1000 ml and 1500 ml after Cesarean Section (C/S) and Cesarean hysterectomy, respectively. Some authors have extended the definition to also include postpartum bleeding that causes a 10% acute decrease in packed cell volume (PCV) or hemodynamic compromise which requires blood transfusion.[2,3] Definition based on maternal hemodynamic compromise may be misleading since she can still maintain her cardiovascular parameters even after significant blood loss due to pregnancy physiology.[3] PPH can be classified as either primary or secondary if it occurs within 24 h or 6 weeks of delivery, respectively. It becomes a major PPH when the blood loss is >1000 ml.[3] Placenta praevia is a positional disorder of human placenta where the placenta overlies or is in close proximity to the internal cervical os, thereby preventing vaginal delivery. This can lead to a significant obstetric hemorrhage.

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Management of major PPH with ongoing hemorrhage or clinical shock is very challenging, especially in resource-limited set-ups. It requires multi-disciplinary interventions which may include admission into the intensive care unit (ICU) for organ support and advanced monitoring.[2,3] We report the management of a patient with major PPH in a resource-poor ICU facility.

Case Report

The patient was an unbooked para 3 with 3 alive who presented to our facility on account of bleeding per vaginam and loss

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of consciousness following an elective C/S delivery. She had antenatal care in a private hospital where she had elective C/S at term on account of placenta praevia type IV. She was delivered of a live baby with good Apgar score

The patient was noticed to have been bleeding per vaginam 4 h after the C/S for which she had balloon tamponade and vaginal packing. Due to persistent bleeding, she had a subtotal hysterectomy under general anesthesia with endotracheal intubation using a size 7.5 mm cuffed endotracheal tube (ETT) and received a total of 10 units of blood. The continuous bleeding necessitated her referral to Irrua Specialist Teaching Hospital for expert management.

On admission, she was unconscious, in shock and respiratory distress. Her Glasgow Coma Scale (GCS) score was 3T/15, pulse and blood pressure (BP) were not recordable, respiratory rate was 56 breaths/min. She had a PCV of 12%. She was resuscitated with fresh whole blood, colloid, adrenaline, dopamine infusion, and tranexamic acid. She was taken to the theater for exploratory laparotomy under general anesthesia with relaxant technique. Baseline vital signs were: Pulse Rate (PR) = 102b/m, blood pressure (BP) = 112/70 mmHg, Respiratory rate (RR) = 23 breaths/min and SPO_2 was 97%. Her GCS had improved to 7T/15. Intra-operative findings revealed an injury to the bladder and a bleeding cervical stump. The urologist was invited for the repair of the bladder injury. The surgery lasted for about 4 h.

She was transferred to ICU for cardiorespiratory support. Oxygen was entrained through the ETT at 5 L/min while breathing spontaneously. She was attached to a multiparameter patient monitor for continuous monitoring. Baseline vital signs were PR = 85b/min, BP = 128/70 mmHg, axillary temperature = 36.6°C, RR = 18 breaths/min and SPO2 = 98%. Her GCS score remained 7T/15. In the ICU, she had a central line inserted. She received dopamine, adrenaline and 4 additional units of fresh whole blood.

Full blood count, electrolyte/urea/creatinine, and random blood sugar were done in the immediate postoperative period which showed a hemoglobin level of 9.8 g/dl, Na+ of 148 mmol/L and HCO_3 of 12 mmol/L, other results were essentially normal.

She made good progress and was extubated on the 2nd day of ICU admission. The patient however developed multi-systemic complications as shown in Table 1 and she was re-intubated on the 22nd day of ICU admission and mechanically ventilated using continuous mandatory ventilation mode (rate = 12 cpm, FiO_2 = 0.4–1, tidal Vol. = 450 ml, PEEP = 10 cmH20). She was paralyzed with atracurium and sedated with midazolam. Weaning was commenced after 48 h of reintubation, and she was successfully extubated 5 days later.

She was unconscious for 35 days. Graded oral sips were attempted and well tolerated, and graduated to fortified meals. The physiotherapy team was also involved throughout the management of this patient. For thromboprophylaxis, subcutaneous enoxaparin was introduced after 72 h when bleeding was controlled.

On the 43rd day, she was transferred to the gynecology ward for continued care by the gynecological, urology, neurology, and physiotherapy teams. She was discharged home after 30 days in the ward when she had made a significant recovery and scheduled for follow-up at the urology, gynecology, neurology, and physiotherapy clinics.

Discussion

Intensive care unit is a special unit in the hospital that is designated to offer comprehensive care to patients who are in critical and life-threatening conditions, with a key interest in resuscitation and stabilization, physiological optimization to prevent organ failure and support of failing organ systems.[4-6] This patient was managed in a 4-bedded general ICU that admits patients from all the departments.

In developed countries, admission of obstetric patients into the ICU is uncommon, and major PPH is one of the most common indications.[7-10] In the United States, 0.07%–1.35% of women required ICU admission during pregnancy and postpartum periods.[9,11] The National Maternity and Perinatal Audit[7] studied maternity admissions to ICU in England, Wales and Scotland in 2015/16, and reported that 0.22% of obstetric patients were admitted into the ICU, while an Australian study[10] reported 1.2%. The low ICU admission among pregnant women may be due to strict adherence to antenatal care attendance, the availability and timely administration of blood and blood products whenever indicated.

In Nigeria, Okojie *et al*.[3] reported that approximately 2% of all deliveries had PPH. Embu *et al*.[12] in their study stated that 2.05% of deliveries required ICU services which contributed 17.29% of the total ICU admission. Obstetric hemorrhage was one of the commonest indications. Mortality rates of obstetric cases in the ICU are also higher in developing countries than the developed nations. Advanced maternal age, previous C/S and sponge-like tissue in the cervix in placenta praevia cases are risk factors for increased bleeding during cesarean delivery.[3] The patient reported was 38-year-old and had one previous Caesarean section. Operative delivery, high parity, increased blood loss during delivery, unbooked status, low socioeconomic status, and the presence of background medical conditions have been identified as risk factors for admission into the ICU.[13,14] These factors except high parity and background medical condition were present in the index case. Even though the blood loss could not be quantified, it was significant enough to cause cardiopulmonary and neurologic compromise and required the transfusion of 16 units of blood. High mortality has been associated with the development of multiple organ failure, and the requirement for mechanical ventilation connotes bad prognosis unless it is only used in the immediate postoperative period.[13] The patient also developed gluteal ulcer, wound breakdown and sepsis with severe hematologic, neurologic, pulmonary, and renal complications. Due to massive and acute blood loss, she presented to ICU in shock with unconsciousness and poor respiratory efforts as a

Table 1: Multi-systemic complications and management

System	Complications	D_1	D_2	Management
Central nervous system	Unconsciousness	0	35	Care of unconscious patient
	Seizures	2	10	IV Phenytoin 400 mg in 200 ml IVF normal saline nocte
	Right hemiplegia	35	-	IV Midazolam 3 mg/h via syringe drive
				Physiotherapy
				Ambulation
				Brain CT scan (multiple infarcts)
Respiratory system	Respiratory failure	0	30	Endotracheal intubation
				Mechanical ventilation
				Hudson's facemask
				Nasal prongs
				Chest physiotherapy
Renal system	Acute kidney injury: (U/O=0.3–0.5 ml/kg/h, ↑Cr=4 mg/dl, ↑Urea=102 mg/dl, HCO^3-=12 mmol/L, Na^+=149 mmol/L)	2	3	IVF 4.3% dextrose/saline
				IVF normal saline
				IVF ringers lactate
				Hemodialysis
Hematologic system	Hemorrhage	0	1	Clotting profile
				Tranexamic acid
				Fresh whole blood transfusion
Cardio-vascular system	Hypotension	0	1	Central line insertion
	Tachycardia	0	2	Dopamine and adrenaline infusion
	Hypertension	3	43	Tab ramipril 10 mg daily (NG tube)
				Tab amlodipine 5 mg daily (NG tube)
Immune system	Sepsis			IV paracetamol, 600 mg 8 hourly
	Fever (T°=38°C–39.2°C)	2	9	Wound swab MCS (yielded multidrug resistant *Enterobacter* spp. and *Klebsiella pneumoniae*)
	Burst abdomen	5	21	
	Cystocutaneous fistula	7	-	Blood MCS (yielded *Enterobacter* spp. sensitive to only ofloxacin)
	Left gluteal ulcer	18	34	
	Left eye discharge	26	28	Urine MCS (yielded multidrug resistant *Klebsiella pneumoniae* and *Candida albicans*)
				Wound debridement, apposition and dressing
				IV levofloxacin 500 mg 12 hourly
				IV meropenem 1 g 8 hourly
				Insertion of suprapubic catheter
				Bedsore dressing
				Waterbed nursing
				Two-hourly turning
				Gutt ciprofloxacin 2 drops 8 hourly
Metabolic system	Wasting syndrome	5	-	Nutritionist's review
				High energy diet
				IV Vitamin C 1 g daily
				Astymin syrup (Vitamins A, C and E)
				Milk shakes (Ensure® original)
				daily physiotherapy

D_1: ICU day it was noticed, D_2: ICU date of recovery. "-": Persisted until after discharge from ICU. ICU: Intensive care unit, CT: Computed tomography, IV: Intravenous, IVF: Intravenous fluid, MCS: Microscopy, culture and sensitivity test

result of cerebral hypoperfusion/ischemia. Cerebral ischemia generates an exaggerated sympathetic surge.[3] This could explain why the patient developed hypertension from the 3rd day of admission. The patient also developed difficulty with breathing and hypoxia on the 22nd day of admission for which she was mechanically ventilated for a few days.

The challenges encountered in the management of the index patient were enormous as a result of the complications in almost all the organs. The patient presented in severe shock due to massive blood loss and later developed septic shock and other complications as listed in Table 1. Fresh frozen plasma and other blood products were not readily available. However, fresh whole blood was always available when needed. Fresh whole blood was essential for volume replacement and clotting factors. Some of the prescribed antibiotics were not available as required due to financial constraint. The arterial blood gases were not estimated because the arterial blood gas analyzer was not functional. When the patient was on ventilatory support, we ensured adequate oxygenation (with the use of peripheral pulse oximeter) and adequate carbon dioxide elimination (based on ventilator settings). Blood

biochemistry was done daily to elicit and treat electrolyte imbalances. Intravenous Vitamin C, 1 g in intravenous infusion was administered daily. Astymin (contains essential Vitamins-A, C, E) was given through the nasogastric tube and discontinued as a result of finance.

The hospital is endowed with experienced specialists in their different disciplines. Frequent evaluation of the patient, early recognition of complications, and prompt intervention by the multi-disciplinary team accounted for the favorable outcome. Total parenteral nutrition was considered for the patient but the products are expensive and were not available in the hospital and the only place that had it was in Lagos. The transportation of the products requires some logistics. We recommend early referral to the relevant discipline whenever such a challenging case is encountered and also making use of available substitutes.

Conclusion

Major PPH with resultant multiple organ dysfunction is one of the top causes of maternal morbidity and deaths worldwide. Early ICU admission is important for organ support and advanced monitoring. Available resources should always be maximized to improve the patients' chances of survival.

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Conflicts of interest

There are no conflicts of interest.

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