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Maternal Death in the Puerperium Following Aspiration of Gastric Contents: A Case Report

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Abstract: ***This case report presents a rare incident of maternal death due to gastric content aspiration during the puerperium. A 45-year-old woman who had delivered twins via caesarean section developed epigastric discomfort and vomiting 12 days post-delivery. Despite receiving outpatient care, her condition deteriorated at home, resulting in sudden death. Postmortem findings confirmed asphyxia due to aspiration of gastric contents. The case underscores the importance of comprehensive evaluation and vigilant monitoring of postpartum women with gastrointestinal symptoms, advocating for a multidisciplinary approach to prevent such avoidable fatalities.***

Keywords: Gastroesophageal reflux, maternal mortality, postpartum complications, aspiration pneumonia, airway obstruction

1. Introduction

Maternal deaths have remained persistently high despite global efforts to reduce them. According to the UN report, every two minutes, a woman dies in pregnancy or childbirth. In 2020, there were an estimated 287,000 maternal deaths worldwide, with about 70% occurring in sub-Saharan Africa (1). Most of these deaths are preventable by instituting evidence-based interventions such as active management of the third stage of labour for prevention of postpartum haemorrhage and administration of Magnesium sulphate for pre-eclampsia and eclampsia, just to mention a few.

Tanzania has been engaged in various interventions to reduce maternal mortality. A high level of political will and accountability through the implementation of maternal and perinatal deaths surveillance and response (MPDSR) and an increased number of Comprehensive Emergency Obstetric and Newborn Care facilities have contributed in reducing maternal mortality from 566 for every 100,000 live births in 2015 to 104 for every 100,000 live births in 2022 (2). Just like in other countries, the major causes of maternal deaths in Tanzania are obstetric haemorrhage, eclampsia and sepsis(1,3). Unpublished data from the daily virtual MPDSR meetings have shown that more than 80% of maternal deaths are caused by inadequate competencies among the healthcare providers in managing these complications, including the lack of multidisciplinary consultations. Involving departments other than obstetrics and gynaecology in managing medical complications during pregnancy, childbirth and puerperium may bridge the gap in competency and save more lives. Though few maternal deaths due to aspiration have been reported globally, healthcare providers should be aware of this complication and take necessary measures, including a multidisciplinary approach to patients in puerperium with signs and symptoms of oesophageal reflux(4). Recognising aspiration-related deaths as a contributing factor in maternal mortality may prompt better screening protocols and emergency preparedness in postnatal care. This case study aims to highlight the overlooked yet potentially fatal complication of aspiration in postpartum women presenting with gastrointestinal symptoms

2. Clinical Case Presentation

On June 13, 2024, at 05:00 hours, a 45-year-old black Tanzanian female patient was brought to the Emergency Medical Department of a regional referral hospital by her spouse and relatives. Upon arrival at the hospital, the patient was found unresponsive, exhibiting neither breathing efforts nor chest movements. Her extremities were cold, and there was no palpable pulse, either centrally or peripherally. Cardiopulmonary resuscitation was done without success. Both pupils were dilated and fixed, with an absent corneal reflex. A point-of-care cardiac ultrasound was performed and revealed no cardiac activity. Death was certified at 05:40 hours.

The spouse reported that his wife had been experiencing epigastric pain for some time, but during the night, she suddenly developed difficulty in breathing and an altered mental status. Further history indicated that the deceased had experienced three pregnancies and four live births. The last pregnancy was conceived through artificial reproductive technology, resulting in the delivery of twins via caesarean section at a private hospital about a week earlier. Her relatives reported that the deceased began experiencing symptoms on the tenth postoperative day. She had complained of epigastric pain and non-blood, non-bilious vomiting, particularly after taking meals. She contacted the attending physician, who advised her to return to the hospital the following day.

On the day of her visit, she was treated with Pantoprazole 40 mg IV stat and Buscopan 20 mg IV stat. She was observed for approximately four hours and discharged with instructions to avoid spicy foods and carbonated beverages. During her visit, her blood pressure was recorded at 158/89 mmHg, which was attributed to pain. After four hours of rest, her blood pressure had decreased to 126/72 mmHg. A urine sample for the

protein test was negative, and severe pre-eclampsia was ruled out.

In the early morning hours, she experienced two episodes of vomiting after consuming porridge. She requested her spouse to allow her to rest. The spouse was later awakened by grunting noises and found his wife struggling to breathe before she eventually stopped. He attempted to perform cardiopulmonary resuscitation, but she did not respond. Consequently, he took her to the hospital accompanied by relatives. She was pronounced dead after a failed cardiopulmonary resuscitation on arrival.

Antenatally, she had made six visits, with the first booking at GA of 15 weeks + 6 days. The fundal height was 18 cm with twin gestation. Her Haemoglobin was ten g/dl, random blood glucose 7.1 mmol/L and blood pressure 97/69 mmHg. The urine for protein was negative in all her visits. Throughout the visits, her systolic BP ranged from 90 to 131 mmHg, while the diastolic blood pressure ranged from 69 to 87 mmHg and the random blood glucose from 5.9 to 7.1 mmol/L. Her booking body weight was 87kg with a height of 178 cm (BMI = 27.5 Kg/m^2). The total weight gain in the course of this pregnancy was 11 Kg, from 87 to 98 kg on her last visit. Apart from these findings, no abnormality was detected in all antenatal visits.

3. Autopsy Findings

After informed consent by the spouse, a postmortem examination was conducted by a pathologist-led team to ascertain the cause of death. The autopsy revealed a female body with no signs of trauma. There was deep peripheral cyanosis on the fingernails (Fig.1a) and a healed suprapubic, horizontal (Pfannenstiel) surgical scar. There was a transverse surgical scar at the lower part of the uterus, which had healed. Abdominal organs were grossly normal. Chest organs, including the heart, were also grossly normal. The stomach mucosa showed no erythematous changes. There were whitish to grey semi-solid food particles within the respiratory tree in the bronchus (Fig. 1b). No embolism was found in the pulmonary artery.

The report derived that difficulty in breathing a few hours before death correlated with deep cyanosis and the presence of semi-solid food in both bronchi seen during post-mortem examination, and complaint of epigastric pain correlates with gastro-oesophageal reflux disease. It was thus concluded that the cause of death was asphyxia due to aspiration of gastric contents.

Figure 1a: Deep cyanosis on fingernails.

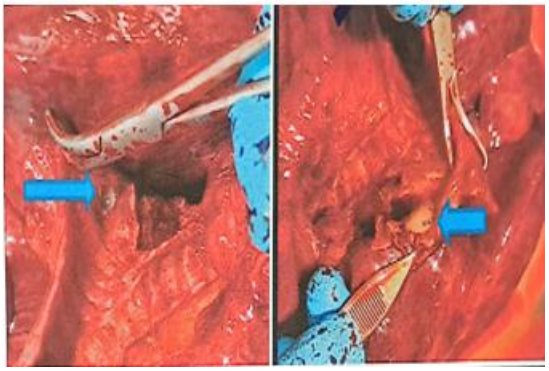

Figure 1b: Semisolid food particles in the bronchi compared with a live person

4. Discussion

Maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes(5). According to this definition, any death of a woman during this period, apart from an accident, is suspected of being caused by complications associated with pregnancy until proven otherwise. This lady died in the puerperium 12 days after having delivered twins by caesarean section and was on symptomatic treatment for clinical features suggestive of Gastroesophageal Reflux Disease (GERD). Therefore, her death was categorised as an Indirect maternal death.

The most frequent causes associated with sudden maternal death in the postpartum period are hypertensive disorders of pregnancy, pulmonary thromboembolism, haemorrhage and cardiac disease(6–9). A thorough mortality review, coupled with a postmortem examination on some occasions, can establish the exact cause of maternal death with a sudden onset like this one.

Throughout her antenatal visits, the deceased had her blood pressure measured. The booking BP was 90/69 at GA of 15 weeks plus five days. The BP taken at GA 34 weeks was 131/87, which shows an increase in systolic pressure of 41 mmHg and diastolic pressure of 18 mmHg. This might have been a sign of gestational hypertension if we used the definition of elevated systolic blood pressure of 30 and diastolic blood pressure of 15 from 20 weeks of gestation, compared to booking values in the first trimester(10). The elevated blood pressure of 158/89 mmHg during admission was rightly associated with acute epigastric pain. There is the release of norepinephrine and corticotropin-releasing hormones by locus coeruleus in acute pain, and these hormones cause vasoconstriction and elevated blood pressure(11). Post-partum pre-eclampsia may show similar symptoms; however, this is ruled out by the absence of proteinuria and regression of the blood pressure to normal values of 126/72 mmHg after administration of antacids and rest.

Pregnancy is a hypercoagulable state with risks of thromboembolism even during puerperium estimated to be approximately 20-fold(9). The risk of pelvic deep venous thrombosis is increased even more with multiple pregnancies

due to the great pressure on the pelvic blood vessels. The absence of clots in the pulmonary blood vessels during postmortem ruled out thromboembolism as the cause of death.

Many pathologies may cause heart disease, dysfunction and sudden death during pregnancy and puerperium. These pathologies run a different course from the gradual onset of the symptoms to sudden death. Multiple gestation is a risk factor for peripartum cardiomyopathy, while hypertensive disorders of pregnancy are associated with coronary artery diseases and pregnancy-associated myocardial infarction. However, pregnancy has no role in newly diagnosed valvular disorders of pregnancy(7,12). The deceased had no prior signs of any cardiac disease, but this does not rule out as the cause of death. During the postmortem, the pericardium looked normal without pericardial effusion or haemorrhage, and coronary vessels, heart valves, myocardium, and chambers did not reveal any pathology. These findings show that cardiac disease was not likely to be the cause of death.

Overdistension of the uterus due to multiple gestation coupled with caesarean section are two risk factors for postpartum haemorrhage(13). Excessive blood loss without replacement by transfusion might have caused severe anaemia, which may have led to heart failure and death in the postpartum period. However, a report from the hospital where the caesarean section was performed stated that there was non-significant blood loss during surgery, and the deceased did not experience postpartum haemorrhage.

During pregnancy, the enlarging uterus causes increased pressure in the abdomen and mechanically causes reflux in the oesophagus, which lies in the area of negative pressure in the chest cavity. The gastroesophageal reflux is exacerbated by the reduction of lower oesophageal sphincter tone due to an increase in Progesterone levels during pregnancy(14). Though levels of progesterone fall after delivery, it has been reported that changes caused may constitute a risk factor for developing gastroesophageal reflux symptoms even within one year postpartum. The deceased developed symptoms and signs of gastroesophageal reflux in the puerperium, which were sub-optimally managed. With the severity that she had shown, it would have been appropriate to keep her at the facility for close monitoring and more investigations, including endoscopy and involving physicians in a multidisciplinary approach(15). However, the deceased received inadequate management and was discharged prematurely, leading to the worsening of her condition at home, leading to her death. This calls for healthcare providers to be vigilant with postpartum women who develop complications because most maternal deaths occur during this period. The finding of aspiration as a cause of sudden death, in this case, highlights the importance of having a broader base of differential diagnoses and performing autopsies for sudden maternal deaths with causes which are not clear.

5. Limitations

This is a case study of a rare condition with limited literature and publications on the subject. More documentation and reporting of similar cases are needed to build more evidence-based recommendations on standardised management of similar cases

6. Conclusion

Although gastroesophageal reflux is common during and after pregnancy, its progression to fatal aspiration remains underrecognized. This case emphasises the importance of thorough assessment and prompt intervention in postpartum women presenting with gastrointestinal symptoms. A multidisciplinary and cautious approach can significantly reduce preventable maternal deaths.

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Declarations

Authors' contributions: Mzee M. Nassoro drafted the manuscript, while Dr. Sunday Dominico, Dr. Alex Ernest, Mr.Habib Ismail and Dr. Ahmed Makuwani reviewed the manuscript. Dr. Amon Bamanyisa performed the autopsy and prepared the pathology report.

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Availability of data and materials: Identification details of the case are confidential and only de-identified information is available for quality improvement purposes. Further Details of this death are kept under lock and key at the hospital where it occurred as per Maternal and Perinatal Deaths Surveillance and Response Guidelines.

Ethical approval and Consent to participate: Informed consent was obtained from the deceased's spouse to use the information for developing the case report.

Consent for publication: Written informed consent was obtained from the spouse of the deceased for the publication of this case report and the autopsy examination images. A copy of the written consent is available for review by the editorial team of this journal.

Competing interests: The authors declare that they have no competing interests.

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