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CASE REPORT

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Avoidable birth injury complicated with limb gangrene: a reflection of an in-efficient health system

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Abstract*:* Gangrene of the lower extremities in neonates is a rare event except in traumatic cases. When risk factors for trauma to the limb of the newborn exist, it is important to prevent such injuries and when they are inevitable, appropriate management of injuries should further prevent complications such as limb gangrene. This report describes a newborn whose birth was poorly managed and thereafter sustained traumatic unilateral lower limb gangrene from the management of femoral fracture at a traditional bone setting. This report aims to highlight the deficiencies in the Nigerian health system which permitted this unfortunate scenario.

Key words: Birth injury, Lower limb gangrene, neonatal femoral fracture, unorthodox bone setting practices.

Introduction

Birth injuries are avoidable or inevitable impairment of neonatal body function due to adverse events that occur during the process of labour and/or delivery with injuries to the newborn resulting from mechanical forces categorized as birth trauma.[1] The incidence of birth injury is unclear with reported incidence rate ranging from 0.2 to 37 per 1000 births.[1-4] Majority of birth injuries are minor and often unreported, however, it is one of the main causes of newborn deaths accounting for 27% of neonatal deaths in Nigeria.[5, 6]

Fracture of long bones as a form of birth injury is not common.[5] Commonly affected is the humerus but the femur may be involved during a difficult breech delivery when traction is applied to extract the fetus.[6, 7] Gangrene which refers to the death of body tissue due to lack of blood supply from an underlying cause, injury and/or infection is uncommon in newborns.[8] However, it may complicate a poorly managed fractured limb.[6] The management of limb gangrene is almost exclusively limb amputation when limb salvage is impossible or poses bigger risk to the affected infant.[9]

The causes of birth injury are multi-factorial with nearly one half been potentially avoidable with anticipation and recognition of obstetric risk factors.[10, 11] Lack of skilled attendants at delivery is one of the major factors responsible for avoidable birth injury with high rate of birth injuries reported in these settings.[5] Recommendation by World Health Organization for skilled attendance at delivery excludes Traditional Birth Attendants.[12] Despite this recommendation and existence of modern health facilities in Nigeria, over 58% of deliveries are conducted by unskilled birth attendants.[13]

A case of birth injury in the form of long bone fracture from poorly managed delivery as well as lower limb gangrene from poor management of the fracture and eventual death is presented to highlight the preventable medico-social circumstances resulting from poor utilization of health services in the developing world as previously reported.[14]

Case description

Baby A was a 10 day old male neonate who presented at the Children Emergency Room of Babcock University Teaching Hospital (BUTH) on referral from a private hospital on account of deteriorating clinical state following 8 days of care for fracture of the right femur noticed on his second day of life. He was delivered per vaginum at a traditional birth home to a 23-year old primiparous woman who had earlier declined the offer of elective caesarean section at the referral private hospital. The indication for the proposed caesarean delivery was persistent breech presentation in a primigravida at term. The mother had prolonged rupture of membranes of about 72 hours prior to delivery and baby did not cry

well at birth. Other details of the perinatal events at the traditional birth home were not available. He was noticed by his mother to have a fracture of the right femur on the second day of life and was subsequently taken to a traditional bone-setter same day where the fractured site was immobilized with sticks and bandaged for about 24 hours following which he developed fever, blisters and swelling of the right lower limb. This prompted presentation at the referral private hospital where he had intravenous fluids and antibiotics, serial blood transfusions and dressings of the wound on the fractured limb. After 8 days of care in the private health facility, he was referred to BUTH on account of deteriorating clinical state.

The mother received ante-natal care at both the referral private hospital and the traditional birth home. Pregnancy was not adversely eventful and obstetric scans done at various stages of pregnancy all confirmed breech foetal presentation with no in-utero fractures or other congenital abnormalities noted. The mother is not a known diabetic or hypertensive patient and she neither smokes cigarette nor consumes alcohol. She is a school certificate holder who deals in patent medicine while the father is a 24 year old plywood trader.

At presentation in BUTH, Baby A was acutely ill, severely pale and lethargic with axillary temperature of 38.3°C. His weight, occipito-frontal circumference and length were 2.6kg, 33.0cm and 48.0cm respectively which were appropriate for age. The dressing over his right lower limb was soaked with serosanguinous fluid and malodorous. His right thigh was swollen with extensive right lower limb gangrene (Figure 1). The examination of the other systems did not reveal any abnormalities.

Fig 1: Shows a gangrenous right lower limb with extensive devitalized tissue.

The admission diagnosis was late onset neonatal sepsis with severe anaemia following gangrenous fractured right lower limb. Complete Blood Count showed hematocrit reading of 21%, Total White Cell Count was 9,400/mm³ with neutrophil (58.7%), lymphocytes (34.9%) and platelet count of 127,000/mm³, while random blood glucose was 82mg/dl. X-ray of the right lower limb showed fracture of the mid-shaft of the right femur (Figure 2). He had intravenous fluids, intravenous ceftazidime and gentamicin, a single volume exchange blood transfusion and daily dressing of the gangrenous limb. The post- EBT PCV was 33%. Phenobarbitone was commenced when he developed repeated seizures 24 hours into admission.

Fig 2: Plain x-ray of the right lower limb showing a displaced transverse fracture of the upper one-third of the right femur.

After two days of medical stabilization, he had a provisional right knee disarticulation and debridement of the distal thigh tissues under general anaesthesia (Figure 3 and 4). Intra-operative findings included extensive wet gangrene of the right foot and leg, with circumferential skin necrosis of the lower two-third of the thigh as well as a proximal femoral shaft fracture.

His clinical state deteriorated progressively till the third post-operative day when he died following development of apnea and a bulging and tense anterior fontanelle Lumbar puncture could not be performed due to his poor clinical, while trans-fontanelle ultrasound scan and computerized tomographic scan of the brain could not be done for logistic reasons and financial constraint. Although the parents declined autopsy, post–mortem lumbar puncture showed xanthochromic cerebrospinal fluid with white cell count of 2-3 per high power field and red cell count of 20-24 per high power field; no organism was demonstrated on direct gram staining and CSF culture yielded no growth after 48 hours incubation at 37°c. The result of blood culture obtained after his demise showed gram negative bacilli sensitive to ceftazidime.

Fig 3: Right lower limb stump after de-articulation of the limb

Fig 4: Patient with bandaged right lower limb after provisional de-articulation

Discussion

This case highlights the poor outcomes of a common scenario in obstetric care in Nigeria where parturient women refuse the offer of abdominal deliveries even in the face of incontrovertible indications.[15] The reasons for declining the offer of elective caesarian section in this case is not available to us however studies have shown aversion for caesarian section to be borne out of morbid

fear for surgeries, religious reasons as well as the financial implications of surgery.[16, 17] Nigeria Demographic and Health survey conducted in 2008 showed that only 38% of women delivered in health facilities.[18] As also highlighted in this report, many women who receive orthodox antenatal care end up delivering in unorthodox centres.[19-21] Reasons for this from this case could be attributed to the poor socioeconomic status of the parents.

The Nigerian health System is heterogeneous comprising orthodox and alternative health care providers some of whom are registered while some are not.[22] Breech presentation is a predictable risk factor for long bone injury during birth.[10] The protocol used for training of TBAs in Nigeria stipulates that high risk pregnancy should be referred to a higher level of care.[23] The TBA should have identified the breech presentation and the woman should have been referred to the next level of care. This is probably due to poor regulation by the government agencies in charge of monitoring health professionals to ensure trained and certified TBAs are practicing rightly and those without the requisite training and certification are apprehended. Although traditional bone setters are currently not recognized by law in Nigeria, they constitute a group of alternative health service providers that are commonly patronized.[24] Complications arise in this setting mainly from methods used in managing these fractures.[25, 26] This was the scenario in the index case in which ischemia of the limb and overwhelming sepsis as a result of poor management of the femoral fracture led to the gangrene of the extremity. Late referral of the patient to our centre from the referral private hospital also depicts negligence on the part of the attending physician. All the factors identified in this case expose the deficiencies in the current state of the health system in Nigeria viz-a-viz poor regulation by the government agencies in charge of monitoring health professionals. Short term surgical management for extensive gangrene of this nature consists of amputation of affected part. This intervention is associated with high risk of intra and postoperative morbidity which may account for the turbulent clinical course experienced by our patient post-surgery.

Socioeconomic factors have been found to influence the utilization of maternal health services in Nigeria.[27, 28] A large proportion of the populace are saddled with the burden of high out-of-pocket payment for medical services because they are not covered by the NHIS scheme.[29] Though we do not have the details of the events that transpired at the referral private Hospital, perhaps, if the family had the opportunity of access to counseling, psychological support, and social security to off-set the financial burden, they may have accepted the offer of surgical delivery and the infant may not have sustained the birth injury.

The Government and Health policy makers must ensure regulation of the practices of both orthodox and alternative medicine practitioners. Training and retraining of unskilled birth attendants should be carried out with emphasis on prompt referral of high-risk pregnancies. Furthermore, the Health Care Delivery System nationwide should be improved by widening the coverage of the National Health Insurance Scheme so as to reduce out-of-pocket payment for health care services.

Author's Contribution
OOM conceived the research idea. All the authors contributed to drafting the manuscript and made substantial contributions to the intellectual content
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