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Septicaemia complicated by Digital Gangrene - A Case Report

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Adeodu OO, Senbanjo IO. Septicaemia complicated by Digital Gangrene - A Case Report. *Nigerian Journal of Paediatrics* **2005;31:137.** A four-and-a-half-year old girl presented with gram-negative septicaemia that was complicated by digital gangrene. This complication was only suspected when the digits became discoloured. Specific pharmacological inhibition of platelet aggregation was not possible. Although the patient survived, she developed auto-amputation of some digits.

Introduction

SEPTICAEMIA sometimes follows local infections in children.[1,2] The complications usually encountered in children with septicaemia include anaemia, congestive cardiac failure, metastatic abscesses and disseminated intravascular coagulation. However, there are rare complications such as purpura fulminans, digital gangrene and necrotizing fasciitis,[3-6] but these, to the best of our knowledge, have hitherto not been reported in Nigeria. A case of septicaemia complicated by digital gangrene is presented to highlight the difficulty in anticipating this complication or in preventing eventual loss of digits if definitive pharmacologic inhibition of platelet aggregation is not instituted.

Case report

OA (Hospital number 205316), a four-and-a-half-year old girl, was brought to the hospital by her maternal aunt with a history of unrelenting fever of three days' duration and three episodes of generalized tonic-clonic seizures of one day duration. There were no catarrhal or urinary symptoms. The child had had febrile convulsions in the past. She had been living with her middle-aged aunt for over two years. Her biological parents lived eighty kilometres away. The child was given chloroquine syrup at home at the beginning of the illness and, prior to her referral to our facility, she had received intramuscular (im) paraldehyde for her convulsions at a nearby comprehensive health centre.

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On examination, she was very ill looking, stuporose, mildly dehydrated and restless. She was anicteric and not pale. She weighed 15 kilograms, her temperature was 39°C, pulse rate 180 beats/min, respiratory rate 52 breaths/min, and her blood pressure was $^{100}/_{50}$ mmHg. No abnormalities were detected in her cardiovascular and respiratory systems. Abdominal examination however, revealed tender hepatosplenomegaly of 6cm and 5cm, below the right and left costal margins, respectively. There were no signs of meningeal irritation.

The differential diagnoses entertained were cerebral malaria and septicaemia. Side laboratory haematocrit was 33 percent, while malaria parasitaemia was graded 2+. Sepsis work-up was carried out on blood, urine, stool and cerebrospinal fluid (CSF) samples in addition to retroviral studies, appropriate chemical assays and full blood count. She was rehydrated and commenced on intravenous quinine infusion (20 mg/kg stat, then 10mg/kg q 8hr), intravenous *Ampiclox* (1 gram q 6hr) and intramuscular gentamicin (40 mg q 12hr) pending the result of the blood culture. She was digitalized (total dose 0.04mg/kg) and commenced on phenobarbitone syrup (5mg/kg/day) and im paraldehyde as required at 3ml per dose.

Her haemoglobin genotype was AA, while her HIV serological test was negative. Response to treatment was poor despite a rapid clearance of malaria parasites from the blood and the initial normal results of the CSF (chemistry and culture), urine (analysis and culture), stool (microscopy) and blood (haematology and chemistry). By day 5 of admission however, she was still febrile and irritable, but fully conscious. Her temperature had slowly risen to 40 °C despite the use of antibiotics and antipyretics. She had become pale with a haematocrit of 23 percent, total leucocyte count of 8.4×10^9/l with toxic granulations of the neutrophils,

and severe thrombocytopenia (< 10.0 x 10^9/l). The terminal digits of both hands and feet became blue, cold and un-reactive to pin prick. The radial and dorsalis pedis arterial pulsations were present and bounding. A purpuric rash was noticed on the inner aspects of the arms with mottling of the palms and soles. There were no associated swellings or pain in the joints, while urinary output was normal. The blood culture result which was received on this day of reevaluation, showed a heavy growth of untyped coliforms. Gram-negative septicaemia complicated by incipient intravascular coagulation and vasculitis of the digital end arteries were then suspected.

The antibiotics were changed to ceftriaxone (1gm daily), intravenous hydrocortisone (5mg/kg/dose) was added, while warm compresses were applied to the hands. The confused and distraught guardian refused the transfusion of blood or blood products for the patient as well as all subsequent attempts at venepuncture for coagulation studies. Her fever subsided on day 7 of admission and her general condition started to improve. By day 10, the terminal digits of the hands and feet had become dark and dry. By day 12, auto-amputation of some of the digits occurred leaving paraesthetic stumps; the right hand was most affected. The depressed aunt refused plastic surgical consultation and demanded for and forced a discharge of her ward who was discharged home on haematinics. Over a period of two years, the child and her aunt were regularly visited by the paediatric registrar and counselled. She gradually became less hostile as she eventually understood the nature of her ward's illness. Her feelings of guilt and depression also eased. Figures 1 and 2 were taken during one of such visits.

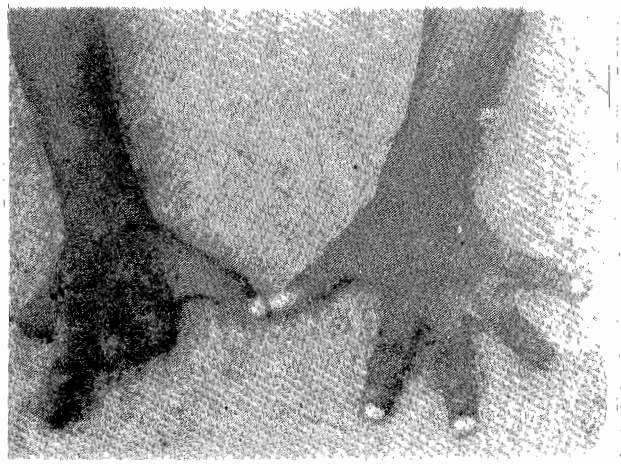

Fig. 1 The patient's hands showing severe auto-amputation of digits which was worse on the right.

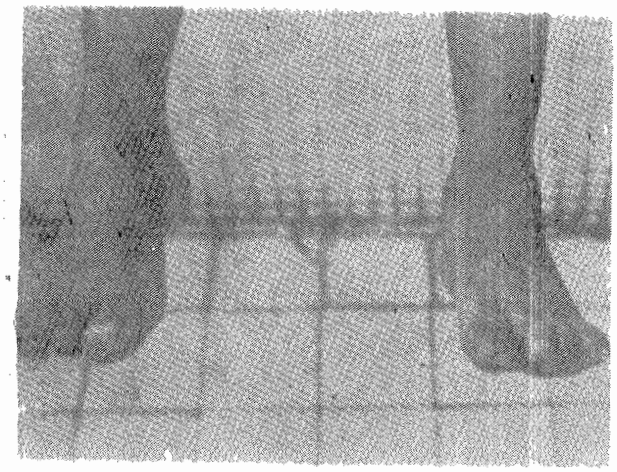

Fig. 2 The patient's feet showing less severe auto-amputation and stumping of digits.

Discussion

Septicaemia refers to a constellation of symptoms and signs due to the presence of rapidly proliferating pus-forming organisms in the blood stream. It is a condition that should be recognized early and treated with appropriate antibiotics. Digital gangrene secondary to systemic necrotizing vasculitis has been reported to complicate septicaemia by pneumoccocal, streptococcal and meningoccocal infections.[4,6] Similarly, par vovirus B19, cytomegalovirus , infectious mononucleosis and human immuno-deficiency virus (HIV) have been implicated in some cases.[7] In this instance however, septicaemia appeared to have been caused by gram negative coliforms. Gram-negative septicaemia may cause immune-complex damage to the vascular endothelium leading to stimulation of a cascade of reactions responsible for haemostasis. The clots formed are dissolved through the fibrinolytic pathway inducing more clot formation with eventual consumption of the clotting factors. There are three possible sequelae of this derangement.[8] First, the vasculitis may result in symmetrical diffuse haemorrhages in the form of petechiae and purpura. Secondly, the dissolved clots may embolize and impact on distal arterioles causing ischaemic necrosis and gangrene. Thirdly, consumption coagulopathy may eventuate in uncontrollable bleeding from various sites. Although our case did not manifest with frank bleeding, the development of purpura,

anaemia, severe thrombocytopaenia and toxic granulations of neutrophils suggested some degree of intravascular coagulation.

In the preventive management of incipient digital gangrene complicating septicaemia, the use of potent antibiotics to contain the primary infection is vital. Additionally, certain ancillary drugs may prove useful. There has been a gradual evolution of ideas about the appropriate ancillary drug regimens, from anti-inflammatory agents like steroids such as hydrocortisone and prednisolone, to various cytotoxic drugs like azathioprine and cyclophosphamide, heparin and the occasional use of immunoglobulin therapy.[3,5,7,9,10] These drugs show variable effectiveness and may lead to the development of considerable toxic manifestations. Lately, the prostacycline analogue, iloprost has been found to have anti-inflammatory properties and to inhibit platelet aggregation, which is a proven mechanism in the development of digital gangrene. Zulian *et al* [7] reported the first successful application of this treatment in a child in 1998. In our case, necrotizing vasculitis with incipient digital gangrene was only suspected as complicating septicaemia on discovery of the colour change to the digits. This has been the usual experience of earlier workers.[6,7] It was at this stage that, in addition to anti-infective drugs, definitive inhibition of platelet aggregation with iloprost which was not available, should have been commenced together with ancillary drug regimens. Heparinisation was deemed inexpedient since detailed investigation of the haematological and clotting profile of the patient was denied. It is not surprising therefore that auto-amputation could not be prevented considering the sub-optimal drug management.

Vasculitic syndromes associated with sepsis may occur in children and lead to digital gangrene. Paediatricians working in African communities must therefore be aware of this rare possibility. It will be worthwhile to equip tertiary health facilities in these communities with pharmacologic agents that may help to prevent this debilitating cosmetic problem.

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