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MEDICAL MEMORANDA

Spontaneous Popliteal Artery Occlusion Complicating Childhood Nephrotic Syndrome*

A. ADENIYI AND J. M. T. ALEXANDER

Department of Paediatrics, University College Hospital, Ibadan, Nigeria

Adeniyi A. and Alexander, J. M. T. (1974). *Nigerian Journal of Paediatrics*, 1 (1), 38. **Spontaneous Popliteal Artery Occlusion Complicating Childhood Nephrotic Syndrome.** Spontaneous popliteal artery occlusion occurring in a nine-year old Nigerian girl with quartan malarial nephrotic syndrome during a relatively quiescent stage of the syndrome is reported. At the time this vascular accident occurred none of the recognized predisposing factors (recent femoral venepuncture, and/or administration of corticosteroids and diuretics) existed. It is therefore suggested that infection, associated with the thrombo-embolic potentialities in patients with nephrotic syndrome, may be factors in the development of this rare complication in the present case.

FEMORAL artery occlusion following femoral venepuncture and fatal massive pulmonary embolism have been reported in children with nephrotic syndrome during active treatment with corticosteroids and thiazide diuretics (Goldbloom, Hillman and Santulli, 1967; Gootman, Gross and Mensah, 1964; Cotton, 1967). To our knowledge no case of spontaneous popliteal artery occlusion in a nephrotic patient without well-known predisposing factors has been reported previously. The present report concerns such a patient and the absence of recognized predisposing factors in this case is of special interest since it raises the possibility of other aetiological factors.

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CASE REPORT

O. O. (U.C.H. 209587), a nine-year old Nigerian girl, was first seen in December 1968 at the age of five years. The mother gave a 3-month history of an insidious onset of swelling of the face, abdomen and limbs. There was no previous history of fever, sore-throat or haematuria. On examination there was generalised oedema and massive ascites. She was normotensive, and the respiratory, cardiovascular and neurological systems were normal. The urine showed heavy proteinuria. The biochemical findings (Table) included marked hypoproteinaemia, hypoalbumiaemia, raised serum cholesterol and normal electrolytes and urea. Differential protein clearance studies showed poorly selective proteinuria (CIgG/CA —37 per cent). Plasmodium *malariae* parasites were found in the peripheral blood. The

TABLE

Serum Proteins, Urea and Cholesterol with Corresponding Blood Pressure Levels

	Total Protein (Gm/100 ml	*Plasma Albumin (Gm/100 ml)*	*Urea (Gm/100 ml)*	*Cholesterol*	*B.P. mm/Hg*
At initial presentation	3·9	0·39	22	358	120/70
Prior to steroids therapy	3·9	1·3	16	655	120/80
On steroids	3·9	1·0	34	598	130/100
After stopping steroids	4·3	1·4	31	535	115/70
At the time of arterial occlusion	4·5	1·2	25	460	100/70

renal biopsy revealed a focal sclerosing lesion with capillary-wall thickening involving about $33\frac{1}{3}$ per cent of all the glomeruli seen. There was no hypercellularity and the tubules were normal. This was classified as Grade I Quartan Malarial Nephrotic (QMN) syndrome (Adeniyi 1971; Hendrickse, *et al.*, 1972). Immunofluorescence studies showed immune complexes of the IgG, IgM and C3 component of complement, deposited in a granular manner in the glomeruli.

She was treated with chloroquine and primaquine, hydroflumethiazide, a high protein and low salt diet. Repeat renal biopsy fifteen months later showed a more severe lesion involving about 50 per cent of all the glomeruli seen and the lesion was classified as Grade II QMN. Severe relapse of oedema and ascites occurred 26 months later, and increased doses of diuretics failed to produce significant diuresis. She was therefore treated with prednisolone for 8 weeks—2 mg/kg/day for four weeks, and 1.5 mg/kg/day for three consecutive days a week for a further period of four weeks. Cyclophosphamide (5 mg/kg/day) was introduced during the later half of prednisolone therapy and continued for 16 weeks. She developed hypertension (B.P. 130/100 mmHg) while on prednisolone, and mild alopecia during cyclophosphamide therapy. Hypertension persisted, but returned to normal level (B.P. 100/70 mmHg) four months after prednisolone was discontinued. Although oedema subsided, proteinuria and hypoproteinaemia persisted. All drugs were discontinued and she remained in fairly good health for the next fifteen months.

In October 1972 she presented with a history of fever, painful cold swelling and greyish discolouration of her right leg below the knee. The lesion on the leg started as an infected pustule over the dorsum of the foot about 5 days previously. She denied any trauma to the leg, but gave a history of diarrhoea a week before. She was toxic, mildly dehydrated and febrile (T. 39°C). The pulse in the femoral artery was palpable, but absent in the popliteal, anterior and posterior tibial arteries. She was normotensive, and urine analysis revealed heavy proteinuria and no glycosuria.

A clinical diagnosis of popliteal artery occlusion was confirmed by arteriography which showed complete occlusion of the artery (Fig. 1). Antibiotics, bed rest, and warmth produced slight clinical improvement. The cold tender leg became warm and non-tender down to the ankle. A repeat arteriogram a week later confirmed the occlusion and demonstrated collaterals through the geniculate branches of the femoral artery. After the gangrene became fully established below the ankle (Fig. II), the leg was amputated below the knee.

Discussion

Vascular disorders are uncommon in idiopathic childhood nephrotic syndrome, and in the early stages of quartan malarial nephrotic syndrome. However, generalised vasculitis and hypertension

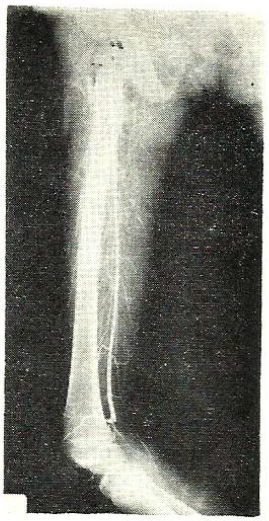

Fig. 1 Arteriogram showing complete occlusion of the artery at the level of the knee-joint.

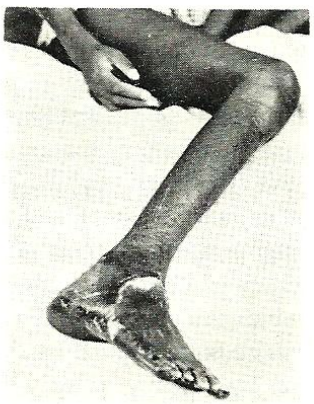

Fig. 2 Right leg of patient showing fully-established dry gangrenous foot.

may be found in other forms of nephropathies early or late in the course of the particular reno-vascular disease.

Arterial occlusion as well as venous thromboses have been reported in few patients with nephrotic syndrome during prednisolone therapy and thiazide diuretics (Gootman, Gross, and Mensah, 1964; Levin, Zamit, and Schmaman, 1967; Cotton, 1967); pulmonary occlusion was demonstrated at necropsy of two such children. Goldbloom, Hillman, and Santulli (1967) also reported of three children receiving prednisolone and diuretics in whom femoral venepuncture was followed by femoral artery thrombosis and death in one of them. Recently, Cameron *et al.* (1971); Harrison and Wood (1972), have reported instances of femoral artery thrombosis following femoral venepuncture in nephrotic children receiving corticosteroids and diuretics. In all of these reports the peripheral vascular occlusion was associated with corticosteroids, diuretics therapy, and/or femoral venepuncture.

The exact cause of the vascular accident in these nephrotic patients is not known. It has however, been suggested that there may be alterations in certain blood factors (factors VII and VIII, platelets, fibrinogen and lipids) in nephrotic syndrome (Dossetor, Gutelins, and Kendall, 1961; Levin, Zamit and Schmaman, 1967; Cotton, 1967. Cameron *et al.*, 1971) have suggested that trauma to the femoral artery during venepuncture may predispose to occlusion in the presence of hypovolaemia, sluggish circulation and increased blood coagulability—factors known to exist in severe nephrotic syndrome. Nasbeth and Jones (1963) have however, reported cases of thrombosis and gangrene in non-nephrotic infants following femoral venepuncture.

Our patient differs significantly from those previously reported in three important respects:

(*a*) steroids and thiazide diuretics had been discontinued fifteen months prior to the vascular occlusion; therefore, these drugs may not be incriminated;

(*b*) femoral venepuncture was not performed on the patient;

(*c*) the popliteal and not the femoral artery was occluded.

While the exact cause of popliteal artery occlusion in this child is not known, an initial mild trauma to the foot in a child who lives on the village farm could not be ruled out. Infection may also play a role, although no organisms were isolated from blood cultures or from swabs taken from the wound. The basic thrombo-embolic potentialities of patients with nephrotic syndrome

together with an initial trauma and subsequent infection appear to be the aetiological basis for this uncommon complication of the syndrome.

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