HYPERTENSIVE CARDIAC FAILURE DUE TO AN ABERRANT RENAL ARTERY

REPORT OF A CASE IN AN AFRICAN CHILD

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The classic experiments of Goldblatt *et al.*[1] aroused great clinical interest in the relationship between unilateral kidney disease and hypertension. Numerous reports have appeared in the literature in which the hypertension has been relieved by the surgical removal of one diseased kidney.[2, 3, 4] The literature[5, 6, 7, 8] invalidates the impression that disease of the urinary tract is causally related to elevation of blood pressure, although the causal relationship in individual cases cannot be denied. There are a number of case reports[9, 10, 11] in which interference with blood supply to one kidney has produced hypertension in children, but these cases are rare enough to warrant this additional report.

CASE REPORT

W.K., a female African child aged 4 years, was admitted to hospital on 9 April 1954 with a 4 months' history of breathlessness on exertion and swelling of the abdomen and legs. She had always been smaller than her friends of the same age, but there had been no previous illness of note. She slept propped up on 2 pillows, but there was no history of paroxysmal nocturnal dyspnoea. There was no frequency of micturition, nor had blood ever been noticed in her urine. The family history was non-contributory.

On admission the child was in congestive heart failure, with dyspnoea, raised jugular venous pressure, hepatomegaly and ascites. The heart was enlarged, the apex beat being felt in the 6th left intercostal space in the anterior axillary line. A heaving impulse indicated left ventricular hypertrophy. There was a triple rhythm at the apex with a soft systolic murmur. The second heart sound at the aortic area was loud and split. The radial pulse was regular, with a rate of 100 per minute. The femoral pulses were easily palpable. The blood pressure in the arms was 154/108 mm. Hg, and in the legs 160/110. The lung fields were clear and some oedema of the ankles was present. There were no other abnormal findings. The urine contained 2 plus of albumin with occasional hyaline casts, red blood-cells and leucocytes.

Radiological examination of the chest (Fig. 1) showed marked cardiomegaly with normal lung fields. Fluroscopy showed that the enlargement was due mainly to the large left ventricle, with the right ventricle enlarged to a lesser degree. Electrocardiography (Fig. 2) showed a left axis deviation in the standard leads with evidence of left ventricular hypertrophy in the unipolar chest-leads. The haemoglobin was 13 g.% and the white blood-count 4,900 per cmm., with a normal differential count. The blood sedimentation rate was 13 mm. in the first hour (Westergren). The standard Eagle test for syphilis was negative and the serum contained 100 units of streptococcal anti-haemolysin per ml. The blood urea was 22 mg. per 100 ml. and C-reactive protein was present (2 plus). The total serum-proteins were 7·8 g. per 100 ml. (albumin 3·7 and globulin 4·1). The liver function tests were abnormal, with a thymol turbidity of 4·0 units, thymol flocculation 4 plus, Takata Ara reaction 3 plus, colloidal red test 3 plus, and the alkaline phosphatase was 15·6 K.A. units per 100 ml.

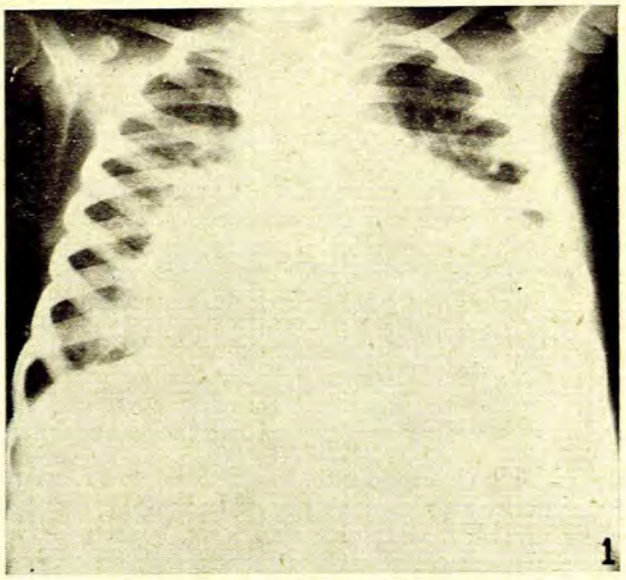

Fig. 1

Treatment consisted of sedation, a salt-free diet, digoxin, mersalyl, and ammonium chloride. The child's condition improved over the next fortnight but she then relapsed. Abdominal paracentesis yielded 1050 ml. of straw-coloured fluid, which had a protein content of 3·4 g. per 100 ml. The blood pressure throughout her illness remained between 140/104 mm. Hg and 164/112. A benzodioxane test for pheochromocytoma[12] (4 mg. of the drug) failed to lower the blood pressure during the 15 minutes following administration. The child deteriorated and died 9 weeks after admission with signs of pneumonic consolidation of the left lower lobe.

At autopsy the heart (200 g.) was enlarged owing mainly to hypertrophy and dilatation of the left ventricle. There was slight dilatation of the right ventricle. The epicardium, endocardium, valves and coronary arteries were normal. The lungs were congested and there was pneumonic consolidation of the left lower lobe. The liver (700 g.) was enlarged and congested. The left kidney showed no abnormality on section, the cortico-medullary ratio being normal. The left renal artery was of strikingly diminished calibre, being about 1 mm. in diameter. It arose from the aorta 1 inch below the normal site of origin and entered the kidney at its lower pole. The pelvis and ureter passed posteriorly to the renal artery and showed no evidence of kinking or obstruction. The other organs showed no abnormality apart from chronic venous congestion.

Microscopic examination of the myocardium of the left ventricle showed hypertrophy of the muscle fibres with some interstitial oedema and congestion. Section of the lung from the left basal lobe revealed the features of acute pneumonic consolidation. Section of the right kidney showed slight generalized congestion. Microscopy of the left kidney revealed several foci of interstitial fibrosis with lymphocytic and plasma-cell infiltration. The glomeruli in these foci showed a varying degree of fibrosis and

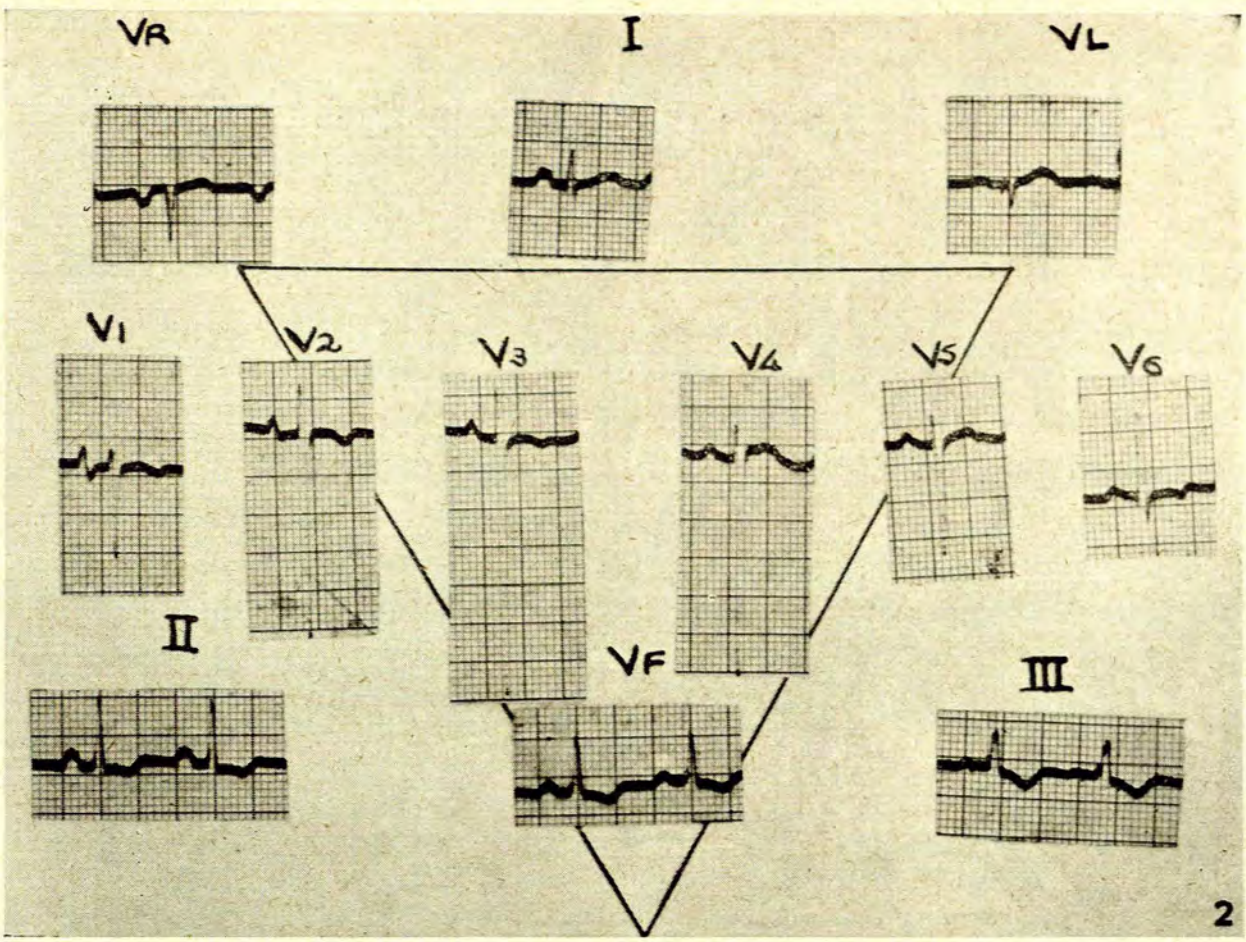

Fig. 2

hyaline change. Foci of tubular degeneration were also observed.

Summary of autopsy findings. 1. Congestive heart failure with left ventricular hypertrophy and dilatation. 2. Aberrant left renal artery with slight atrophy of the left kidney. 3. Terminal left basal pneumonia.

COMMENTS

This child, during life and at autopsy, presented with the classical features of hypertensive cardiac failure as seen in adults. However, the relationship between the hypertension and the aberrant renal artery was only demonstrated at the post-mortem examination. It is felt that this aberrant artery might have been demonstrated by aortography,[13] and that nephrectomy might have relieved the hypertension.

The incidence of aberrant renal arteries in hypertensive subjects is significantly higher than in normotensive individuals.[14] Hypertension in childhood is rare[15] and glomerulo-nephritis is by far the commonest cause in this age-group. Consequently, when this disease has been excluded as the cause of the hypertension and the tests for pheochromocytoma are negative, aortography should be carried out. If this demonstrates any abnormality of the renal arterial supply, nephrectomy is indicated and may result in a permanent cure of the hypertension.

SUMMARY

1. A case of hypertensive cardiac failure due to an aberrant left renal artery is described.

2. It is suggested that aortography should be considered in any unusual case of hypertension in childhood.

We should like to thank the following members of the S.A.I.M.R. for their help: Dr. B. Grobbelaar for carrying out the post-mortem examination and microscopic studies, Dr. R. Cassel for laboratory examinations, and Dr. I. Bersohn for the liver function tests. Dr. H. Clain carried out the radiological examinations.

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NEW PROFESSORS AT THE UNIVERSITIES OF CAPE TOWN AND THE WITWATERSRAND

At the University of Cape Town Dr. J. N. Jacobson has been appointed to the chair of Radiology (Diagnostic).

Prof. J. N. Jacobson, M.R.C.S. (Eng.), L.R.C.P. (Lond.), D.M.R.E. (Camb.), D.P.M. (Lond.), was educated at King Edward VII School, Johannesburg, and qualified in 1925 after studying at Witwatersrand University, Johannesburg, and St. Thomas's Hospital, London. He undertook postgraduate study in psychological medicine and radiology, and in 1932-33 received the Röntgen Award of the British Institute of Radiology, which is given for the 'most meritorious contribution' made before the Institute each year.

Prof. J. N. Jacobson

Photo: Cape Times.

For 15 years he was in the service of the London County Council, when he worked in several L.C.C. hospitals, and was for 5 years Deputy Medical Superintendent of the Fountain Hospital, Tooting Grove, London. During 1932-35 he also worked in the X-ray Department of St. Bartholomew's Hospital.

From 1940 to 1947 Professor Jacobson was Radiologist at Groote Schuur Hospital, Cape Town, and from 1940 Lecturer in Radiology at the University of Cape Town. From January 1947 to June 1948 he was Chief Radiologist to the Johannesburg Hospital Board, being in charge of the X-ray departments at the General, Coronation, Baragwanath and the Children's Hospital, and held the position of Senior Lecturer in Radiology at the University of the Witwatersrand.

From 1950 to the present time he has been Radiologist to the No. 2 South African Military Hospital, Wynberg, Cape. He has also had extensive experience of private practice in this speciality.

The author of many papers on radiological subjects both in South Africa and England, Professor Jacobson was for some years on the editorial committee of the *British Journal of Radiology* as well as being its medical correspondent.

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The University of the Witwatersrand announces the appointment of Dr. Basil J. P. Becker as Professor of Morbid Anatomy and Histopathology and Head of the Department of Pathology and Microbiology, and of Dr. H. B. Stein as Professor of Chemical Pathology.

The University has amalgamated the two existing departments of Pathology and Clinical Pathology into a single department of Pathology and Microbiology with two full-time chairs.

Prof. Basil J. P. Becker, M.D., D.P.H., D.P.M. & H. (Rand) is at present head of the Department of Pathology at the South African Institute for Medical Research, and until last year was acting Head of the Department of Pathology at the University. He is at present overseas.

Professor Becker was born in Wepener in the Orange Free State, received his early education at King Edward VII School, Johannesburg, and qualified in medicine at the University of the Witwatersrand in 1933, when he was awarded the bronze medal of the Southern Transvaal Branch of the South African Medical Association as the most distinguished graduand of his year. After serving on the staff of the Johannesburg General Hospital, he practised in Rhodesia and Johannesburg before joining the staff of the University of the Witwatersrand in 1935, firstly as a lecturer and later as a senior lecturer in Pathology and Bacteriology.

During the war he served with the South African Medical Corps in East Africa, Abyssinia and Egypt and was mentioned in dispatches. In 1942 he returned to the University of the Witwatersrand as senior lecturer in the Department of Pathology, a position he held for 3 years until he was appointed pathologist at the South African Institute for Medical Research.

Professor Becker is a member of the Medical and Dental Research Committee and the Pneumoconiosis Advisory Committee of the Council for Scientific and Industrial Research, and Organizing Secretary of the South African Committee of the International Society for Geographical Pathology. He is at present conducting research on heart and liver diseases in European and Bantu races on the Witwatersrand.

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Prof. H. B. Stein, M.D., M.Sc., D.P.H. (Rand), D.C.P. (Lond.), is at present senior lecturer in the Department of Clinical Pathology of the University, which position he has held since 1944.

Prof. H. B. Stein

Professor Stein was born in Johannesburg, received his early education at Parktown High School for Boys, and in 1932 took the degree of B.Sc. (Hons.) at the University of the Witwatersrand with first-class honours in histology, embryology and neurology. He qualified in medicine in 1935, and in 1937 received the degree of M.Sc. and in 1946 that of M.D.

After serving as resident medical officer at the General Hospital and then as junior lecturer in the Department of Anatomy at the University, Professor Stein was appointed assistant, and then lecturer and in 1944 senior lecturer, in the Department of Clinical Pathology.

In 1946 as holder of a postgraduate scholarship of the Witwatersrand Council of Education, he went to London, where for 2 years he served in the Department of Pathology at the Postgraduate Medical School in London.

Professor Stein has been closely associated with the University's Medical Graduates' Association and on two occasions has been elected President of that body.