Symposium on the Physiology and Pathology of the Kidney

The British Medical Bulletin, vol. 13, no. 1, January 1957, published a Symposium on Physiology and Pathology of the Kidney, written by clinicians and others in close contact with clinical departments.

Professor Robert Platt, acting as Chairman of the Committee, points out that the current interest changed from tests of renal efficiency to the metabolic effects of renal disorder, understanding the kidney more as an homeostatic than an excretory organ.

New thoughts on Renal Function in the New-Born are presented by R. A. McCance and E. M. Widdowson. The glomerular filtration rate in the newly born is lower than in adults. There is a low Cl clearance, but infants under condition of starvation and water restriction derive only 4% of their calorie requirements from protein breakdown as against 17–18% in adults. Due to the lower clearance in infancy, too high concentration of Na and Cl in the food is followed by their retention and by high values of Na and Cl in the serum.

Tubular Secretion of Potassium is studied by D. A. K. Black and E. W. Emery as an example of a physiological substance, which is believed to be eliminated by tubular secretion. After injection of 42 K and T-1824, serial samples were taken in a few seconds from the brachial artery and renal vein. Only 4% of the injected 42 K found in the arterial plasma passes through the kidney on first circulation. It is concluded that renal-venous plasma K is derived from K already present in the renal tissue and not from the K which came to the kidney at the time of injection. The K in the urine is different from the K entering the kidney by the artery, showing that urine K is a product of tubular secretion and not of filtration into Bowman’s capsule.

The Volume Control of Body Fluids is represented by 0. Wrong in the metabolism of sodium and potassium on which it mainly depends. The stimuli for aldosterone, which has the greatest effect on the urinary excretion of Na and K, is still not known, but it is assumed to be important for the problem of oedema.

Potassium Deficiency and its Relation to the Kidney (M. D. Milue, R. C. Muehrcke, B. E. Heard), becomes evident by balance studies in men with prolonged diarrhoea, potassium-losing nephritis and primary aldosteronism. The glomerular filtration rate is reduced. Other renal functional abnormalities in K depletion appear to be caused by reduced intracellular pH. Only in severe and prolonged K deficiency, K depletion does not reverse renal damage. Chronic pyelonephritis is frequent in prolonged K depletion. The K deficient kidney seems more susceptible to bacterial infection.

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Histochemical Changes in the Potassium Depleted Kidney (C. R. MacPherson and A. G. E. Perse) and Microdissection of the Nephron in Diseases (E. M. Darmady and Fay Stranack) as acute tubular necrosis, Lignac-Fanconi disease, congenital nephrosis, infantile pyelonephritis, interstitial nephritis, nephrocalcinosis and K-losing kidney are reported with excellent figures.
Genetically determined Renal Aminoaciduria (H. Harris) as cystinuria, galactos-aemia and Hartnup-disease are reported.

The Role of the Kidney in Experimental Hypertension (M. A. Floyer) is reviewed and the Disturbances in Water and Electrolyte (esp. Ma) Metabolism (J. M. Ledingham) is discussed. These investigations on experimental hypertension are partly accompanied by adrenalectomy.

The Treatment of Hypertension in Primary Renal Disease (C. Wilson and D. G. Abrahams) (Type I nephritis, Type II nephritis or chronic pyelonephritis) and the effect of hypo-tensive therapy on renal function are described. Prophylactive treatment is justifiable even before retinal changes appear since the hypotensive drugs have their maximum value in postponing or retarding renal failure and hypertensive changes. As long as the nitrogen retention is minimal at the beginning of the treatment, control of the blood pressure may prevent deterioration of renal function. The authors gave Ansolysen or Ecolid usually in combination with Serpasil and have found that it was effective in most cases of renal hypertension. Smaller doses of ganglion blocking drugs were necessary in renal than in malignant essential hypertension. Reduction of blood pressure does not influence renal impairment if the kidney function is only slightly impaired but relieves symptoms in cases with severely damaged kidneys even though further deterioration is likely to happen. In chronic Type II nephritis with more active and progressive inflammatory lesions the results are less favourable.

The Nephrotic Syndrome is reported to be a clinical problem. (Squire, Blainey and Herdwicke). The events leading to oedema and other features of the nephrotic syndrome are diagrammatically summarized. The urine proteins are composed of serum constituents. Oedema occurs on reduction in serum colloid osmotic pressure at below 40% of the normal value. Serial studies over certain periods are desirable in patients with continued proteinuria to come to the diagnosis of the primary renal disturbance. On a material of 44 patients it is found that renal function as a whole determines the prognosis. Oral cortisone, also in adult patients, has led to a progressive reduction in proteinuria, in many cases followed by diuresis and a rise in serum albumen concentration. All patients were given penicillin and high protein, high calorie and high calcium diet and also reserpine, if necessary.

The Pathogenesis of Urinary Calculi composed of calcium salts is discussed by M. G. McGlown and G. M. Bull. Using a diet containing 154 mg of Ca, the urinary excretion of calcium has been found increased in 30% of 73 patients suffering from stone. There is no direct evidence that infection initiates calculus formation although it seems probable that it may encourage the growth of calculi in those already predisposed.

In several series of cases no vitamin A deficiency was found. The relationship of Randall’s Plaques to renal calculus remains unknown. Microliths form the basis of a hypothesis to explain the pathogenesis of calculus (Can, 1954). The role of carbonic anhydrase inhibitor, hyaluronidase, acetylsalicylic acid, amino acids, mucoprotein and others, are presented and it is concluded that calculus formation is probably prevented by the balance between the factors which tend to cause calcium to precipitate and those which tend to hold it in solution. The prophylaxis against recurrences of calculi rests upon the maintenance of high fluid intake and treatment of coexisting urinary infection.

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Azotaemic Renal Osteodystrophy. Osseous complications of renal disease with retention of nitrogen are described on an experience of approximately 25 azotaemic patients by S. W.
Stanbury. Renal osteodystrophy is regarded as an extraordinary intricate series of reactions of the skeleton to the presence of renal insufficiency. Rickets or osteomalacia of chronic uraemic patients is believed to be the result of acquired insensitivity to the action of vitamin D with a failure of calcium absorption from the gut and failure of phosphorus absorption. It seems that it cannot be ascribed to the acidosis of renal failure. In renal ostitis fibrosa associated almost invariably with para-thyroid enlargement, it is generally assumed that calcium and phosphate ions released from bone oversaturate the extracellular fluids. Osteosclerosis and osteoporosis is also mentioned. The treatment of rickets and osteomalacia with calciferol or dihydrotachysterol should be controlled by metabolic balance studies.

Renal Angiography (R. S. Murray and J. C. Tresidder). In the description of renal angiography the selective method of Seldinger and Tillander is favoured in passing the contrast medium directly into the renal artery on the affected side. The main indications for the aortography are renal haematuria and other cases of doubtful diagnosis in which any of the simpler urological and radiological investigations are indefinite or in cases of hydronephrosis for assessment of renal function.

Venography in Relation to the Kidney (R. E. Steiner). Venography of the inferior vena cava and renal vein by bringing a catheter into the saphenous vein or iliac vein or from above by catheterization via an arm vein through the superior vena cava and right auricle is reported to be helpful in clinical varieties of renel vein obstruction and patients with proteinuria in the presence of other abnormalities.

Effects of Old Age and Over-Nutrition on the Kidney (G. C. Kennedy). Effects of old age and over-nutrition on the kidney are studied in the rat. These circumstances are leading first to hyperplasia and then to degeneration and are similar to those which are produced by partial nephrectomy.

A. All articles are very interesting and well illustrated by figures and diagrams. This Symposium is highly recommended to the urologist and to all interested in the physiology and pathology of the kidney. All contributions in this Symposium show – as R. Platt emphasizes – that “the study of the kidney is not a narrow speciality”.

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