of the hypertensive population. The effect of propranolol upon plasma renin activity (PRA), arterial blood pressure (BP) and heart rate has been studied in patients with mild hypertension.

Nine patients with mild uncomplicated hypertension were selected for the study. BP and HR were recorded weekly and a peripheral venous blood sample taken for the immunoassay of PRA under controlled conditions of diet, posture and physical activity. All other anti-hypertensive therapy was discontinued for a month before commencing oral propranolol therapy. Initially 40 mg/day was given. The daily dose was increased by 40 mg at weekly intervals to a maximum of 320 mg/day or until the hypertension was controlled.

It was found that propranolol lowered PRA whether the hypertension was controlled or not. The three patients with a high pretreatment PRA had their hypertension promptly relieved with propranolol at a dose of 120 mg/day or less whereas propranolol was only effective in three of the five patients with a normal pretreatment PRA and was not effective in the one patient with a low pretreatment PRA.

These results support the suggestion of Buhler et al. (1972, New England Journal of Medicine, 287, 1209) that the pretreatment PRA is of some predictive value in the treatment of arterial hypertension with propranolol. In addition it was found that the response of heart rate to propranolol paralleled that of PRA implying that similar control mechanisms are operative. It is suggested that propranolol lowers PRA by antagonizing the action of the sympathetic nervous system.

17. ELECTROCARDIOGRAPHIC CHANGES AFTER CORONARY BYPASS GRAFT SURGERY

P. R. WILKINSON, A. D. GOLDBERG, E. B. RAFFTERY, M. TOWERS and M. YACOUB
Northwick Park Hospital and Clinical Research Centre, Harrow, Middx.

In a series of 210 patients operated on for intractable ischaemic heart disease by a single surgeon at Harefield Hospital up to July 1973, pre- and post-operative electrocardiograms were available for analysis in 190. The mean follow-up period was 11 months (range 5 months to 4 years). In each patient at least three recordings were independently examined by two observers: immediately pre-operative, 2 months and 6 months post-operative. Further electrocardiograms were studied at 6 monthly intervals.

All electrocardiograms were initially classified according to the Minnesota Code, and then a standard report was given, following which changes were defined and agreed on.

10-5% were normal pre-operatively, and only one patient showed a significant post-operative change. Evidence of previous myocardial infarction was found in 66% pre-operatively. New infarction was observed in 4% post-operatively, all were inferior infarcts, and changes appeared in the first post-operative electrocardiogram. All these patients had had a right coronary graft.

Left bundle branch block was present pre-operatively in 2-3%, and developed post-operatively in 1%.

We conclude that the electrocardiographic findings do not support the suggestion that symptomatic relief of angina after saphenous vein grafting is related to fresh infarction of the ischaemic area.

18. THE EVALUATION OF CORONARY SINUS LACTATE STUDIES IN THE DIAGNOSIS OF DISPUTED ISCHAEMIC HEART DISEASE

BRIAN LIVESLEY
Department of Geriatric Medicine, King's College Hospital, London SE5 8RX
(Introduced by J. ANDERSON)

The validity of the role of coronary sinus lactate studies (Livesley & Oram, 1973, Lancet, i, 1461) in the accurate diagnosis of tachycardia-induced myocardial ischaemia has been confirmed by the re-evaluation 2-3 years later (mean 2-6 years) of the eighteen patients with disputed Heberden's angina who formed the original control group. During the original investigation, one patient in this group had a change of myocardial lactate extraction during rapid atrial pacing at the extreme of that for the other seventeen patients. He is the only one who has developed typical anginal symptoms to date.

19. INCREASED GLOMERULAR FILTRATION IN PATIENTS WITH MYOCARDIAL INFARCTION

E. D. BENNETT and J. KEDDIE
St George's Hospital Medical School, London

Experimentally produced myocardial infarction in dogs results in an increase in renal blood flow despite systemic hypotension and reduced cardiac output (Hanley & Raizner, 1972, American Journal of Cardiology, 29, 803).

In the present study, 24 h creatinine clearance and urinary sodium excretion have been measured in forty-two patients admitted to a coronary care unit with suspected myocardial infarction. In twenty of these patients the diagnosis of infarction was confirmed; the remainder who serve as a control group were diagnosed as having angina or chest pain of non-cardiac origin.

On the day of admission the mean creatinine clearance for patients with infarction was 96 ml/min (SD± 36-0 ml/min) and for those without infarction was 74-0 ml/min (SD ± 270 ml/min). The difference was significant at the 5% level. Subsequently the creatinine clearance for the infarction group fell and by the third day was not significantly different from the control group.

Examination of the difference in creatinine clear-
ance in the infarction group for days 1 and 3 showed that patients with radiographic evidence of left ventricular failure had a mean fall of 36 ml/min; whereas those patients without radiographic left ventricular failure had a mean rise of 6 ml/min.

All forty-two patients were placed on a 40 mEq/24 h sodium diet for the first 3 days. Analysis of the differences in sodium excretion between days 1 and 3 showed that patients with infarction had a mean fall of 43 mEq/24 h in sodium excretion compared to a mean fall of 73 mEq/24 h for the non-infarction group. However, those in the infarction group with radiological evidence of left ventricular failure had a mean fall of 78 mEq/24, whilst those without left ventricular failure showed a mean increase of 40 mEq/24 h.

The implications of these findings will be discussed.

20. INCREASED URINE VASOPRESSIN CONCENTRATION IN ESSENTIAL HYPERTENSION

A. M. KHOKAR, C. Hough and J. D. H. Slater
Institute of Clinical Research, Middlesex Hospital Medical School

Defects of renal tubular water reabsorption have often been detected in patients with hypertension. We have re-examined this problem by measuring osmolar and free water clearance as well as urinary arginine vasopressin concentration in nine normal subjects and in ten patients under 45 years of age with mild to moderate systemic arterial hypertension. The subjects have been studied (a) in their basal state, (b) after a 45° upright tilt, (c) after 18 h water deprivation, and (d) the difference when compared with normal.

In (a), the slope of the curve related to urine AVP (ordinate) to urine osmolality (abscissa) is steeper than normal. However, hypertensive patients showed a reduced mean rate of tubular water reabsorption in each of the situations (a) to (d) described above. In (a), (b) and (c) the difference when compared with normal people was significant or highly significant (unpaired t-test). The results suggest that urinary vasopressin concentration (AVP) in normal people is closely related to the osmolality of the urine (U*osm) and that it becomes undetectable when U*osm approaches that of the plasma osmolality. In hypertension the slope of the curve related U*osm (abscissa) to urine AVP (ordinate) is steeper (P<0.001) than normal. However, hypertensive patients showed a reduced mean rate of tubular water reabsorption in each of the situations (a) to (d) described above. In (a), (b) and (c) the difference when compared with normal people was significant or highly significant (unpaired t-test). The results suggest that in hypertension there is a primary resistance of the kidney to the action of endogenous vasopressin, whose concentration in the urine is, therefore, increased.

21. THE RELATION OF ANTIHYPERTENSIVE TREATMENT TO PLASMA LIPIDS AND OTHER VASCULAR RISK FACTORS IN HYPERTENSIVES

Brian Johnson, Carole Bye, Justin Labrooy, Douglas Munro-Faure and Joan Slack
Department of Medicine, King’s College Hospital, London, S.E.5, and Institute of Child Health, 30 Guilford Street, London, W.C.1

Drug control of hypertension has reduced mortality from cerebral haemorrhage, renal failure and heart failure, but not myocardial infarction. One possible explanation is that some widely-used antihypertensive agents may have detrimental effects.

118 patients aged between 34 and 56 years were attending the Hypertension Clinic of King’s College Hospital in April 1972. In 112, blood samples were obtained after fasting for 14 h. Electrocardiograms and creatinine clearance determinations were obtained within 6 months of blood collection. By comparison with a large series of matched control subjects, hypertensives did not have a significantly greater incidence of abnormal lipoprotein patterns of either Type II or IV. However, hypertensive women had a significantly higher mean triglyceride level, and densitometric measurement after agarose gel electrophoresis demonstrated a significant shift from beta to pre-beta lipoproteins in both male and female hypertensives. Compared with other hypertensives, nineteen with previous vascular complications were significantly older, had a lower mean creatine clearance, higher serum uric acid and more apparent beta to pre-beta lipoprotein shift. Thirty-seven hypertensives with electrocardiographic ST segment depression were heavier smokers, had significantly higher initial pretreatment blood pressure, fasting blood glucose and percentage pre-beta lipoproteins, and lower creatinine clearance and plasma cholesterol. In women, uric acid levels were also significantly higher. Similar differences were observed between hypertensives with creatinine clearance above or below 60 ml/min. Within hypertensives, pre-beta lipoprotein percentage was positively correlated with serum triglyceride (r = 0.68), uric acid (r=0.37) and glucose (r = 0.21), and triglyceride was correlated with percentage ideal weight (r = 0.24) and skinfold thickness (r = 0.25). Creatinine clearance was negatively correlated with initial blood pressure (r = 0.20) and uric acid (r = -0.30). Heavy smokers had significantly higher triglycerides, pre-beta lipoproteins and uric acid levels, and reduced creatinine clearance.

Of the 112 patients, seventy-eight were taking thiazide diuretics. A significantly higher mean triglyceride level and pre-beta lipoprotein percentage was noted among men receiving thiazides. Beta to pre-beta lipoprotein shift was also noted in men taking adrenergic neurone blockers.

In a separate group of fourteen hypertensives, mean fasting blood glucose and triglycerides were 90 and 85 mg%, respectively after taking placebo for 4 weeks. Hydrochlorothiazide 50 mg b.i.d. for a similar period caused significant mean elevations to 106 and 109 mg%, respectively (P<0.01).

Hypertensive patients show an altered distribution of plasma lipoproteins, probably caused by anti-hypertensive drugs. Thiazide diuretics induce consistent elevation of plasma triglyceride, as well as uric acid and glucose, all of which are known risk factors for coronary artery disease. Plasma lipids