

SOUTH AFRICAN SOCIETY OF PATHOLOGISTS

SUMMARIES OF SCIENTIFIC PAPERS*

(Continued from p. 1098 of the Journal for 26 October)

20. THE DIAGNOSIS AND MANAGEMENT OF MYELOSCLEROSIS

S. KRAWITZ and J. METZ,† *Department of Haematology and Radioisotope Laboratory, South African Institute for Medical Research, Johannesburg*

The diagnosis and management of myelosclerosis may be difficult, and for this reason an evaluation of the various features seen in patients investigated over a 2-year period is presented.

A previous history of polycythaemia vera was present in some patients. Splenomegaly was a constant feature. Considerable variation in the haemoglobin value and leucocyte and platelet counts occurred, but a leuco-erythroblastic reaction was always present. The red cells showed characteristic anisopoikilocytosis with teardrop poikilocytes, and giant platelets were present in all patients. Marrow aspiration was of little diagnostic help. Difficulty with aspiration was experienced in some patients. The marrow cellularity was too variable to be of diagnostic value, but marrow trephine biopsy proved the diagnosis in all patients. Studies with ⁵⁹Fe and surface counting demonstrated extramedullary erythropoiesis in all patients.

In the differential diagnosis from chronic myeloid leukaemia the neutrophil-leucocyte alkaline phosphatase was helpful. Enzyme activity was normal or raised in myelofibrosis, but absent in chronic myeloid leukaemia.

In management, transfusions were used as necessary. Steroids were found to be very valuable and in some patients obviated the necessity for blood transfusion. Androgens are also used, but without dramatic effect. Myleran was used in 2 patients, but was stopped prior to any obvious beneficial effect when thrombocytopenia supervened. ⁵¹Cr studies revealed 2 patients with markedly shortened red-cell life span and 'excess' spleen counts. As they had failed to respond to conservative treatment splenectomy was carried out. Both patients died—one at operation and the other 10 days after operation.

Peripheral blood morphology in conjunction with marrow trephine biopsy and ⁵⁹Fe studies (including surface counting) enable the diagnosis of myelosclerosis to be made without difficulty. Blood transfusion and steroids are the most important therapeutic measures. Splenectomy is undertaken only when definitely indicated by ⁵¹Cr and ⁵⁹Fe data. The operation in patients with well-established disease is accompanied by a high mortality.

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21. THE PATHOLOGY OF TERN VIRUS INFECTION IN CHICKENS

C. J. UYS and W. B. BECKER, *Departments of Pathology and Bacteriology, and the U.C.T. and C.S.I.R. Virus Research Unit, Medical School, University of Cape Town*

Chickens infected by conjunctival and intranasal inoculation became ill after 3 days, rapidly deteriorated and died a few days later. At autopsy macroscopic changes were inconspicuous. However, striking inflammatory changes were apparent histologically in the spleen and eyelid after 2 days; in the tissues of the comb, wattles and skin after 3 days; and in the eye, ocular muscles, brain and myocardium after 4 days. In the affected organs, lymphoid tissues or aggregates were the first to be involved, with subsequent extension of the reaction to other tissue elements.

Histologically, the essential lesion manifested initially as focal tissue necrosis; where lymphoid tissue was present this was preceded by reticulum-cell proliferation. An intense mononuclear cell and mild heterophil infiltrate soon followed. In the mild lesions complete resolution thereafter occurred, but in the severer ones, where tissue necrosis was extensive, the mononuclear cells became transformed into epithelioid cells and multinucleate giant cells, resulting in the formation of focal granulomata.

While tern virus infection may produce lesions similar to those seen in both Newcastle disease and fowl plague, differences in the pathological pattern as a whole exist, suggesting that it is a separate entity.

22. ADDITIONAL OBSERVATIONS ON PARASITIC CYST INFESTATION OF THE CENTRAL NERVOUS SYSTEM AND EYE

N. S. F. PROCTOR, *South African Institute for Medical Research, Johannesburg*

In a number of tapeworm-cyst infestations of the central nervous system it is not possible to ascertain the identity of the worm involved. A recent study involving 71 cases showed that it was possible to identify the cyst as either *Cysticercus cellulosae*, *Coenurus cerebralis* or hydatid in only 32 instances. In the remainder neither scolices nor hooklets were found, although the histological appearances of the wall were typical of those of a tapeworm cyst.

The lesions associated with infestation by these cysts fall into the following categories:

(a) Basal arachnoiditis and internal hydrocephalus with cranial-nerve involvement—the 'posterior fossa' syndrome.

(b) Subacute or chronic basal leptomeningitis without obstruction.

(c) Hydrocephalus, sometimes of paroxysmal type due to intermittent intraventricular obstruction by cysts.

(d) Predominantly space-occupying lesions due to the size of the cyst itself, as in hydatid, or associated with an expanding arachnoidal cyst.

(e) Intracerebral cysts, usually *Cysticercus cellulosae*, manifesting clinically as epilepsy.

(f) Incorporation of the lumbosacral nerve roots in inflammatory adhesions, resulting in the 'cauda equina' syndrome.

(g) Spinal-cord compression, usually associated with extradural hydatid disease.

(h) Ocular infestation with associated inflammatory reaction in the eye and disturbance of vision.

23. ABSORPTION OF FOLIC ACID IN MEGALOBlastic ANAEMIA ASSOCIATED WITH PREGNANCY

K. STEVENS and J. METZ,* *South African Institute for Medical Research, Johannesburg*

While megaloblastic anaemia associated with pregnancy in Bantu patients has been shown to be due to folic-acid deficiency, the aetiological role of dietary deficiency, malabsorption, and foetal demand for folic acid, is unknown.

The results of a study of the absorption of folic acid in these patients is presented. Three techniques have been used, viz. serum *S. faecalis* folic-acid levels following an oral dose of folic acid, urinary radioactivity following oral administration of tritiated folic acid, and haematologic response to small oral doses of folic acid in patients with megaloblastic anaemia in relapse. In one patient, response to natural folate in the form of lettuce was studied.

The results fail to show any defect in the absorption of either pteroylglutamic acid or natural folate, when compared with control subjects.

It is concluded that malabsorption of folate is not a factor in the aetiology of megaloblastic anaemia associated with pregnancy in the Bantu patient studied.

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24. ON THE MORPHOLOGY OF PLASMA CELLS

J. G. THOMSON, *Department of Pathology, Medical School, University of Cape Town*

The generally accepted regularly ovoid shape of the plasma cell is that of a plasma cell of low activity as regards production and giving-up of antibodies—the type of plasma cell that is presumably responsible for the diminishing blood levels of antibody after the infection has been overcome and antigen is no longer present. When functionally active and producing much larger amounts of antibody, as in the acute phases of infection, the plasma cell shows rounded projections and processes, some of which become detached. Occasionally the nucleus disappears by karyolysis, but the rounded cytoplasmic masses appear to resist autolysis. They become more open in structure and give the impression of slow solution of their substance. These morphological indications of plasma cells apparently giving up their antibodies by cytoplasmic extrusion can most readily be seen in the granulation tissue of acute pyogenic infections, in acute generalized infections with a marked antibody response, such as Weil's disease, and, oddly enough, in dental cysts.

25. THE INVESTIGATION OF BACTERIURIA

R. CASSEL, *South African Institute for Medical Research, Baragwanath Hospital, Johannesburg*

A modified technique to do viable bacterial counts on mid-stream specimens of urine is described. A 1:1,000 dilution of urine in sterile saline is made. Two aliquots of 1 ml. of this dilution are used to flood a blood agar and McConkey plate, and the number of colonies developing after 24 hours' incubation at 37°C. are counted. More than 100 colonies constitute a pathological finding, 20-100 colonies are of doubtful significance, while less than 20 colonies are considered as

contaminants. This technique is easy to perform and is eminently suitable for a busy diagnostic bacteriological laboratory. The results obtained by this method compare favourably to those by other techniques.

26. AGE DISTRIBUTION OF NEUTRALIZING ANTIBODIES TO *Herpesvirus hominis* IN THREE RACE-GROUPS IN CAPE TOWN

W. B. BECKER, *Department of Bacteriology and Virus Research Unit, University of Cape Town Medical School*

The epidemiology of primary herpesvirus infection in Cape Town was studied by determining the incidence of neutralizing antibodies to *Herpesvirus hominis* in the serum of children according to age and race groups.

In all three race groups, namely European, Coloured plus Malay, and Bantu, the incidence of serum antibodies was high at birth, but fell rapidly to reach the lowest level at 8-10 months of age. After this age there was a rise to peak incidence at about 7 years of age in the Coloured, and 3 years in the Bantu. In Europeans the sera of children up to the age of 12 years were examined, but the peak incidence of herpesvirus antibodies had not been reached by that age.

The sera of 100 adults of each of the European, Coloured and Bantu race groups were examined, and antibodies to herpesvirus found in 94%, 99% and 100% respectively.

Factors influencing the epidemiology of primary herpesvirus infections were discussed.

27. CUSHING'S SYNDROME (HYPERCORTISOLISM) IN AN INFANT

B. M. BLOOMBERG, *Clinical Laboratories, Johannesburg*

The occurrence of Cushing's syndrome in an infant is almost always due to a tumour of the adrenal cortex, and the characteristic clinical picture leaves little doubt of the diagnosis. The value of steroid estimations in prognosis and the validity of the histological criteria of malignancy will be discussed.

28. THE DIAGNOSIS OF POLYCYTHAEMIA VERA

S. KRAMER, P. VAN HEERDEN and J. METZ,* *Department of Haematology and Radioisotope Laboratory, South African Institute for Medical Research, Johannesburg*

Tests used in the investigation of patients with elevated haemoglobin and haematocrit values have been evaluated. The patients studied were examples of polycythaemia vera, secondary polycythaemia, and relative polycythaemia ('chronic haemoconcentration syndrome', stress polycythaemia). Patients with relative polycythaemia were easily separated from other forms of polycythaemia by measurement of the plasma and red-cell volume. Polycythaemia vera could be distinguished from secondary polycythaemia on the basis of history, physical signs, peripheral blood findings, neutrophil alkaline phosphatase, and oxygen saturation. Splenomegaly was apparent at some stage in all cases of polycythaemia vera studied, leucocytosis was common, but thrombocytosis less common. Neutrophil alkaline phosphatase was raised in all patients with polycythaemia vera. The ratio of increase in plasma iron turnover to increase in red-cell mass was not found to be of value in distinguishing polycythaemia vera from secondary forms of polycythaemia.

It is concluded that the combination of clinical features, haematologic findings, oxygen saturation, and blood volume studies, enable the cause of elevated haemoglobin values to be elucidated without difficulty in most patients.

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29. ENDOCRINOLOGICAL ASPECTS OF HABITUALLY ABORTING ANGORA-GOAT EWES

S. J. VAN RENSBURG, *Institute for Veterinary Research Institute, Onderstepoort*

Habitual abortion in Angora-goat ewes is a serious limitation to the mohair industry, because the prevalence of the condition may be as high as 70% in some flocks. Previous work has excluded an infectious aetiology, but it was noted that at abortion the corpus luteum showed advanced regression and

this was associated with histological evidence of decreased luteotropic function of the adeno-hypophysis.

In this work sexual cycles of normal and aborter ewes were compared, and the length was found to be a mean of 4 days shorter in aborter ewes ($P > 0.01$). Corpora lutea removed at laparotomy from aborter ewes 10 days after ovulation were retarded in growth ($P > 0.01$), and all the 9 removed contained large central cavities, whereas only 1 of 9 removed from normal ewes was found to be cystic.

Urinary pregnanediol excretion was similar in normal and aborter groups 10 and 15 days after ovulation, but lower in the aborter groups during pregnancy. The excretion of this metabolite was found to be a poor indication of luteal function, because of the large adrenal contribution.

Blood-leucocyte studies revealed a highly significant increase in neutrophils, and a reduction in lymphocytes and eosinophils, in aborter animals. This trend was absent in luteal-phase ewes, but apparent in oestrous animals and marked in pregnant ewes.

Examination of endocrine glands in sacrificed ewes only revealed a marked increase in the adrenal weight of aborter ewes ($P > 0.01$). In animals in which adrenal hyperplasia was induced with adrenocorticotrophin, corpus luteum growth was retarded and central cavities were larger than in controls.

It is postulated that by breeding and selecting for high mohair production, animals with adrenal hyperplasia have been favoured—a condition that is inimical to gestation.

30. DEHYDROGENASE ACTIVITIES IN MALIGNANT AND NORMAL HUMAN-CELL CULTURES

R. E. BERNSTEIN, M. C. SALKINDER and J. H. S. GEAR,
Electrolyte and Metabolic Research Unit, South African Institute for Medical Research and Poliomyelitis Research Foundation, Johannesburg

The enzyme activities of continuous human malignant-cell lines and short-term cultures of embryonic tissues have been assayed for key dehydrogenases of glycolysis. Quantitative enzyme estimations were performed on homogenates of tube cultures, and the relative activities of different dehydrogenases standardized in terms of cell protein or DNA content. Histochemical localization of various dehydrogenase systems was demonstrated in cell monolayers grown on coverslips, with specific incubation media containing nitro-blue tetrazolium. The enzyme patterns of cultured cells revealed that essential differences underlay their metabolism.

31. THE ELECTRON MICROSCOPY OF THE GRANULES OF THE RENAL JUXTAGLOMERULAR CELLS

I. W. SIMSON, *Institute for Pathology, University of Pretoria*
The ultrastructure of the granules in the juxtaglomerular cells in mice was described.

The granules are electron-dense but the electron density is variable and in some granules small denser particles are present.

The granules appeared to be secreted by the Golgi apparatus and it was suggested that they arise as small granules that contain central electron-dense masses and form larger granules by coalescence. Some of the granules contained distorted paired membrane systems and many were closely related to mitochondria. It was suggested that mitochondria may play a part in the genesis of the granules.

Finally a transition was demonstrated from normal smooth-muscle cells in the afferent arteriole to granule-secreting smooth-muscle cells in the juxtaglomerular region.

32. VITAMIN-B₁₂ AND FOLATE NUTRITION IN PREGNANT BANTU WITH OBSERVATION ON THE EFFECT OF SUPPLEMENTATION WITH VITAMIN B₁₂ AND FOLIC ACID

K. STEVENS, T. EDELSTEIN, N. BAUMSLAG and J. METZ,*
South African Institute for Medical Research and Department of Obstetrics, Baragwanath Hospital, Johannesburg

The results of a study of some tests of folate and vitamin-B₁₂ nutrition during pregnancy and the puerperium is reported

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in 235 Bantu subjects who received iron supplementation during pregnancy. The haemoglobin, haematocrit, serum *S. faecalis* folic-acid activity 15 minutes after an intravenous injection of folic acid, and urinary excretion of FIGLU and urocanic acid after histidine loading, were determined at various stages of pregnancy, after delivery, 6 weeks postpartum and 12 weeks postpartum.

The results were compared to those with Bantu females whose diet was supplemented during pregnancy with either iron+folic acid or iron+folic acid+vitamin B₁₂.

The median haemoglobin value at term was highest in the folic acid+vitamin B₁₂ group, the differences being of the order of 0.3 G. per 100 ml. At 6 and 12 weeks postpartum, the median haemoglobin values were similar. No differences were noted in the median haematocrit values at delivery or postpartum.

In the iron-only group the 15' folic-acid levels fell progressively during pregnancy, and rose postpartum; however, the mean level at 6 weeks postpartum was significantly less than in control subjects. The percentage of patients with subnormal levels increased progressively during pregnancy, reaching 69% at delivery. At 6 and 12 weeks postpartum, about one-third of patients remained subnormal.

The number of patients with abnormally rapid clearance at delivery and postpartum was less in the groups supplemented with folic acid and vitamin B₁₂.

The serum vitamin-B₁₂ level, which was similar in the various groups, fell during pregnancy, but rose to within normal range postpartum. While 33% of patients in the iron-only group had subnormal values at delivery the number of subnormal values was lowest in the folic acid+vitamin B₁₂ group. No patient had significantly low levels at 6 and 12 weeks postpartum.

The mean urinary FIGLU excretion throughout pregnancy was significantly higher than in non-pregnant controls, the highest values being found early in pregnancy. It is suggested that some of these changes are due to alteration in histidine metabolism during pregnancy. In the iron-only group about 42% of patients showed excessive FIGLU excretion at delivery, and this number increased postpartum.

Although there were no differences in FIGLU excretion at term, in the various groups the median values and the number of patients with excessive excretion postpartum were lower in the groups receiving folic acid and vitamin-B₁₂ supplementation. Urocanic acid did not comprise a significant portion of the excretion of histidine metabolites during pregnancy or postpartum.

It is concluded that in the population under study routine supplementation with vitamin B₁₂ is not warranted, but that a case can be made out for routine supplementation with folic acid.

33. HEAD INJURIES IN THE BIBLE

J. C. E. KAUFMANN, *Neuropathology Department, South African Institute for Medical Research, Johannesburg*

The circumstances surrounding four instances of head injury in the Bible are discussed. The head injuries are interpreted where possible in the light of modern knowledge, and reference is made to legends about the same incidents. Two of the incidents are illustrated by 35 mm. transparencies.

34. MULTIFOCAL LYMPHOMA IN SOUTH AFRICA

J. GLUCKMAN, *Clinical Laboratories, Johannesburg*

The incidence of the 'multifocal lymphoma' syndrome in Africans across Central Africa, with its special occurrence in the jawbones in Central and East Africa, was described in terms of many publications on this topic. This tumour had previously not been recognized in South Africa, a factor which was taken by Burkitt to support the theory that the disease did not occur in areas over 5,000 feet, areas where seasonal mean temperature may fall below 60° F., and areas with less than 20 inches rainfall per annum.

Three cases in White children were described, having occurred in Johannesburg and Vanderbijlpark. These were also the first reported cases of this condition in South Africa. Also reported were 6 cases from Natal and 3 cases from Durban.

publications being in the press by other authors. The occurrence of these cases in the areas indicated destroys the geographical and climatological limits previously postulated for the occurrence of this tumour. It is now to be recognized that it occurred as far as the extreme south of the African continent. The results of virological, histochemical and electron-microscopic observations were also quoted. It was felt that the so-called Central African lymphoma was no more than conventional lymphoma with, possibly, some special type of local emphasis. It was further suggested that the existence of the cases now reported must cast doubt on all the hypotheses proposing that the disease was caused by a vector-borne virus and that, in any case, these hypotheses could no longer withstand the implications of the new geographical conditions.

35. NEWER PREGNANCY TESTS

W. M. POLITZER, *Department of Biochemistry, South African Institute for Medical Research, Johannesburg*

Recently developed pregnancy tests are immunological methods, and those carried out in parallel with the *Xenopus laevis* tests were one agglutination and two haemagglutination inhibition tests. In the agglutination test (Ortho Pregnancy Test) human chorionic gonadotrophin (HCG) present in pregnancy urine will be neutralized when mixed with rabbit HCG anti-serum. Addition of latex particles coated with HCG will prevent the particles from being agglutinated, and a turbid supernatant remains after centrifugation. In non-pregnancy urine the latex particles are agglutinated and after centrifugation a clear supernatant remains. The turbidity is compared with a standard. Variation in the tint of the supernatant and visual assessment created difficulty in reading results 'equal to' or slightly higher or slightly lower than the turbidity standard. In the first haemagglutination-inhibition test (Pregnosticon Test) a suspension of erythrocytes sensitized to HCG is added to an HCG anti-serum/urine mixture. In the presence of HCG, agglutination of the cells is inhibited and they form a brown ring at the bottom of the tube. In the absence of HCG the cells agglutinate and remain as a suspension. The second haemagglutination-inhibition test (Prepuerin Test) is similar; a suspension of erythrocytes already agglutinated by rabbit HCG anti-serum is used, and unsensitized erythrocytes in suspension as controls. The test is carried out in 3 dilutions and for each specimen 3 tests and 3 controls are set up. A negative result is indicated by complete agglutination in the 3 tests and no agglutination in the 3 controls. A positive result is obtained if there is no agglutination in the 3 tests and 3 controls. The results of the 3 different tests were as follows:

Number of specimens tested	106		115		107	
	Xenopus laevis Test	Ortho Pregnancy Test	Xenopus laevis Test	Preg-nosticon Test	Xenopus laevis Test	Pre-puerin Test
Correct positive	95%	95%	87%	96%	85%	98%
Correct negative	97%	98%	98%	98%	100%	98%

The immunological tests are more sensitive than the *Xenopus laevis* test. When urinary HCG levels are 1,000 I.U./l. the immunological pregnancy tests become positive usually 8 days after the first missed period, whereas the frog ovulates only when injected with urine containing 3,000 I.U./l. or more, a level which may be reached 14 days after the first missed period. The introduction of these immunological methods may be an important advance in pregnancy diagnosis.

36. NEPHELINE PNEUMOCONIOSIS

I. WEBSTER, *Pneumoconiosis Research Unit, C.S.I.R., Johannesburg*

37. THE BIOCHEMICAL DEFECT OF L-XYLULOSURIA

W. M. POLITZER, *Department of Biochemistry, South African Institute for Medical Research, Johannesburg*

38. SEKERE ASPEKTE BETREFFENDE DIE NEUROTROPIESE AANPASSING VAN VIRUSSE MET SPESIALE VERWYSING NA PERDESIEKTEVIRUS

B. ERASMUS, *Veterinary Research Institute, Onderstepoort*

39. PHENACETIN-INDUCED NEPHRITIS IN EXPERIMENTAL ANIMALS

C. ABRAHAMS, A. RUBENSTEIN and N. W. LEVIN, *Department of Pathology, University of the Witwatersrand Medical School*

40. THE DIAGNOSIS OF THALASSAEMIA

S. HOLMAN, *Clinical Laboratories, Johannesburg*

41. LIPID COMPOSITION OF SUB-CELLULAR ORGANELLES IN THE SPLEEN OF A CASE OF GAUCHER'S DISEASE

G. S. GETZ and BASIL A. BRADLOW, *Department of Chemical Pathology and C.S.I.R. Nutrition and Metabolism Unit, University of the Witwatersrand Medical School*

42. THE TOXIC EFFECTS OF ALUMINIUM DUST

I. WEBSTER, *Pneumoconiosis Research Unit, C.S.I.R., Johannesburg*

43. THE CULTIVATION OF *Besnoitia besnoiti* IN TISSUE CULTURE AND EMBRYONATED EGGS

R. D. BIGALKE, *Veterinary Research Institute, Onderstepoort*