SOUTH AFRICAN PAEDIATRIC ASSOCIATION (M.A.S.A.)

SUMMARIES OF SCIENTIFIC PAPERS*

1. THE HEART IN KWASHIORKOR

DRS. P. M. SMYTHE, A. SWANEPOEL and J. A. H. CAMPBELL, *Cape Town*

The purpose of this paper was to describe in detail the serial changes found in the ECG and X-ray of the heart during the recovery phase of kwashiorkor; to investigate the possible rôle of the heart in fatal cases of kwashiorkor, and to consider the possibility that in kwashiorkor some changes might be found that would help to explain the changes associated with the so-called 'nutritional heart' of the adult Bantu.

X-rays taken on admission were examined for heart size and showed a significant decrease in the transverse diameter of the heart when compared with a normal control series. Serial X-rays during recovery showed a consistent increase in heart size. An early and rapid increase in heart size was thought to be due to an increased venous return, while a later and slower increase might have been due to an increase in muscle bulk of the heart associated with protein repletion.

The ECG changes were arbitrarily classified into 5 groups: ionic; sharp T inversion; low voltage and flat T; a striking series of changes that occurred during convalescence; and cold injury. The changes which occurred during convalescence have been called the 'recovery pattern'; some of these had not previously been described.

There were 28 fatal cases in which the ECG changes were classified in the same way as those of children who recovered. In these the ionic type of ECG correlated well with the serum-potassium levels as did those with low voltage and flat T waves. A unique case showed a pattern of anterior transmural infarction.

In 75% of the fatal cases an adequate cause of death, other than heart disease, was found at autopsy. In the remaining 25% of cases in which no satisfactory cause of death was demonstrable there was no clearly defined histological change to indicate heart disease as the cause of death. With 2 exceptions there was no correlation between the ECG and the autopsy findings.

Some of the hearts were very small, suggesting that atrophy occurred, while in other hearts there was a pathological increase in weight which histological examination suggested was due to oedema.

Changes were found in some infants' hearts that were histologically similar to those described in the so-called 'nutri-

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tional heart' of the adult Bantu. It was stressed that this does not establish a common aetiology or pathogenesis.

These findings suggested, however, that there was some relation between 'kwashiorkor heart' and the adult type of 'nutritional heart'. So also did the ECG changes found during the recovery phase, which in some children were strikingly similar to those described in the adult Bantu 'nutritional heart'.

2. CARBOHYDRATE METABOLISM IN KWASHIORKOR

DRS. D. SLONE, L. S. TAITZ and G. S. GILCHRIST,
Johannesburg †

Hypoglycaemia had been shown to be a cause of death in severe protein malnutrition in childhood.[1]

The aim of this study was to investigate aspects of carbohydrate metabolism in kwashiorkor by estimating the fasting blood sugar in 20 cases of kwashiorkor and in control subjects. In addition intravenous glucose-tolerance tests were performed on 9 cases of kwashiorkor.

It was shown that the fasting blood-sugar levels in patients with kwashiorkor were, on an average, 20 mg. per 100 ml. lower than the normal controls studied. Fasting blood sugar levels ranged from 10 mg. to 70 mg. per 100 ml. Intravenous glucose-tolerance tests demonstrated mild glucose intolerance. This was shown by the fact that in 8 cases glucose levels had not returned to fasting levels 120 minutes after loading. In no case was the intolerance marked enough to fulfil Duncan's criteria for diabetes mellitus.

It was postulated that defective gluconeogenesis was responsible for the occurrence of hypoglycaemia in kwashiorkor. It had been observed that in the early phase of treatment with milk, kwashiorkor patients had transient increased levels of serum amino-acids[2] and unusually low plasma-urea levels. This suggested that there was a temporary block in the deamination of amino-acids, and a consequent inability to maintain normal levels of blood sugar in the presence of a glycogen-depleted liver, under fasting conditions (8 hours).

In view of this observation it was recommended that during the first week of treatment of kwashiorkor, carbohydrate be added to the high protein feed.

1. Kahn, E. and Wayburne, S. (1959): Paper presented at the 1st Congress of the South African Nutrition Society, Pretoria.
2. Schendel, H. E. and Hansen, J. D. L. (1959): S. Afr. Med. J., **33**, 871.

† Paper read at the Congress by Dr. L. S. Taitz.

3. THE RELATION OF RECENT RESEARCH TO THE TREATMENT OF KWASHIORKOR **

DR. J. D. L. HANSEN, *Cape Town*

The relationship of low-protein diets to the incidence of kwashiorkor was now well established. Research from many different parts of the world had also indicated the severe degree of protein depletion in this syndrome.

An important question during the last 10 years had been — did diets low in protein lead not only to protein depletion but also to disturbances of nitrogen metabolism that might under certain circumstances increase the protein depletion still further? The question was relevant because for every case of kwashiorkor there were at least 100 cases of underlying protein malnutrition. Research on the characteristics of nitrogen metabolism in cases of kwashiorkor had been necessary to provide data for the improvement of therapy and prevention.

Until 1953 there were no reports of nitrogen-balance studies done specifically on cases of kwashiorkor. Previous work on malnourished marasmic European and American children indicated that these children retained nitrogen more efficiently than normal children. In 1953 Bray[1] found that malnourished West African children retained nitrogen more efficiently than normal American children aged 7 - 9 years in spite of a higher faecal nitrogen output.

Nitrogen-balance studies on cases of kwashiorkor in Cape Town and elsewhere had now established that retention of nitrogen in cases of kwashiorkor was as efficient as that in a healthy newborn infant and far greater than that of normal children of the same age. There was thus no evidence of a breakdown in protein synthesis in cases not complicated by overt infection. There was some decrease in the absorptive capacity of the gastro-intestinal tract and an apparent susceptibility to attacks of severe diarrhoea. The diarrhoea could lead to great loss of water, nitrogen, and electrolytes, and was a significant factor in mortality. In treatment, therefore, attention had to be paid to correction of losses from the gastro-intestinal tract. Protein in the form of milk should be administered as soon as possible, in order to institute recovery and prevent further protein depletion.

On the preventive side, evidence was accumulating that merely improving the quality of low-protein cereal foods such as maize, e.g. by the addition of synthetic amino-acids, was not sufficient. Increase of total protein intake among children who were susceptible to kwashiorkor was even more important. This could best be done by the addition of animal protein to staple cereal diets but suitable mixtures of vegetable protein were also effective.

1. Bray, B. (1953): Brit. J. Nutr., **7**, 3.

** Part of this work was published in *Pediatrics*, **25**, 258, (1960).

4. KWASHIORKOR AND CULTURAL CHANGE

MISS A. MOODIE, *Cape Town*

Kwashiorkor was widely distributed and occurred under different circumstances among different populations. It had long been recognized that, although a deficiency of protein foods was the cause of kwashiorkor, this deficiency itself was attributable to a variety of social and environmental factors. The suggestion was made that cultural change rather than cultural custom was the common factor wherever kwashiorkor occurred and that the disease was a manifestation of failure by some populations to adapt to the new ways with which they were rapidly being brought into contact.

Important among these were the conditions of urban living, the growth of industry, the breakdown of old patterns of family and community life, the employment of women, and the changed set of values resulting from a money economy. The universal trend away from breast-feeding well illustrated a change in cultural habit before a satisfactory alternative was understood or economically possible. Figures were shown to illustrate the significance of early weaning in kwashiorkor.

Examples were also drawn from 3 areas in varying stages of sophistication to show the effect on nutrition of different cultures in a state of flux. Kampala, with late incidence of kwashiorkor, exemplified the effect of social disorganization on a primitive rural people without great poverty, and Trinidad, with very early kwashiorkor, the effect of ignorance in a more sophisticated and technically advanced setting. Cape Town lay mid-way, with poverty, in addition to the ignorance and disorganization which were typical of a country in the early stages of industrial development. An added complication was the recent impact of the African culture on that of the Cape Coloured and the introduction of a cheaper labour force. Kwashiorkor was widespread and seemed to be occurring at increasingly early ages in the Cape Town area as it did in Johannesburg.

It was questionable whether any cultural change was reversible in view of its symbolic value to the populations concerned.

5. COXSACKIE MYOCARDITIS

PROF. J. G. A. DAVEL, *Pretoria*

Infection of young children by members of the Coxsackie virus group appeared to be very prevalent in South Africa and caused much illness in young children. Its severity ranged from quite a mild illness to a most serious fulminating disease ending in death. Sporadic cases occurred at any time of the year but every now and then the infection assumed an epidemic form. An epidemic occurred in Pretoria during October and November 1959, and formed the subject of this report.

Previous reports during the past 6 years stressed the danger of this infection to the neonate. Montgomery *et al.*,[1] Javett *et al.*,[2] Suckling and Vogelpoel,[3] etc., described epidemics of myocarditis occurring in lying-in institutions in

various centres in Southern Africa. From these and other reports, the causative agent appeared to belong to the Coxsackie group-B viruses, types 2 - 5 being implicated, although in some, the evidence might be deemed to be inconclusive.

During October and November 1959, a number of cases occurred in Pretoria, the patients being in the older age group (5 months - 5 years) with a distressingly high mortality rate; those who died did so from a fulminating myocarditis with acute heart failure, where all manner of treatment was of no avail; others, especially the older ones, responded well, and quite quickly, to treatment.

The children were admitted to hospital after a shorter or longer period of illness which, in most of them, had been diagnosed as sore throat or upper-respiratory-tract infection with acute bronchitis of bronchopneumonia. A few patients presented with signs of heart involvement.

On admission the clinical findings included fever, injected throat, non-productive cough, tachypnoea and signs in the lungs varying from scattered râles to crepitations at both bases. A few of the more severe cases had signs of acute heart failure, e.g. marked distress, tachycardia, dyspnoea, cervical venous congestion, cardiomegaly, gallop rhythm, poor heart tones, occasional soft apical murmurs, and a rapidly enlarging painful liver. Patients, less seriously ill on admission, soon developed these signs in the wards. In none were there signs of central-nervous-system involvement, the lungs and the heart bearing the brunt of the infection.

Treatment consisted of supportive measures, putting the patients in oxygen tents, control of pyrexia and restlessness, rapid digitalization, and antibiotics. Cortisone was given in some of the cases with no effect.

Postmortem examinations were carried out in several of the fatal cases. The changes in the myocardium were identical with those shown to be due to Coxsackie group-B type 3 virus in a report from Johannesburg[2] of an epidemic in the newly-born.

1. Montgomery, J., Prinsloo, F. R., Kahn, M. and Kirsch, Z. G. (1955): S. Afr. Med. J., **29**, 608.
2. Javett, S. N., Heymann, S. C., Mundel, B., Pepler, W. J., Lurie, H. I., Gear, J., Measroch, V. and Kirsch, Z. (1956): J. Pediat., **48**, 1.
3. Suckling, P. V. and Vogelpoel, L. (1958): Med. Proc., **4**, 372.

6. FANCONI'S ANAEMIA AND ITS TREATMENT

DR. R. MCDONALD, *Cape Town*

This uncommon condition of pancytopaenia with associated congenital defects was first described in 1927 by Fanconi.[1]

Numerous defects had been recorded, the commonest being hyperpigmentation, abnormalities of thumbs, microphthalmia, hypogonadism, and hyper-reflexia. These were noticed in infancy but anaemia was usually not apparent until the child was a few years old, though there were exceptions to this. Boys were affected more often than girls and the condition might be familial or sporadic. No treatment had, until recently, been effective and death had occurred within a few years of the onset of the anaemia.

Three cases in a family were described, the condition being recognized only when the third member came to hospital. This was an overt case. It was then possible to diagnose (in retrospect the condition in the eldest child who had died, and to do so as well in the second member of the family, who was admitted to hospital again for fuller examination.

As the result of an encouraging article by Shahidi and Diamond from Boston, USA,[2] the 2 surviving affected members of the family were then put on the recommended daily treament of testosterone, 2 mg. per kg.; and 10 mg. of prednisone.

In both cases preliminary results were encouraging. The elder child, who had previously required blood transfusions every 2 months, had gone for 3 months without transfusion and at the end of this time her haemoglobin was higher than on any of the previous recordings. Her platelets and granulocytes were also increasing in number and the previously hypocellular marrow was showing well-marked activity.

The younger child, with more congenital defects but less anaemia, also showed a good response to treatment. Side-effects of the drugs were, however, becoming prominent and it was therefore decided to halve the dosage of each drug.

It was still too early to forecast the ultimate fate of these children, since the treatment would have to be continued for several months, and it was not known whether further courses of treatment would then be necessary. It was, nevertheless, to be hoped that there might now be a prospect of cure for *some* patients suffering from this hitherto fatal disease.

1. Fanconi, G. (1927): Jb. Kinderheilk., **117**, 257.
2. Shahidi, N. T. and Diamond, L. K. (1959): Amer. J. Dis. Child., **98**, 293.

7. DOMICILIARY CARE OF PREMATURE INFANTS

DR. I. ROBERTSON, *Cape Town*

The results of an 18 months' experiment in the domiciliary care of Coloured and Malay premature infants born and nursed at home were presented, compared with a control group of similar infants born at home and admitted to a hospital premature unit. There was no selection of cases, domiciliary care being provided for those for whom no accommodation was available in hospital.

The mothers were lent metal cribs which were fitted with padded linings containing pockets for hot-water bottles. One of the Health Department nurses visited the homes as often as she was able in the course of her usual duties (2 or 3 times a week for 1 - 2 months), and was thus able to do special supervision of the care and feeding.

The results obtained in this series of cases were very good in all cases where the mothers were cooperative, even where housing conditions were poor. Thirty cases were cared for at home in this way and were compared with 86 admitted to hospital. The neonatal deaths were comparable, but of the 50 hospital cases who survived the first week, gastro-enteritis and bronchopneumonia were responsible for the deaths of 3 infants between 1 and 4 weeks, and 7 infants between 1 and 7 months. Of the 26 domiciliary infants who survived the first week, only 2 subsequently died of the above infections.

When weight gains were compared it was found that infants in the domiciliary series kept closely to their expected gain, whereas in the hospital series half the children fell well below their expected gain, due to a combination of frequent infections and marasmus.

The principal factors in favour of domiciliary care as brought out by this experiment were: The importance of the mother-child relationship being maintained from the start, which gave the infant continuity of care in the same environment, as well as developing in the mother a sense of responsibility and a knowledge of infant care and feeding; and the elimination of the marked susceptibility to infection displayed by the premature infants in the hospital series, both in hospital and after their return home.

If this method were adopted as a hospital out-patient service there might be a great saving in the large amount of money spent at present on the purchase of incubators and the maintenance of premature units.

8. CYSTIC DISEASE OF THE LUNG

MR. W. L. PHILLIPS, *Cape Town*

Cystic disease of the lung had evoked the interest of clinicians for a long time. It might be classified into congenital and acquired cystic disease.

Congenital cysts might be of bronchogenic or gastrogenous origin, while acquired cysts might belong to 2 sub-groups. These were (1) The various types of air cysts known as pneumatoceles, or emphysematous bullae, plus a variety of multiple cysts which resembled very closely the condition of saccular bronchiectasis; and (2) healed abscesses — it was a remarkable fact that many children who had suffered from an acute lung abscess or any staphylococcal infection of the lung were left with a residual lung cyst.

Clinically, pulmonary cysts were of 3 varieties: (1) Air-containing cysts — such cysts were in communication with the

bronchi, or had been in the past; (2) fluid-containing cysts — these cysts had usually been shut off completely from both bronchial and alimentary tract connections, and the lining wall had secreted the fluid; and (3) pus-containing cysts — these were secondarily-infected fluid-containing cysts which might show an area of surrounding pneumonitis.

Lung cysts might present in 1 of 3 ways: (1) Accidental discovery — these cysts were usually discovered accidentally on routine X-ray examination of the chest; (2) respiratory distress — an expanding lung cyst would cause respiratory distress as the lung became compressed, showing signs of respiratory embarrassment; and (3) acute lung infection — the presence of super-added infection would alter the picture, and the patient might present symptoms of acute pneumonia, of lung abscess, or of recurring attacks of acute bronchitis.

The treatment of cystic disease might be divided into emergency, medical and surgical treatment.

Emergency treatment. Expanding lung cysts required simultaneous cyst and pleural cavity drainage.

Medical treatment. Acute infections and associated empyemata, of course, had to be drained. The causal organism had to be isolated and its sensitivity to antibiotics established. The necessary antibiotics then had to be administered.

Surgical treatment. Full investigations had to be completed, since they would determine the type and extent of operation which was curative. The results of surgical resection of the affected part had been uniformly good.

9. SPIROMETRIC STUDIES IN CHILDREN

DR. H. DE V. HEESE, *Cape Town*

The evaluation of disability and the immediate and long-term assessment of pulmonary diseases, such as asthma, posed important problems for the clinician. The forced expiratory volume (FEV) and the forced vital capacity (FVC) test could be employed in the objective assessment of the disability in children resulting from common chest diseases and the reversibility of such diseases. It was a simple, interesting, easily performed and repeatable test.

The FVC was the maximum volume of gas which could be expired following a maximum inspiration, the expiratory phase being accomplished as rapidly and as forcibly as possible. The FEV was that volume of gas expired between 2 stated times during the performance of the forced vital capacity test. The time interval was indicated by a subscript, thus $FEV_{.75}$ referred to the volume expired during the first three-quarters of a second.

The $FEV_{.75}$ and FVC could be measured from the spirographic tracing of the FVC on a fast-moving kymograph using a Bernstein-type spirometer. This was termed the forced expiratory spirogram (FES) and the form and details of the FVC then became clearly visible. The FESs for a given child were in general remarkably uniform in shape and almost specific at any particular occasion for that individual. The first phase of expiration was always recorded as an almost straight line. As the speed of expiration lessened, the curve deviated from this initial straightness and became horizontal when the forced expiration was completed. In asthmatics, in proportion to the severity of the disease, the initial drop in the curve became progressively less steep, the shape being that of a shallow curve rather than an almost straight line. The time over which the FVC was expelled was prolonged.

The change in the shape of the FES of an asthmatic child after giving a bronchodilator drug such as isoprenaline, indicated the presence of reversible bronchospasm. This change, to be regarded as significant, had to result in an increase of at least 10% in the $FEV_{.75}$ and FVC values, and the absolute increase in these values had to be 50 - 75 ml. or more in volume. The likelihood of successful bronchodilator, steroid or other therapy could be assessed, as could the possible benefit or uselessness of a particular drug to any particular individual.

The severity of the bronchospasm in an asthmatic patient was reflected in the lowered absolute values for the $FEV_{.75}$ and FVC, the former being the most useful single spirometric index of ventilatory function. These values could be compared with the 'normal' expected $FEV_{.75}$ and FVC for the individual, using prediction formulae.[1] In patients with an obstructive defect (asthma and emphysema) the $FEV_{.75}$ was lowered to a larger extent than the FVC, and when expressed as a percentage ($FEV_{.75}\%$) of the FVC might fall to very low levels. In a patient with asthma, therefore, a low value for the $FEV_{.75}\%$ suggested insufficient treatment or the presence of concurrent emphysema. Serial readings helped to distinguish these two.

1. Heese, H. de V. (to be published).

10. PATHOLOGY — AIDS TO DIAGNOSIS IN PAEDIATRICS

DR. D. MCKENZIE, *Cape Town*

This paper was in the nature of a review of the more common diseases of children encountered at the Red Cross War Memorial Children's Hospital, Cape Town, and the part the laboratory played in diagnosis.

The biggest problem encountered was that of gastro-enteritis and in the summer season 9,000 cases were seen, 1,200 requiring intravenous resuscitation. Only 200 stools and rectal swabs were cultured, so the coverage of these cases was small; however, 5·7% of specimens yielded salmonellae and 2% shigellae. At an outside clinic a single investigation yielded 17% shigellae and 3% salmonellae, illustrating the difference between clinic and hospital practice. The cause of death in 6% of cases coming to autopsy was salmonella or shigella infection. Attention was drawn to the biochemical imbalance in these cases resulting in hyperosmolaric, hypoglycaemic and hyperglycaemic states and their sequelae.

The frequency of parasitic infestation even in the very young was stressed and attention drawn to the surgical complications of ascariasis and the medical syndromes following infestation with *Giardia lamblia*, which were relatively common.

The value of duodenal intubation in giardiasis and in fibrocystic disease was indicated and newer methods of assessing malabsorption states were evaluated. Four out of 8 autopsies on patients with fibrocystic disease were in Coloured children.

The difficulties encountered in the differential diagnosis of jaundice of the newborn were discussed, in particular the differentiation of biliary atresia from neonatal hepatitis. The use of serum-transaminase levels as a guide had not proved diagnostic in any way but might sometimes be of value.

The problems of disseminated herpes simplex virus infection and Hirschsprung's disease were indicated. Examination of frozen sections of biopsy material were of considerable aid to surgeons in the treatment of Hirschsprung's disease.

The great value which accrued from the close cooperation between clinicians and pathologists, when the laboratory was situated in the hospital building, was stressed. This ideal situation resulted in a better service for the patient and a more direct control of such problems as cross-infection, sterilization and the overall therapeutic policy of the hospital.

11. THE COLLECTION OF SPUTUM IN CHILDREN WITH A DESCRIPTION OF A NEW TECHNIQUE

DR. I. MIRVISH, *Cape Town*

Valuable information could be obtained by bacterial examination of the sputum, e.g. in tuberculosis, pertussis, and other lower respiratory infections. The collection of sputum in young children, however, was rendered difficult by the fact that children under 6 years of age tended to swallow their sputum instead of coughing it up.

Procedures used in the collection of sputum were discussed and evaluated in the paper and a new technique was described, referred to as supralaryngeal aspiration.

The procedures described included gastric lavage, the 'cough swab', the laryngeal swab or supralaryngeal swab, and the serum swab. Gastric lavage was essentially a hospital procedure, and 'cough swabs' collected only small quantities of sputum.

The principle of the new technique (supralaryngeal aspiration), was to promote a bout of coughing and aspirate the sputum produced into a tube, instead of catching it on a swab. The apparatus consisted of a glass medicine or vitamin dropper, preferably one with an angled end, to which was attached 3 inches of thin plastic tubing. (The tubing used in the Baxter intravenous sets was eminently satisfactory.) A large rubber bulb was substituted for the small bulb usually present. The prepared set could be sterilized by inserting it into a wide test tube and autoclaving it.

The method was as follows: With the child lying down and held firmly, a wide spatula was introduced to depress the tongue, and the soft tubing was pushed down to just above the glottis, while the bulb was squeezed between the forefinger and thumb. As a result of this manoeuvre, a fit of coughing was produced, and when the bulb was released some coughed-up sputum was aspirated into the tube. With experience, about a quarter- to a half-an-inch of thick tenacious sputum was aspirated into the tube.

The advantages of this technique were, that the apparatus was simply made and easily manipulated, the soft tube was not likely to cause trauma, the procedure could easily be carried out at home or at the clinic, and sufficient sputum could be collected for direct examination, guinea-pig inoculation, and culture.

A preliminary trial at the Dr. A. J. Stals Memorial Sanatorium, Cape Town, suggested that the technique was useful. Further work was proceeding.

12. RHEUMATIC FEVER IN CAPE TOWN: A COMPARISON OF TWO FORMS OF THERAPY

DR. C. RAINIER-POPE, *Cape Town*

The results of 2 forms of therapy in patients suffering from rheumatic fever were reported.

During the 18 months following the opening of the Red Cross War Memorial Children's Hospital, Cape Town, salicylates only were used in the treatment of rheumatic fever. Thereafter high dosage steroids (prednisolone) together with salicylates were used in accordance with the scheme advocated by Illingworth *et al.*[1] in 1957.

All patients included in the survey had to conform to the modified Duckett Jones criteria[2] for the diagnosis of rheumatic fever.

There were thus 2 groups of patients, 18 cases treated with salicylates only, and 28 patients treated with high dosage steroids and salicylates. All patients were seen regularly after discharge and their cardiac state was reviewed 2 years after their last attack of rheumatic fever.

The results of the survey showed that in the salicylate group 29·4% of new cases had established heart disease 2 years after their last attack. In the steroid and salicylate group, 31% had cardiac damage after 2 years.

The second finding was that in patients treated with steroids, the ESR fell to normal extremely rapidly. Only 1 out of 25 patients had a raised ESR 3 weeks after treatment was started. In the salicylate group, however, 7 out of 11 patients had a raised ESR at 3 weeks.

The series was too small for definite conclusions to be drawn. However, the incidence of cardiac damage in patients treated with salicylates was very low in comparison with the generally reported results, e.g. 60% in patients reported both by Bland and Jones[3] and by the 1955 cooperative trial.[4] Long-term follow-up in the 2 groups was much the same.

However, in patients treated with steroids the fall in ESR and the rapid return to health was very striking. The length of invalidism and stay in hospital was much reduced. If the fall in ESR was indicative of a cessation of the rheumatic process, obviously this form of therapy was very desirable.

A plea for further investigation and accurate diagnosis of rheumatic fever was made.

1. Illingworth, R. S., Lorber, J., Holt, K. S. and Rendle-Short, J. (1957): Lancet, **2**, 653.
2. Jones, T. D. (1944): J. Amer. Med. Assoc., **126**, 481.
3. Bland, E. F. and Jones, T. D. (1952): Ann. Intern. Med., **36**, 1006.
4. Cooperative Clinical Trial (1955): Brit. Med. J., **1**, 555.

13. PURULENT MENINGITIS

DR. S. R. ESRACHOWITZ, *Cape Town*

There had been much controversy over the treatment of non-tuberculous meningitis, and no satisfactory single antibiotic or combination of antibiotics had proved ideal, whether given parenterally or orally only, or in combination with intrathecal therapy.

At the City Hospital for Infectious Diseases, Cape Town, 306 cases were seen over a 3-year period from January 1955 to December 1957. These were divided into 4 main groups.

In the first group, meningococcal meningitis, there were 198 patients (65%), including adults. Routine treatment consisted of penicillin and sulphonamide, with chloromycetin given only in severe cases. In addition, penicillin and/or chloromycetin were given at the initial lumbar puncture. Patients with the Waterhouse-Friderichsen syndrome were given cortisone for 10 days.

There were 181 complete recoveries (91%), 12 deaths (6%), and 5 patients with sequelae (3%). Excluding those dying within 24 hours of admission (9 patients), there were 186 survivors out of 189 (98%).

The second group was labelled purulent meningitis. The cerebrospinal fluid was turbid, but no organisms were seen on smears or grown on culture. These cases were assumed to be meningococcal as the meningococcus is difficult to demonstrate particularly when antibiotics have been administered before admission to hospital. Therefore, this group of patients was treated in the same way as meningococcal meningitis. Of 36 patients below the age of 10 years, 33 recovered completely (92%), 3 died (8%), and none had sequelae. No patients died in the first 24 hours, and therefore the survival rate was 92%.

Influenzal meningitis, comprising the third group, was treated with chloromycetin, sulphonamide and streptomycin, with daily intrathecal injections of chloromycetin and streptomycin. Intrathecal therapy continued until the sugar in the cerebrospinal fluid was normal and there were not more than 30 - 40 cells per c.mm.; most of these were lymphocytes. General therapy was given for 1 week longer. Of a total of 23 patients below 10 years of age, there were 16 complete recoveries (70%), 5 deaths (21%), and 2 patients with sequelae (9%). Excluding patients dying within 24 hours of admission, the survival rate was 82%.

In the last group, pneumococcal meningitis, treatment consisted of penicillin, chloromycetin and sulphonamide, with daily intrathecal injections of penicillin and chloromycetin until the cerebrospinal fluid was normal by the same criteria as for influenzal meningitis. Again, general therapy continued for 1 week more. Of 12 patients below the age of 10 years, 11 recovered completely (92%), 1 died (8%) and none had sequelae. The death occurred within 24 hours of admission, and therefore, excluding this patient, the survival rate was 100%.

It was also found that the average duration of history before admission to hospital was longer in patients who died or were left with sequelae.

The conclusion drawn was that failure to achieve 100% recovery was due to 4 factors: (1) Failure to call for early medical attention; (2) failure of early clinical diagnosis of meningeal irritation; (3) inadequate laboratory facilities for accurate and rapid identification of the aetiologic agent; and (4) lack of the necessary discrimination in selection and use of therapeutic agents.