ACUTE NEPHRITIS IN NON-EUROPEAN CHILDREN, WITH SPECIAL REFERENCE TO THE TREATMENT OF HYPERTENSION WITH MAGNESIUM SULPHATE

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Acute nephritis is a fairly common condition in paediatric practice but as far as we are aware no comparable series of the disease in the non-European community in South Africa has been published. The only available literature is a paper by Uys on the pathology of renal disease in the Bantu on the Witwatersrand.

The paediatric out-patient department of the Coronation Hospital deals with children of African, Indian and Coloured (i.e., mixed) descent up to the age of 12 years. The average annual attendance is 65,000, out of which 2,100 patients are admitted to the wards.

The series now reported comprises 83 cases of acute nephritis admitted to the paediatric wards during the period January 1951 - December 1958 (inclusive). The diagnosis was based on the 4 factors: history, oedema, oliguria, and hypertension, in various combinations, as well as urinary findings of haematuria, albuminuria and granular casts in all cases.

SEX, AGE AND RACE. Of the 83 cases, 45 were males (54%) and 38 females (46%). There were 46 Africans (55%), 30 Coloured (i.e., of mixed descent) (36%), and 7 Indians (9%). The ages ranged from 2 to 12 years, the greatest incidence being at 3 - 5 years (Tables I and II).

TABLE I. CASES BY AGE (IN YEARS) AND SEX

<table>
<thead>
<tr>
<th>Age (in years)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>3 - 4</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>5 - 6</td>
<td>6</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>7 - 8</td>
<td>7</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>9 - 10</td>
<td>9</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>11 - 12</td>
<td>10</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>12 - 13</td>
<td>11</td>
<td>1</td>
<td>12</td>
</tr>
</tbody>
</table>

TABLE II. CASES BY RACE

<table>
<thead>
<tr>
<th>Race</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bantu</td>
<td>24</td>
<td>18</td>
<td>42</td>
</tr>
<tr>
<td>Mixed</td>
<td>22</td>
<td>12</td>
<td>34</td>
</tr>
<tr>
<td>Indian</td>
<td>4</td>
<td>38</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>30</td>
<td>76</td>
</tr>
</tbody>
</table>

Irritability

Clinical Findings

1. Oedema. A history of oedema was given in 72 cases, but on examination this was only found in 67; and of these 3 did not give a history of oedema. This indicates that at least 75 patients had had oedema during the course of their illness.

2. Hypertension. This was recorded as being present in any child with a diastolic blood-pressure reading of 10 mm.Hg (or more) above the normal for the corresponding age-group given by Lyon and Kaplan in Nelson's Textbook of Pediatrics. On this criterion, 61 cases (73.5%) of whom 32 were males and 29 females, showed variable degrees of hypertension (Table V). Under treatment this persisted for 1 - 29 days (average 7.1 days). Of the 46 African cases 71.7% showed hypertension, and of the 30 Coloured, 70%. All the 7 Indians were hypertensive. Associated with the hypertension were 13 cases in con-
impetigo, 5 acute otitis media, 3 pneumonia, and 8 recorded if the level of haemoglobin found

Mean normal blood pressure, systolic 98 -108, diastolic 64-69.

In 39 of these a reading of over 11,000 WBCs per c.mm. was recorded.

In those showing an initial oliguria the output soon

Serum-protein and serum-cholesterol estimations were carried out in 35 cases; 8 had levels between 100 -150 mg. per 100 ml., 17 between 151 - 200, and 10 between 201 - 260 mg. per 100 ml. Serum-protein estimations showed the usual reversal of albumin-globulin ratio which is found in the non-European population, except in 1 case. The albumin-globulin ratio in this case was 4:3:1 g. per 100 ml.

In the 31 cases where throat swabs were taken haemolytic streptococci were isolated on culture in only 2 cases. Other organisms cultured were non-haemolytic streptococci (2 cases), Streptococcus viridans (11 cases), Staphylococcus aureus (1 case) and pneumococci (2 cases).

In 13 cases no pathogenic organisms were found.

9. Streptococcal antihaemolysin-O titres were only estimated (in 26 cases) during the latter years of this series. In 16 cases (62%) the titre exceeded 200 units.

TREATMENT AND RESULTS

General Treatment

All cases were treated with bed rest, salt-free and low-protein diet, and a regulated fluid intake for a variable period depending on the clinical improvement. Every case received parenteral penicillin for at least 5 days.

Treatment of Hypertension

Hypertension was treated in cases where it persisted for more than 24 hours after admission, or the blood pressure continued to rise, and in cases with complications (congestive cardiac failure or encephalopathy).

In our opinion the treatment of choice in cases of uncomplicated hypertension is intramuscular magnesium sulphate (0·1 c.c. of a 50% solution per kg. body-weight) given every 4 -6 hours until the blood pressure readings became normal. These were taken every 2-4 hours.

Cases in which congestive cardiac failure is present are treated with digoxin as well as intramuscular magnesium sulphate. The digitalizing dose of digoxin is 0·025 - 0·04 mg. per lb. body-weight for the first 24 hours.

In patients with encephalopathy magnesium sulphate is given by slow intravenous infusion (15 c.c. of a 1% solution per kg. body-weight) over 12-24 hours. The blood pressures should be checked every half hour. As clinical improvement occurs, the treatment should be changed to intramuscular magnesium sulphate until the blood pressure has become normal.

The following 2 cases are reported as examples of this regime of treatment:

Case 1

P. J., a 10-year-old Coloured girl was admitted to hospital on 13 September 1956 with a history of headache and vomiting of increasing severity for 3 weeks. On the day before admission she developed generalized convulsions lasting from 2-5 minutes without loss of consciousness. There was no history of previous convulsions and no family history of epilepsy.

Examination. On the day of admission the child lay curled up in bed, ill, mentally confused, and irritable. Temperature 99-8°F, pulse rate 100 per minute, respiration rate 24 per minute, blood pressure 180/120 mm. Hg. Further examination negative. The next day peri-orbital oedema and left hemiparesis were noted. The fundi showed vascular spasm. The urinary output during the first 24 hours was slightly diminished. Urinalysis showed marked proteinuria with innumerable erythrocytes, a moderate number of pus cells, and granular and hyaline casts. Blood urea 62 mg. per 100 ml.
Rubin of the series. These figures occurred in 31·1% of patients with hypertension which we considered necessitated close observation of the patient with immediate therapy upon detection of either of these complications. Hypertensive encephalopathy is a much more frequent complication in children than in adults. Blackfan and Butler\(^\text{13}\) reported an incidence of 8%. Cerebral symptoms occurred in 31-1% of Burke and Ross's cases. In the present series 26-5% showed cerebral symptoms but only 2-4% had encephalopathy. Rubin\(^\text{14}\) states that congestive cardiac failure occurs in 20% of cases. In this series 15-7% showed evidence of congestive cardiac failure.

A number of drugs have been employed in the treatment of hypertension in acute nephritis. Magnesium sulphate has been used for many years. It was introduced by Blackfan et al.\(^\text{15}\) in 1923 and has been widely used ever since. It is most satisfactory in the treatment of hypertensive crises because it has the advantage of increasing the glomerular filtration rate, improving the effective renal plasma flow with a corresponding increase in the renal blood flow in the presence of vascular spasm. When encephalopathic symptoms occur the intravenous is the most useful method of administration,\(^\text{16,17}\) because of its action in relieving cerebral arterial spasm.\(^\text{13}\) In the presence of oliguria the excretion of the magnesium sulphate decreases, giving rise to toxic effects manifested by slowing of the respiratory rate.\(^\text{18}\) It can be counteracted by the intravenous administration of 10% calcium gluconate, but this was not required in any of our cases.

Magnesium sulphate was the drug of choice in all our patients with hypertension which we considered necessitated treatment. The drug was effective in all cases and other hypotensive agents were found to be unnecessary.

Veriloid,\(^\text{13,14}\) reserpine,\(^\text{16}\) hydralazine,\(^\text{17,18}\) reserpine with hydralazine,\(^\text{19,20}\) and hexamethonium\(^\text{21}\) have all been used in the treatment of hypertension of acute nephritis with variable results. We have had no experience with them.

**Conclusion**

We have found magnesium sulphate a very effective drug to use in the treatment of hypertension in acute
nephritis. We did not carry out routine control with electrolyte estimations and ECG tracings; nevertheless, none of our cases showed any signs of toxicity, and we recommend it as a safe and useful drug when hypertensive agents are indicated in this disease, provided it is used in the dosage suggested.

SUMMARY

1. Eighty-three cases of acute nephritis in non-European children admitted to hospital over a period of 8 years are analysed.

2. Special reference is made to hypertension, its complications, and its treatment with magnesium sulphate.

3. Cases where it was indicated were treated with magnesium sulphate with good results. No toxic effects followed its use.

4. There was only 1 fatality in the series.

We wish to thank Dr. D. G. Elliott, Medical Superintendent, Coronation Hospital, for permission to publish this report; Dr. H. C. Falcke, senior paediatrician; and Dr. Harvey Cohen, under whose care the cases reported were admitted. We are especially grateful to our friends for much helpful criticism.

AMPTELIKE AANKONDIGING : OFFICIAL ANNOUNCEMENT
INSURANCE COMPANY MEDICAL AID

At its recent meeting held in Vereeniging on 19-21 October 1960, the Federal Council of the Medical Association of South Africa debated the policy of the Association in connection with (1) the approval by the Association of groups administered by insurance companies as medical aid societies, and (2) the advice to be given to members regarding certain cheques on which a code number indicates that the value of the cheque is according to the medical aid tariff of the Association and is 'tendered in full settlement of the gross amount of such account'—these cheques are at present being issued by the South African Mutual Medical Aid Society to medical practitioners.

1. Approval of Medical Aid Groups Administered by Insurance Companies

In March 1960, Federal Council took the following decision:

(i) That the Medical Association of South Africa agrees to cooperate with insurance organizations which provide prepaid medical care, in order to enable them to provide an adequate medical service to the public, and

(ii) That the preferential tariff, as amended from time to time, be granted to all groups which can conform with the rules laid down for approval as medical aid societies on the understanding that the organizations administering them will in their turn undertake to pay the accounts of doctors directly and in full.

At its meeting in Vereeniging, Federal Council now decided to review the aforementioned decision in the light of recent negotiations, and it resolved as follows:

(i) That groups within the insurance companies be recognized and approved if they conform with a rule requiring them to have an income ceiling to be determined, and certain other standing rules as applicable to medical aid societies.

(ii) That all insured persons whose incomes are below the income ceiling be placed in an approved group on their own for whom the insurance companies agree to pay the doctors' fees "direct and in full" according to the Tariff of Fees for Approved Medical Aid Societies.

(iii) That insured persons whose incomes are over the determined ceiling be placed in a different category so that the insurance companies will pay direct to them any indemnity due and they will be classed by doctors as private patients from whom they will collect their fees.

A number of groups, to which reference will be made in the Journal in due course, have been granted approval, but Federal Council decided 'that no further negotiations regarding groups will be undertaken with insurance companies, and

no further groups will be recognized until satisfactory arrangements regarding matters affecting the dignity of the profession and the payment of accounts have been finally settled between the Medical Association and the insurance companies'.

2. Advice Regarding Coded Cheques

In an Official Announcement which was published in the issue of the Journal for 17 September 1960, a special Subcommittee of Federal Council, which was instructed to discuss the matter of coded cheques issued by the South African Mutual Medical Aid Society with their representatives, decided to give the following preliminary directive to members of the Association: to hold these cheques wherever possible and not to receipt or deposit them until after the next meeting of Federal Council. The Sub-Committee had no alternative but to give this directive, because several new principles emerged from the discussions and the whole problem consequently became fluid again.

After considering this problem from all possible angles at its meeting in Vereeniging, Federal Council took the following decision:

(i) That members that they may accept the coded cheques from the South African Mutual Medical Aid Society, under protest, up to 30 November 1960.

(ii) Before this date members will be informed of the result of negotiations which are to be conducted by the Federal Council. They will also be advised on a further course of action.

(iii) Members are advised that all cheques which have been issued to them for an amount less than tariff rates are understood to have been issued in error and can be returned to the sender for adjustment.

The aforementioned recommendations refer to cheques issued in respect of services rendered to members of groups before these groups were approved. Members should, however, keep in mind that a number of groups—to be referred to in a later issue of the Journal—have now been granted approval. Therefore, cheques received in respect of services rendered to members of these approved groups will be in order if made out at medical aid rates, even after 30 November.

Members of the Association will be kept fully informed regarding any new developments in connection with the matters mentioned here, by means of notices in the Journal.

Vereeniging 21 October 1960

E. W. Turton
Chairman, Federal Council