EEG Pattern of Mentally Deficient Children and the Effect of Photic Stimulation and Mentat

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ABSTRACT
Incidence of epileptic seizures is known to be high in children with mental deficiency. The EEG abnormalities in this group are even higher and may be precipitated by provocative stimuli in the majority of them. In 34 mentally deficient children with abnormality of EEG pattern, photic stimulation increased spike frequency and reduced occipito parietal (OP) alpha activity. Treatment with Mentat reduced the increase in spike frequency after photic stimulation and increased the basal alpha activity. Mentat may be an useful adjunct to prevent epilepsy alone or in combination with antiepileptic therapy.

INTRODUCTION
The incidence of epileptic seizures is known to be higher in children with mental deficiency especially following birth trauma or encephalitis (Ounsted, 1969). However, many such children who do not show manifestations of epilepsy have abnormal EEG patterns and may later show frank manifestations of epilepsy. Even in those children who do not show abnormality in EEG, changes suggestive of epilepsy can be induced by audio-visual stimulation. Such children are also prone to develop epileptic fits (Ames, 1971, Marsden and Reynolds 1982).

Mentat, an indigenous formulation based on Ayurvedic principles, has been shown to be useful in mentally retarded and hyperkinetic children (Dave, 1991) and to have beneficial effect in improving control of epileptic attacks in patients treated with antiepileptic drugs (Chavda, 1991; Shah 1991). It was therefore decided to study the EEG pattern of mentally deficient children with and without photic stimulation and assess the effect of Mentat treatment.

MATERIAL AND METHODS
Thirty four children diagnosed as mentally deficient following birth trauma or encephalitis and who did not give a history of epileptic fits were selected for the study. They comprised both male and female children between the ages of 4 to 12 years.

The EEG was recorded on a two channel recorder from bitemporal electrodes and electrodes on the occipito parietal area, the latter recording the filtered alpha waves. The recording was done in a quiet room after the subject was acclimatised for 30 minutes. Photic stimulation was applied by random flashing of coloured 25 watt bulbs fixed on the board in front of the subject. Normal recording for 5 minutes was followed by photic stimulation for 5 minutes and again normal recording for a further 5 minutes. The spikes and alpha bundles occurred irregularly both during the normal and photic stimulation periods. The maximum number of spikes or alpha bundles in any one minute period during each phase was taken as a parameter. After the initial recordings 20 children received Mentat syrup and 14 received a placebo syrup in the dose of two teaspoonfuls twice a day for 12 weeks. The EEG recordings were repeated at the end of 12 weeks.
Mentat is a formulation based on Ayurvedic principles.

The drug was given in bottles sufficient for two weeks’ treatment. The subjects were seen every two weeks to ascertain compliance and look for any adverse reactions.

RESULTS

As seen in Table 1 the children showed abnormal spikes in the resting state, which were increased on photic stimulation. Similarly the alpha activity was suppressed by photic stimulation. After treatment with Mentat, basal seizure discharge was reduced and the effect of photic stimulation markedly decreased. The basal alpha activity was considerably increased indicating a relaxed and less excitable state of the central nervous system. Fig. 1 shows a characteristic tracing of one of the cases treated with Mentat.

Table 1: Showing a) the maximum number of spikes in one minute period, b) maximum number of alpha bundles in one minute period during normal EEG recording and recording during photic stimulation, before and after treatment with Mentat and Placebo

<table>
<thead>
<tr>
<th></th>
<th>Before treatment</th>
<th>After treatment</th>
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<tbody>
<tr>
<td></td>
<td>Normal EEG</td>
<td>Photic Stimulation</td>
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<tr>
<td></td>
<td>Recording</td>
<td>Recording</td>
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<tr>
<td>Mean maximum no. of spikes in one minute</td>
<td>Placebo (n = 14)</td>
<td>7.8</td>
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<tr>
<td></td>
<td>Mentat (n = 20)</td>
<td>6.5</td>
</tr>
<tr>
<td>Mean maximum no. of alpha Bundles in one minute</td>
<td>Placebo</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>Mentat</td>
<td>3.8</td>
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* \( p < 0.05 \) compared to corresponding value in placebo group

Fig. 1: Effect of Mentat on brain wave pattern following photic stimulation

None of the patients suffered from any side-effect of drug administration. The parents voluntarily remarked about their children being more amiable and having better toilet sense after Mentat administration in 16 out of 20 patients in the treated group as against just one out of 14 patients in the placebo group.
DISCUSSION
The risk of developing epilepsy with consequent devastating effect on personality is high among mentally deficient children. Routine EEG screening specially with photic stimulation can identify high risk children. So far there is no acceptable prophylactic treatment except empirical administration of the usual antiepileptic drugs with attendant side-effects. Mentat treatment significantly reduced the spike frequency and especially the effect of photic stimulation. It also increased the frequency of alpha bundles in the occipito parietal region which indicates reduced excitability. Mentat was significantly different from placebo and in addition to its effect on EEG also produced beneficial effects on behaviour. There were no side-effects on behaviour. There were no drop-outs. The remedy shows promise of being useful in preventing epileptic attacks in a high-risk population. A longer longitudinal study will be required to confirm this observation.

REFERENCES