Early Feeding History of Children with Learning Disorders

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Introduction

Learning disorders in the school-age child are the outcome of numerous genetic and environmental factors, some of which are only gradually being understood, while others are still unknown. From a series of observations collected by us between 1962 and 1971, we concluded that larger pre-term infants whose blood tyrosine levels rose above 15mg/100ml as a result of high-protein feedings subsequently achieved a significantly lower performance IQ and had a higher incidence of intellectual impairment in the area of perceptual function than matched pre-term infants who were able to handle the high protein load (Menkes et al. 1966, 1972). Analogous intellectual deficits have been detected in a high proportion of children who as full-term neonates experienced significant and prolonged tyrosinemia.

Since tyrosinemia occurs in some 8 to 10 per cent of term neonates, and is particularly prolonged and severe in infants who are entirely bottle-fed (Wong et al. 1967, Mamunes et al. 1976), it appeared possible that feeding formulas having a protein content considerably higher than breast milk might be one factor responsible for the evolution of a learning disorder.

We therefore undertook a retrospective examination of early infant feeding in children with learning disorders.

Method

Data for this study were obtained from the private office population of the author, a pediatric neurologist practising in a large metropolitan center. The population consisted entirely of white children whose parents belonged to social classes 1 or 2 (professional and intermediate), as based on Drillien’s classification (Drillien 1957). This is a modification of the Registrar General’s classification of occupations. Patients whose parents were separated or divorced were classed according to the father’s occupation. Information on infant feeding was obtained from the existing medical records or from the referring pediatrician, and in all instances was verified by telephone interview of the parent.

Twenty-nine children had been referred for evaluation and treatment of their learning disorder. Commonly this was accompanied by hyperkinetic behaviour, perceptual handicaps and clumsiness, appearing singly or in combination. 25 of the 29 children were boys (86·2 per cent), and four (13·8 per cent) were girls. None
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of these patients had a seizure disorder or other abnormalities on neurological examination, other than the commonly encountered 'soft' signs.

In order to ascertain the frequency of breast-feeding in children seen in the same office with neurological conditions other than learning disorders, 53 control children were selected, matched for year of birth and sex. 27 of these children (50·9 per cent) had a seizure disorder, seven (13·2 per cent) had headaches, and the remainder had a variety of neurological disorders. While some of the control children had associated learning problems, these were never the presenting complaint. In the control group there were 45 boys (84·9 per cent) and eight girls (15·1 per cent). Pre-term infants and children with major congenital malformations or with a neonatal course that might have determined the feeding history were excluded from both groups.

Results
The infant feeding history of the children in both groups is presented in Table I. Children who were nursed for four weeks or longer were considered to be breast-fed. 47·2 per cent of control children and 13·8 per cent of children with learning disorders were breast-fed. The difference between the two values is statistically significant ($p = 0·004$) (Siegel 1956). The incidence of breast-fed babies in the control group is somewhat higher than the one-third encountered in the community as a whole (La Leche League 1976), and probably reflects the higher social class of the families. Although a greater proportion of female control children were nursed, the difference is not significant, for the number of girls admitted to the control group was small. In the community as a whole, the reverse is true; boys are more likely to be nursed (La Leche League 1976).

Twenty-three parents of children with learning disorders and 26 parents of control children remembered the name of the formula taken by their children. The protein content of these formulas ranged from 1·5g/100ml to 3·3g/100ml, in contrast with a protein content of mother’s milk of 1·2g/100ml. No difference was found with respect to the protein content of the formulas chosen by the two groups.

Although this retrospective study of infant feeding failed to demonstrate an increased proportion of children with learning disorders who had been on formulas with a high protein content, it does show

<table>
<thead>
<tr>
<th>TABLE 1</th>
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<tbody>
<tr>
<td>Feeding history of children with learning disorders and of control children</td>
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<table>
<thead>
<tr>
<th>Year of birth</th>
<th>Learning disorders</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast-fed</td>
<td>Formula-fed</td>
<td>Breast-fed</td>
</tr>
<tr>
<td>1959–1963</td>
<td>Boys</td>
<td>1</td>
</tr>
<tr>
<td>Girls</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1964–1967</td>
<td>Boys</td>
<td>1</td>
</tr>
<tr>
<td>Girls</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1968–1970</td>
<td>Boys</td>
<td>1</td>
</tr>
<tr>
<td>Girls</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td>4</td>
<td>25</td>
</tr>
</tbody>
</table>

$p = 0·004$
that a significantly higher proportion of these children were bottle-fed.

It would be presumptuous to explain why the incidence of formula feeding is so high amongst children with learning disorders. The explanation might be social, psychological, biochemical or toxicological factors (Feingold 1975). One suspects that each reader will provide himself with his own explanation.

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SUMMARY

The infant feeding histories of 29 children with learning disorders were compared with those of 53 control children referred for other neurological conditions. 13.8 per cent of children with learning disorders had been breast-fed, compared with 47.2 per cent of the control children. There was no difference between the two groups in protein content of the formulas used for bottle-feeding.

ZUSAMMENFASSUNG

Primäre Art der Ernährung bei Kindern mit Lernschwierigkeiten

Um die Hypothese zu prüfen, die besagt Nahrungen mit einem viel höheren Eiweißgehalt als dem der Muttermilch könnten ein verantwortlicher Faktor für spätere Lernschwierigkeiten sein, wurde die primäre Art der Ernährung von 29 Kindern mit Lernschwierigkeiten verglichen mit der von 53 Kindern mit anderen neurologischen Befunden. Die beiden Gruppen wurden nach Geburtsjahr und ökonomischem Stand aufeinander abgestimmt. 13.8 Prozent der Kinder mit Lernschwierigkeiten und 47.2 Prozent der Kontrollkinder waren gestillt worden. Von den Kindern der beiden Gruppen, die Flaschennahrung bekommen hatten, hatten alle den gleichen Proteingehalt in den einzelnen Nahrungen.

RESUMEN

Antecedentes de alimentación precoz en niños con alteraciones en el aprendizaje

Con el objeto de probar la hipótesis de que los biberones con un contenido de proteína mucho más alto que la leche de mujer podrían ser un factor responsable de posteriores alteraciones en el aprendizaje, se comparó la historia precoz alimenticia de 29 niños con alteraciones en el aprendizaje con la de 53 niños que ofrecían otras características neurológicas. Los dos grupos fueron homologados en lo que respecta al año de nacimiento y a la clase económica. 13.8 por ciento de los niños con alteraciones en el aprendizaje y 47.2 por ciento de los niños control habían sido alimentados al pecho. En aquellos niños de ambos grupos que habían recibido biberón no se encontró ninguna diferencia con respecto al contenido de proteínas del biberón escogido.

REFERENCES


