Detection of hepatic encephalopathy

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Summary: The most sensitive index of hepatic encephalopathy in 29 patients following a porta-caval shunt appeared to be the assessment of a close relative who had known the patient pre-operatively. They noticed that 19 of the 20 patients were mentally slower; 11 were markedly aggressive and 8 had become placid and uncaring about family problems. Only 9 of these patients had clinical encephalopathy as judged by two independent observers, 14 had a prolonged trail test and 8 produced an abnormal five-pointed star.

Eight patients were forced to retire prematurely after the operation due to ill health and 20 felt that their marriage had deteriorated.

Eighteen of the 29 patients had a lie score on the Eysenck personality questionnaire (an index of 'social naivety') which was more than one standard deviation above the mean value for a large control group ($P < 0.01$). This did not correlate with other measurements of encephalopathy, but 8 out of the 11 patients who exhibited aggressive behaviour had an abnormal score.

Introduction

The first comprehensive description of neuropsychiatric disorders complicating liver disease was made by Adams & Foley (1953). A similar syndrome which followed a porta-caval anastomosis was described in 1954 and Sherlock and her colleagues (1954) coined the term 'portal-systemic encephalopathy' (PSE) to emphasize the importance of diversion of portal blood from the liver in the pathogenesis of this disorder.

The subtle mental changes of PSE may be difficult to quantitate, although Davidson & Summerskill (1956) demonstrated a constructional apraxia using the five-pointed star, and the Reitan (1955) trail test, which quantitates the extent of organic brain damage, has also been used (Zeegen *et al.*, 1970).

None of these tests take cognizance of mood changes. Having been impressed that the capricious behaviour of severely affected patients may put an intolerable strain on family relationships, we have interviewed relatives of patients who have undergone a porta-caval shunt to try and assess the effect of encephalopathy – even when clinically mild – on the patient's relationship with colleagues, friends and family. These observations have been correlated with a clinical assessment of the patient, the patient's own observations concerning their condition, together with

their scoring in a Reitan trail test and Eysenck personality profile.

Patients and methods

Over a 9 month period, 29 patients who had undergone a porta-caval shunt were interviewed in the out-patient clinic.

All patients were assessed by two independent observers for clinical evidence of encephalopathy as evidenced by foetor, flapping tremor or obvious mental slowness, but without access to the clinical notes or results of any other tests. Each patient performed a Reitan trail test (Part 1) and constructed a five-pointed star. These tests were scored as previously described (Zeegen *et al.*, 1970). In addition the patients filled in an Eysenck personality questionnaire.

All the patients were interviewed in detail about their hobbies, work record, marriage, social and sexual life. They were also asked to assess whether there had been any change in the quickness of their mental processes, their ability to concentrate or their mood, following the shunt operation. A close relative, who knew the patient well pre-operatively and at the time of interview, was asked the same questions.

Statistical correlations were carried out by the Spearmann Ranking co-efficient unless otherwise stated.

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Table I Relatives' assessment compared with various other parameters (total numbers shown in brackets)

	<i>Mental processes slower (19)</i>	<i>Aggressive behaviour (11)</i>	<i>Mental processes the same (10)</i>
Clinical encephalopathy found by two clinicians (9)	9	4	0
Trail test prolonged (14)	14	6	1
Five point star abnormal (8)	8	5	0
Lie score raised (18)	11	9	7
by > 1 standard deviation compared with control group			

Results

The Unit at St Bartholomew's Hospital has had a special interest in non-cirrhotic portal hypertension which accounts for this and alcohol being the commonest aetiology of liver disease leading to a shunt operation (8 and 6 patients each). The average age of the patient was 53 with a range of 22 to 76 years, and on average the operation had been performed 9 years previously (range 2–24 years). None of these factors correlated with the subsequent results.

The relatives considered that the mental processes of 19 of the 29 patients had slowed post-operatively. They were also particularly worried by changes in other aspects of the patient's character. Eleven patients had become aggressive and some of them had unexplained bouts of rage. This was particularly so in 5 men whose wives became frightened of them and 2 developed violent behaviour towards their children. A further 8 patients became more placid and appeared to have become uncaring about family problems.

Prolongation of the trail test by more than 50 seconds and an abnormal score for the construction of a five-pointed star was strongly associated ($P < 0.05$) with the relative's assessment of mental slowing (Table I and Figure 1).

The two observers (BCG and HP) were in agreement about 9 patients who were felt to have clinical encephalopathy, and two further patients were thought to be abnormal by one observer only. The 9 patients in whom there was agreement were all receiving standard encephalopathy treatment. Five other patients had been treated for encephalopathy within the previous 4 months but none within 2 weeks of study. All these patients were considered slower by their relatives.

Patients' assessment and activities

Eight patients had retired early from work because of ill health and were receiving Social Security payments. Seven of these patients had also given up hobbies

Figure 1 Results of 28 trail tests subdivided according to mental slowing as assessed by a close relative. The trail test could not be evaluated in one patient who was partially sighted.

because they were unable to concentrate. Twenty of the 29 patients felt that their married life had deteriorated because of the operation, and sexual intercourse was very infrequent in all the patients except 4, although 9 had been sexually active pre-operatively.

Eysenck personality questionnaire

The most interesting feature of the Eysenck personality questionnaire was the high lie score with 18 having a score which was more than one standard deviation greater than the mean of the previously

Figure 2 Results of the lie score in the Eysenck personality questionnaire compared with the mean scores for a group of aged-matched controls (Eysenck & Eysenck, 1977).

published large control group matched for age and sex (Eysenck & Eysenck, 1977) (Figure 2). Although this high lie score on the Eysenck personality questionnaire was not correlated with other features of encephalopathy it was associated with increased aggression (Table I).

Discussion

We wished to see if the assessment of mental slowing by a relative was an accurate guide to hepatic encephalopathy. The 19 patients considered slower certainly included all those with any clinical evidence of encephalopathy, and all but one of those with a prolonged trail test. Additional tests of hepatic encephalopathy have been used by authors, although none appears to be completely reliable. Thus Schomerus

and his colleagues (1981) found that Part VI (block design section) of the Wechsler scale (Wechsler & Stone, 1977) was helpful in predicting the fitness to drive of patients with possible encephalopathy, but this was not included in our study as it needs a trained psychologist for accurate interpretation. The electroencephalogram (EEG) was also not included in our assessment as this cannot be performed by the clinician at the bedside. Although the EEG has been considered a sensitive guide to encephalopathy several studies contradict this view (Zeegen *et al.*, 1970; Rikkers *et al.*, 1978).

One of the most striking and disturbing findings in this study was the profound effect that PSE may have on the family. Psychiatric disturbance had made 19 of these patients very difficult to deal with. The relatives of many of these 19 cases often needed more support than the patients themselves who had little insight into their condition.

The passivity and aggression of these patients were similar to the changes sometimes seen after a leucotomy and, while there are excellent descriptions of these findings in the literature (Davidson & Summerskill, 1956), they have perhaps not been emphasized sufficiently in recent years.

Many of these patients had a high lie score on the Eysenck personality questionnaire, and this is said to be an index of 'social naivety' which would be a good description of their personality. There did not appear to be any correlation between the lie score and other measures of encephalopathy, and thus the cause of this 'social naivety' is likely to be different from changes in cognitive function.

It is likely that the frequency of changes of mentation and personality in hepatic encephalopathy or following a porta-caval shunt are underestimated both clinically and by sophisticated tests of cerebral function. It is perhaps not surprising that, in a widespread cerebral disease, the pattern of disorder should be wide and that formal testing may not be as sensitive as assessment by relatives who may be a better guide to subtle changes in mentation. We suggest that close questioning of relatives should form an important part of the evaluation of patients with liver disease.

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