

## Psychiatric and Social Outcome of Liver Transplantation

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**Background.** This study measures psychiatric morbidity, quality of life, and cognitive function after liver transplantation.

**Method.** We undertook a cross-sectional study, with a longitudinal subgroup. The setting was a tertiary referral centre for liver transplantation. The subjects were 30 post-liver-transplantation patients, including 11 also interviewed before the operation. The main outcome measures were the Clinical Interview Schedule (CIS), the General Health Questionnaire (GHQ), the Nottingham Health Profile (NHP), and the Mini-Mental State Examination (MMSE).

**Results.** Of the patients, 8/30 were CIS cases, and 7/30 were GHQ cases. NHP scores were higher than a previous postal study indicated, with less impairment after than before transplant. MMSE scores were 24–30. Median GHQ was 7.0 before operation and 1.0 after operation ( $P=0.03$ ), with no significant change in CIS score.

**Conclusion.** Liver transplantation improves quality of life, but not to the level of the general population; post-transplantation patients have a prevalence of psychiatric morbidity comparable with that of general medical patients.

Chronic liver disease is associated with much physical ill health, psychiatric morbidity, and impaired quality of life (Collis & Lloyd, 1992), but for patients with progressive disease the prognosis has been transformed in recent years by the increasing use of hepatic transplantation as a treatment for end-stage liver disease. Some previous studies of the quality of life of post-transplantation patients have been encouraging: in a preliminary report, Tarter *et al* (1988) found that 90% of patients were able to return to work and to lead active lives; Lowe *et al* (1990), in a postal survey of 58 post-transplantation patients with the Nottingham Health Profile (NHP), found that the prevalence of reported problems was similar to that seen in the general population. However, Surman *et al* (1987) reported that 8/40 post-transplantation patients were referred for treatment of depressive symptoms, typically associated with medical complications; and Commander *et al* (1992) found that although the prevalence of psychiatric morbidity in the 32 patients studied was comparable with that found in general population surveys, there was significant impairment in some areas of social functioning.

This study is the first in the UK to examine concurrently psychiatric morbidity, cognitive impairment, and quality of life after liver transplantation. Our aims were to determine the prevalence of significant psychiatric morbidity, to measure quality of life and investigate its association with psychiatric symptoms, and to examine whether alcohol dependence was associated with a poorer outcome. We also wished to determine whether patients in the first year after operation have more problems than those

in the second or subsequent years, as suggested by Lowe *et al* (1990). In a subgroup of patients who were interviewed both before and after operation, we sought to determine whether there was a significant change in psychiatric morbidity and quality of life.

### Method

Thirty consecutive post-transplantation patients attending the Royal Free Hospital Liver Unit (London) were asked to take part in the study; none declined. Eleven were interviewed both before and after transplantation. Thirty-six other patients had undergone transplants at the Royal Free since the transplant programme had started: 22 had died and 14 were living overseas. Assessments took place between 2 and 151 weeks after the transplantation (median 39 weeks).

Patients were interviewed in a standardised manner. Demographic characteristics and personal or family history of psychiatric disorder, including alcohol or other substance abuse, were recorded. The mental state was assessed with the Clinical Interview Schedule (CIS), a standardised psychiatric interview (Goldberg *et al*, 1970), and the Mini-Mental State Examination (MMSE), an 11-item assessment of cognitive function (Folstein *et al*, 1975). Finally, patients were asked to complete the 28-item General Health Questionnaire (GHQ) (Goldberg & Hillier, 1979) and the Nottingham Health Profile (NHP) (Hunt *et al*, 1986). The former consists of 28 questions, grouped into somatic, anxiety, social dysfunction, and depression subscales. The latter,

consisting of two parts, is designed to measure the patients' quality of life; Part 1 is concerned with six groups of symptoms (energy, pain, emotional reactions, sleep, social isolation, and physical mobility); Part 2 asks patients whether their state of health is causing problems with work, home life, social life, personal relationships, sex life, personal interests, or holidays.

### Results

Of the 30 patients (18 women and 12 men aged between 16 and 66, mean age 44), five had a previous history of mental illness, four of alcohol dependence, and one of substance abuse (no patient had a dual diagnosis). Four women and four men had psychiatric disorders according to the CIS (with a cut-off of 13/14). Four had mild mixed anxiety and depressive disorders, two adjustment disorders, one a severe depressive disorder, and one an organic mood disorder. Seven of the patients had psychiatric disorders according to the GHQ (with a cut-off of 5/6). There was no significant correlation between GHQ score and number of weeks after operation (Pearson correlation coefficient - 0.10) or CIS score and number of weeks after operation (Pearson correlation coefficient - 0.08).

Eleven patients were interviewed both before and after transplantation. The median GHQ score before transplantation was 7.0, and after transplantation it was 1.0 ( $P=0.03$  by Wilcoxon matched pairs signed rank test); the overall difference was mainly accounted for by differences in the subscales for somatic symptoms and social functioning. There was no significant change in median CIS scores (3.0 before operation and 5.3 after operation). The two patients who were CIS cases at interview before the operation were not CIS cases after the operation; one patient became a CIS case postoperatively.

Only four of the patients had a history of alcohol dependence. Of these, three were CIS cases, with anxiety and depressive symptoms predominating. Their median CIS score was 13 and their median GHQ score was 6. They had more impairment than other patients on all the NHP scales, except the home-life scale.

The MMSE scores ranged from 24 to 30. Only one patient scored below the 24/25 threshold, indicating significant cognitive impairment; four were in the borderline range of 25-27.

Table 1 shows the median scores for the NHP. On all the scales in Part 1 of the NHP, patients in the first year after operation had more symptoms than patients in subsequent years. Only four patients scored zero in all six of the scales. For each of the

Table 1  
Nottingham Health Profile results for post-transplantation patients ( $n=30$ )

Part 1	
Scale	Score Median (range)
Energy	24.00 (0-100)
Pain	5.83 (0-100)
Emotional reactions	9.76 (0-64.49)
Sleep	12.57 (0-84.90)
Social isolation	19.34 (0-35.33)
Physical mobility	11.20 (0-74.70)
Part 2	
Scale	% with problem
Job of work	36.7
Looking after home	36.7
Social life	33.0
Home life	23.3
Sex life	30.0
Interests and hobbies	36.7
Holidays	43.3

problem areas in Part 2, 23-35% of patients continued to experience impairments in their quality of life; 12 patients had no problems in any of the areas.

Of the subgroup of patients interviewed both before and after the operation, NHP data was incomplete for one subject. Of the remaining 10 patients, one person scored zero in all the NHP Part 1 scales before operation and four scored zero in all the scales after operation; one was problem free in all areas of Part 2 of the NHP before operation, and five were completely problem-free after operation. There was an improvement in all the subscales of the NHP, except for pain and home life. The number of subjects was too small to allow further statistical analysis.

CIS cases had higher scores in all subscales of the NHP. None of the CIS cases were completely problem-free as measured by Part 2 of the NHP, whereas 12/22 non-cases were ( $\chi^2=5.17$ ;  $P=0.02$ ).

### Discussion

There was significant psychiatric morbidity, most commonly anxiety and depression, in a quarter of the patients interviewed after liver transplantation. This is comparable with the prevalence in other patients with liver disease (Ewusi-Mensah *et al*, 1983; Sarin *et al*, 1988) or other physical illnesses (Maguire *et al*, 1974). In most cases, these disorders were mild; only two required psychiatric treatment. Our results are similar to those of Commander *et al* (1992), who

found that 21.9% of their post-liver-transplantation patients were defined as psychiatric cases by the 30-item version of the GHQ and 18.8% by the Psychiatric Assessment Schedule (Dean *et al*, 1983). In contrast, a longitudinal study, using structured interviews, of 71 cardiac transplantation recipients found that only three patients had had no psychological problems after the operation; 51% experienced an affective illness and 21% anxiety (Shapiro & Kornfeld, 1989).

In patients who were assessed on two occasions, there was no significant change in psychiatric morbidity after transplantation, although quality of life did improve. Continuing physical symptoms after transplantation, the need to attend for follow-up and to take medication, and the risk of organ rejection may be as important in causing symptoms of anxiety and depression as the more acute physical ill health found before transplantation.

Patients with a history of alcohol dependence may have a particularly high risk of psychiatric morbidity; previous research has indicated that people with alcoholic liver disease have twice the prevalence of psychiatric disorder of patients with non-alcoholic liver disease (Ewusi-Mensah *et al*, 1983). Only four of the subjects in our study had a history of alcohol dependence; three of them had significant psychiatric morbidity postoperatively, and their quality of life showed greater impairment than other patients. Alcoholic patients are increasingly being accepted for liver transplantation programmes; as their numbers rise, the need for psychiatric intervention in the post-transplantation period may become greater.

Although the case notes suggested that several patients had symptoms of delirium in the immediate postoperative period, these were transient and only one of the patients studied had significant cognitive impairment at interview. More detailed neuropsychological assessment may have revealed cognitive deficits not apparent on testing with the MMSE, but none of the patients had difficulties in memory or intellectual function which interfered with their lives.

There was a significant association between psychiatric morbidity and impaired quality of life. CIS cases had more problems in all areas of the NHP, either because their psychiatric symptoms made them less able to cope with daily living, or because their physical health was worse; patients often linked psychological symptoms to worries about their physical health. Commander *et al* (1992) also noted an association between psychiatric morbidity and impairment in social functioning, and Surman *et al* (1987) indicated

that depressive symptoms frequently followed medical complications.

This study supports the finding of Lowe *et al* (1990) that quality of life is more impaired in the first year after transplantation than subsequent years, particularly in the areas of physical mobility and energy. This may indicate that recovery is slow and that improvement can be expected to continue for a long time after transplantation. Only 13% of our patients scored zero in all the six areas of Part 1 of the NHP, in contrast to 47% in Lowe *et al*'s study; furthermore, 69% of their patients identified no problems in Part 2 of the NHP, in contrast to only 37% of ours. Possible explanations for these discrepancies are that the questionnaires in our study were completed during a face-to-face interview rather than sent out by post, that patients with a poorer outcome may have been less likely to return the postal questionnaires (their response rate was 79%), or that there may have been differences between the two centres in how ill the patients were before transplantation. Our findings concur with those of Commander *et al* (1992): quality of life improves considerably after liver transplantation but remains impaired in relation to the general population.

#### Acknowledgements

Dr Ian Collis was supported as Research Registrar by a Grovelands Priory Hospital Grant. We are grateful to staff and patients in the Royal Free Hospital Liver Unit for their support and assistance in this study.

#### References

- COLLIS, I. & LLOYD, G. (1992) Psychiatric aspects of liver disease. *British Journal of Psychiatry*, **161**, 12–22.
- COMMANDER, M., NEUBERGER, J. & DEAN, C. (1992) Psychiatric and social consequences of liver transplantation. *Transplantation*, **53**, 1038–1040.
- DEAN, C., SURTEES, P. G. & SASHIDHARAN, S. P. (1983) Comparison of research diagnostic systems in an Edinburgh community sample. *British Journal of Psychiatry*, **142**, 247–250.
- EWUSI-MENSAH, I., SAUNDERS, J. B., WODAK, A. D., *et al* (1983) Psychiatric morbidity in patients with alcoholic liver disease. *British Medical Journal*, **287**, 1417–1419.
- FOLSTEIN, M. F., FOLSTEIN, S. E. & MCHUGH, P. R. (1975) 'Mini-Mental State'. A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*, **12**, 189–198.
- GOLDBERG, D., COOPER, B., EASTWOOD, M. R., *et al* (1970) A standardised psychiatric interview for use in community surveys. *British Journal of Preventive and Social Medicine*, **24**, 18–23.
- GOLDBERG, D. & HILLIER, V. F. (1979) A scaled version of the general health questionnaire. *Psychological Medicine*, **9**, 139–145.
- HUNT, S. M., MCEWEN, J., MCKENNA, S. P. (1986) *Measuring Health Status*. London: Croom Helm, 153–202.
- LOWE, D., O'GRADY, J., MCEWEN, J., *et al* (1990) Quality of life following liver transplantation: a preliminary report. *Journal of the Royal College of Physicians of London*, **24**, 43–46.

- MAGUIRE, G. P., JULIER, D. L., HAWTON, K. E., *et al* (1974) Psychiatric morbidity and referral on two general medical wards. *British Medical Journal*, *i*, 268–270.
- SARIN, S. K., SACHDEV, G., JILDHA, R. C., *et al* (1988) Pattern of psychiatric morbidity and alcohol dependence in patients with alcoholic liver disease. *Digestive Diseases and Sciences*, *33*, 443–448.
- SHAPIRO, P. A. & KORNFELD, D. S. (1989) Psychiatric outcome of heart transplantation. *General Hospital Psychiatry*, *11*, 352–357.
- SURMAN, O. S., DIENSTAG, J. L., COSIMI, A. B., *et al* (1987) Psychosomatic aspects of liver transplantation. *Psychotherapy and Psychosomatics*, *48*, 26–31.
- TARTER, R. E., ERB, S., BILLER, P. A., *et al* (1988) The quality of life following liver transplantation: a preliminary report. *Gastroenterology Clinics of North America*, *17*, 207–217.

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(First received 17 January 1994, final revision 25 August 1994, accepted 12 September 1994)