Autologous Transplantation of Adrenal Medulla Into the Caudate Nucleus: A Four Year Follow Up Study

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The objective of this study was to determine whether the associated morbidity and mortality of adrenal medulla autologous transplantation into the striatum (open transcortical procedure) justifies this as a safe and effective treatment for Parkinson's Disease (PD).

METHODS

The 4 year postoperative status was evaluated in 17 patients with PD who were recipients of adrenal medulla autologous transplants between August, 1987 and August, 1988. The results were compared with those obtained at the two year follow-up published in 1990 /1/.

Two patients were lost to follow-up and two additional patients died of pneumonia (aside from the 3 deaths we reported in 1990).

The parameters evaluated included:

- a) The Unified Parkinson's Disease Rating Scale (UPDRS), including: the modified Hoehn/Yahr scale, Schwab and England assessment score, mentation, activities of daily living (ADL), and motor examination;
- b) Neuropsychological evaluation (12 patients);
- c) Neurophysiological evaluation (10 patients);
- d) Pre- and postoperative diabetes mellitus and endocrine evaluation.

Data forms were collected at baseline, and at 24 and 48 months postoperative periods. All medical complications were registered. Ten of the seventeen surviving patients had MRI of the brain postoperatively.

RESULTS

1. Two patients (9%) showed long lasting improvement. However, we identified some characteristics that put them out of the mean group of the illness:

- a) PD started at early age; 24 (B.B.) and 41 years (B.C.);
- b) One of the patients was exposed to DDT (B.C.);
- c) Neither of the two had received Levodopa on a regular basis.

2. A second group (23%) showed a disability score quite similar to the preoperative level. This related to a less aggressive course of PD that we considered brought the clinical course to a "plateau".

3. The third group (68%) showed a progressive aggravation of the symptoms, and was the depository of most of the complications. There were three operative deaths related to the surgical procedure, two within 30 days after surgery, and one in the first 3 months. These data showed an overall operative mortality of 12%. Two additional deaths occurred 18 and 36 months after the operations were performed, both of them due to pneumonia.

4. This group of operated patients presented signs of long-term deleterious effects on the regulation of the hypothalamic-hypophyseal adrenocortical axis, for example, decreased cortisol level and a two-fold incidence of diabetes mellitus after surgery (17%). We related this to a reduction in the tolerance of stress after unilateral adrenalectomy, particularly in patients over 55 /2/.

5. This group also showed signs of progressive ageing as shown by Schwab and England scores. Radiological or NMRI changes of the brain, as

well as EEG changes, were present in ageing relatively young adults. Finally, a progressive decline of I.Q., particularly short-term memory, was seen.

These conclusions are similar to the ones reported by our group two years ago, and are in agreement with the recent report by the United Parkinson Foundation Neurotransplantation Registry [3].

REFERENCES

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TABLE

	Base line	2 years	4 years
No. of patients	24	20	17
Female	9	7	7
Male	15	13	10
UPDRS			
<i>Mentation</i>			
Group I	6.5	6.5 (0)	6.5 (0)
Group II	7.25	7.50 (-.25)	7.75 (-.5)
Group III	6.50	8.00 (-1.5)	8.75 (-2.25)
<i>ADL</i>			
Group I	32.5	21.25 (+11.3)	20.5 (+12)
Group II	23.5	22.5 (+1.5)	23.15 (-0.35)
Group II	53	62.8 (-9.8)	75.6 (-12.6)
<i>Motor</i>			
Group I	46.5	30 (+16.5)	20 (+26.5)
Group II	39.0	38.7 (+0.3)	42.5 (-3.5)
Group III	40	48 (-8)	60.5 (-20.5)
Hoehn/Yahr			
Group I	3.5	2.1 (+1.4)	2.7 (+0.8)
Group II	3.0	2.75 (+0.25)	3.50 (-0.5)
Group III	3.5	3.8 (-0.3)	4.5 (-1.0)
Schwab/England			
Group I	40	80 (+40)	70 (+30)
Group II	50	52.5 (+2.5)	50.5 (+0.5)
Group III	55	45 (-10)	30 (-25)
I.Q.			
Group I	78	72.5 (-5.5)	70.5 (-7.5)
Group II	102.3	94.3 (-8)	92.3 (-10)
Group III	78.5	70.5 (-8)	60.6 (-13.9)

UPDRS denotes Unified Parkinson's Disease Rating Scale, and ADL activities of daily living scale. Values in parentheses represent changes in the mean score as compared with the base-line scores. Negative signs indicate decline from base-line. Mentation UPDRS ranges from 0 (normal) to 16 (very abnormal) and positive signs indicate improvement, ADL ranges from 0 (normal) to 70 (very abnormal). Motor ranges from 0 (normal) to 68 (very abnormal). H/Y stages range from 0.5 (least disabled) to 5.0 (most disabled). Schwab/England scale ranges from 100 percent (no disability) to 0 percent (extreme disability).