

1386



ELSEVIER

Journal of Affective Disorders 50 (1998) 45-48

JOURNAL OF
**AFFECTIVE
DISORDERS**

Brief report

P300 amplitude and antidepressant response to Sudarshan Kriya Yoga (SKY)

P.J. Naga Venkatesha Murthy^a, N. Janakiramaiah^{a,*}, B.N. Gangadhar^a, D.K. Subbakrishna^b

^aDepartment of Psychiatry, National Institute of Mental Health and Neurosciences, Bangalore 560 029, India

^bDepartment of Bio-statistics, National Institute of Mental Health and Neurosciences, Bangalore 560 029, India

Received 24 September 1997; received in revised form 2 February 1998; accepted 3 February 1998

Abstract

Background: There is evidence that Sudarshan Kriya Yoga (SKY) has significant antidepressant effects. **Objective:** The present study examined whether pretreatment P300 ERP amplitude predicts antidepressant response to SKY. **Methods:** Consenting, drug-free depressed patients ($n = 30$; dysthymics, 15, melancholics, 15) who received SKY as the sole treatment were assessed clinically at pretreatment, 1 month and 3 months. Auditory P300 was recorded before treatment. **Results:** Twenty-two patients responded favourably to SKY. The pretreatment P300 amplitude neither distinguished responders and non-responders nor was associated with differential rates of response. **Discussion:** It is concluded that SKY therapy is uniformly effective regardless of the pretreatment P300 amplitude. © 1998 Elsevier Science B.V.

Keywords: Depression; Dysthymia; Melancholia; P300 event related potential; Yoga

1. Introduction

Sudarshan Kriya Yoga (SKY: Yoga Research Group, 1995) as the sole treatment has been found to be effective in dysthymia in an open trial (Janakiramaiah et al., 1998). Low pretreatment P300 event related potential (ERP) amplitude 'normalised' with improvement in both dysthymic ($n = 15$) and

melancholic ($n = 9$) patients on SKY therapy (Naga Venkatesha Murthy et al., 1997), similar to earlier reports with somatic treatments such as antidepressant medications and ECT (Blackwood et al., 1987; Gangadhar et al., 1993).

It has been reported, from our laboratory, that depressives with severe 'biological' dysfunction, as reflected by low pretreatment P300 ERP amplitude, require longer time for responding and that normal pretreatment P300 ERP amplitude predicts rapid response to a course of ECT (Ancy et al., 1996). Whether this is true with SKY therapy has not been studied. The current study is to examine whether

*Corresponding author. Tel.: +91 80 6642121 ext. 383; fax: +91 80 6631830; e-mail: bng@nimhans.ren.nic.in

pretreatment P300 ERP amplitude is related to variation in antidepressant response to SKY therapy.

2. Method

Fifteen patients each of dysthymia (eight males) and melancholia (depressive episode or recurrent depression with somatic syndrome: six males) confirmed by ICD-10 DCR checklist (WHO, 1992) were the sample. Bipolarity, psychotic symptoms, substance use, current drug treatment, major physical illnesses and audiological dysfunction were all excluded. Informed consent for the study was taken. Before SKY treatment auditory odd-ball P300 ERP was recorded with eyes closed, as detailed elsewhere (Naga Venkatesha Murthy et al., 1997). Where the P300 was bifid (in six recordings) the later peak was chosen for measurement.

SKY was the sole treatment consisting of 'three successive components of specified rhythms of breathing' for about half-an-hour daily and continued for 3 months. SKY was taught by a SKY teacher during the first 10 days. Patients were assessed, on Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960), Beck's Depression Inventory (BDI; Beck et al., 1961) and Clinical Global Impression Scale (CGI; Guy, 1976), pretreatment, at 1 month and at 3 months.

Independent samples *t*-test was used for between-group comparison and paired *t*-test for within-group comparison of variables. The level of significance was chosen at $P < 0.05$. Two-way repeated measure analysis of variance (RMANOVA; epsilon corrected

for adjusting df) was used for comparing HRSD and BDI scores over three occasions between depressive with low or normal P300 amplitude.

3. Results

The duration and severity of depression (HRSD and BDI scores) differed significantly as expected between the dysthymia and melancholia groups. However, the two groups were comparable on other variables including pretreatment P300 ERP amplitude and latency (Table 1). In the total sample HRSD total scores did not correlate with the P300 amplitude at pretreatment (Pearson's $r = 0.07$, $P > 0.7$). The two groups were combined for further analysis.

Patients who were rated ≤ 2 on CGI-Severity, at both 1 and 3 months were classified as responders (10 dysthymics and 12 melancholics). Responder ($n = 22$) and non-responders ($n = 8$) did not differ on any of the variables including baseline depression scores (Table 2). At 1 month, mean \pm S.D. HRSD total scores of responders (3.8 ± 2.5) was significantly ($P < 0.001$) lower than that of non-responders (13.6 ± 5.2). Corresponding BDI total scores 11.1 ± 9.6 and 30.5 ± 13.9 , were also different ($P < 0.001$).

In accordance with the observed amplitude in delayed responders in Ancy et al. (1996), a cutoff of $5 \mu V$ was used to classify the patients into 'low' ($n = 10$) and 'normal' ($n = 20$) pretreatment P300 ERP amplitude groups. These two groups showed

Table 1
Comparison of dysthymia and depressive episode with somatic symptom (melancholia) groups

	Dysthymia ($n = 15$)	Melancholia ($n = 15$)	<i>t</i> =	<i>P</i> =
Age (years)	30.6 (9.9)	35.7 (9.8)	-1.4	0.2
Duration (months)	35.6 (19.8)	2.4 (1.7)	6.5	0.00*
Education (years)	8.7 (3.2)	9.3 (3.8)	-0.5	0.1
HRSD score	12.3 (3.2)	24.6 (6.3)	-6.8	0.00*
BDI score	27.5(11.3)	40.2 (9)	-3.4	0.00*
CGI severity	3.1 (0.3)	4.8 (0.9)	-7.4	0.00
P3 amplitude (μV)	8 (4.5)	6.8 (3.6)	0.8	0.4
P3 latency (ms)	346.4 (28)	355.4 (25)	-0.98	0.34

Cell values are mean (S.D.).

*Significant.

Table 2
Comparison of responders and non-responders to SKY therapy

	Responders (<i>n</i> = 22)	Non-responders (<i>n</i> = 8)	<i>t</i> =	<i>P</i> =
Age (years)	34.5 (10.4)	29.6 (8.2)	1.3	0.2
Duration (months)	21.6 (23.8)	11.9 (13.9)	1.1	0.3
Education (years)	9.1 (3.2)	8.6 (4.4)	0.4	0.7
Pretreatment CGI severity	3.6 (0.9)	4.3 (1.2)	-1.6	0.1
Pretreatment HRSD score	17 (6.8)	22.3 (10)	-1.6	0.1
Pretreatment BDI score	31.9 (10.7)	39.3 (14.3)	-1.5	0.1
Pretreatment P3 amplitude (μ V)	7.4 (3.8)	7.6 (5)	-0.1	0.9
Pretreatment P3 latency (ms)	349.1 (28.7)	356.9 (19.7)	-0.7	0.5

Cell values are mean (S.D.).

comparable rates of antidepressant response with SKY over time (Fig. 1).

4. Discussion

Depression improved significantly following SKY therapy, with significant reductions in both HRSD and BDI scores (Fig. 1). The classification into responder and non-responder groups is validated by

the significant differences in these scores at 1 month. Surprisingly, the pretreatment P300 amplitude was comparable between dysthymics and melancholics despite two-fold differences in HRSD scores. Lower P300 ERP amplitude could be a non-specific state marker (Naga Venkatesha Murthy et al., 1997) which normalizes with clinical recovery. However, severity of 'biological' dysfunction (as reflected by lower pretreatment P300 ERP amplitude), unlike in the previous study with ECT (Ancy et al., 1996), has not

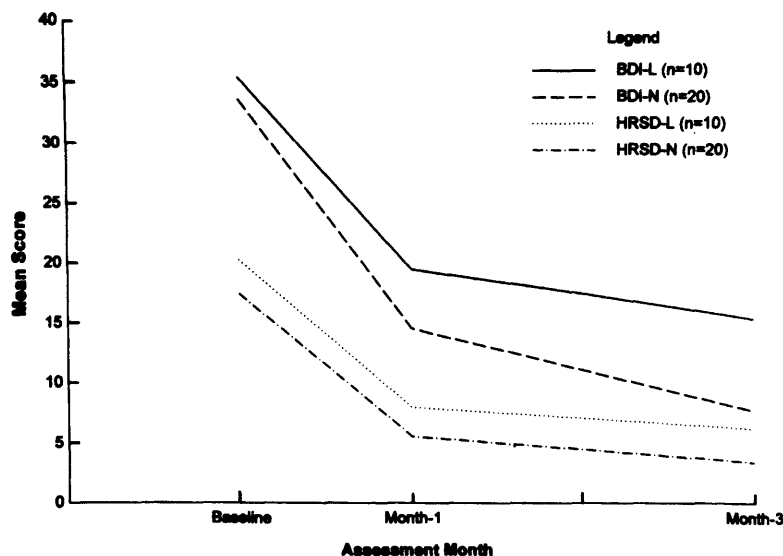


Fig. 1. Comparison of groups with low (*n* = 10) and normal (*n* = 20) P300 ERP amplitude. BDI-L, BDI total scores of group with the pretreatment P300 ERP amplitude $< 5 \mu$ V; BDI-N, BDI total scores of group with the pretreatment P300 ERP amplitude $> 5 \mu$ V; HRSD-L, HRSD total scores of group with the pretreatment P300 ERP amplitude $< 5 \mu$ V; HRSD-N, HRSD total scores of group with the pretreatment P300 ERP amplitude $> 5 \mu$ V; BDI, Beck's Depression Inventory; HRSD, 17-item Hamilton Rating Scale for Depression. BDI — two-way RMANOVA Group effect: $F = 1.5$, $df = 1,28$, $P = 0.2$; Occasion effect: $F = 55.7$, $df = 2,56$, $P = 0.00^*$; Group \times Occasion effect: $F = 0.7$, $df = 2,56$, $P = 0.5$. HRSD — two-way RMANOVA Group effect: $F = 2.1$, $df = 1,28$, $P = 0.2$; Occasion effect: $F = 68.7$, $df = 2,56$, $P = 0.00^*$; Group \times Occasion effect: $F = 0.02$, $df = 2,56$, $P = 0.98$. *Significant.

predicted differential response to SKY therapy. This could be because in the present study the repeat assessment was at 1 month, whereas in the study by Ancy et al. (1996), it was at 2 weeks after starting ECT.

The antidepressant effects (reduction in HRSD scores) following 1 month of SKY treatment were demonstrable even after excluding the anxiety items of HRSD (Janakiramaiah et al., 1998). This supports that SKY has independent antidepressant effects. Second, it takes a week to learn SKY practice correctly, which means that the treatment actually starts only after a week from recruitment. Considering this time difference, it may be stated that SKY exerts its antidepressant effect in about 3 weeks. The observation that the pretreatment P300 amplitude does not predict variation in treatment response, indicates uniform response to SKY therapy. Though it is conceivable that differences in time course may exist within the first 3 weeks, it is concluded that SKY therapy is uniformly effective regardless of the pretreatment P300 amplitude.

Acknowledgements

N.J. is a recipient of a NIMHANS research grant for Yoga in Depression 1994–95 (current study was conducted as a part of this project).

References

- Ancy, J., Gangadhar, B.N., Janakiramaiah, N., 1996. 'Normal' P300 amplitude predicts rapid response to ECT in melancholia. *J. Affect. Disord.* 41, 211–215.
- Beck, A.T., Ward, C.H., Mendelson, M., Mock, J., Erbaugh, J., 1961. An inventory for measuring depression. *Arch. Gen. Psychiatry* 4, 561–571.
- Blackwood, D.H.R., Whalley, L.J., Christie, J.E., Blackburn, I.M., St Clair, D.M., McInnes, A., 1987. Changes in auditory event related potential in schizophrenia and depression. *Br. Psychiatry* 150, 154–160.
- Gangadhar, B.N., Ancy, J., Janakiramaiah, N., Umopathy, C., 1993. P300 amplitude in non-bipolar, melancholic depressive. *J. Affect. Disord.* 28, 57–60.
- Guy, W., 1976. *ECDEU Assessment Manual for Psychopharmacology*. NIMH, Rockville, MD, pp. 217–222.
- Hamilton, M., 1960. A rating scale for depression. *J. Neurosurg. Psychiatry* 23, 56–62.
- Janakiramaiah, N., Gangadhar, B.N., Naga Venkatesha Murthy, P.J., Taranath Shetty, K., Subbakrishna, D.K., Meti, B.L., Raju, T.R., Vedamurthachar, A., 1998. Therapeutic efficacy of Sudarshan Kriya Yoga (SKY) in dysthymic disorder. *NIMHANS J.* (in press).
- Naga Venkatesha Murthy, P.J., Gangadhar, B.N., Janakiramaiah, N., Subbakrishna, D.K., 1997. Normalization of P300 amplitude following treatment in dysthymia. *Biol. Psychiatry* 42, 740–743.
- World Health Organisation, 1992. *ICD-10: Classification of Mental and Behavioural Disorders — Diagnostic Criteria for Research*. WHO, Geneva.
- Yoga Research Group, 1995. *Treating depression with Sudarshan Kriya Yoga*. Department of Health Education, National Institute of Mental Health and Neurosciences, Bangalore.