

CONTINGENT NEGATIVE VARIATION AND SEVERITY OF DEPRESSION

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INTRODUCTION

For a long time, psychiatry has been suffering from a lack of objective techniques of assessment. With biological psychiatry, several lines of research have been opened and some of them tend to come in clinical practice.

Contingent Negative Variation (CNV) is a slow potential shift that develops during a simple experimental situation in which stimuli and responses are serially organized (Walter et al, 1964). In depressive patients, CNV studies have shown abnormalities in both amplitude and duration, as previously described by Giedke et al (1980), Timsit-Berthier et al (1987), and Ashton et al (1988). A decrease in amplitude has been reported in depression except in a subgroup where the opposite was found. Prolonged postimperative negative variation (PINV) is also frequent in depressed patients.

Therefore, the purpose of the present study was to assess the relationship between CNV amplitude and severity of depressive symptoms.

METHODS

Subjects

The subjects were 59 inpatients, with major depressive disorder, endogenous subtype, as defined by DSM-III and RDC criteria. Patients comprised 51 females and 8 males, aged from 21 to 60 years, with a mean age of 45.6 years. All patients had been drug-free for at least 2 weeks at the time of the recording.

Clinical rating

The level of depression was assessed by means of observer's rating scales (MADS or Montgomery and Asberg depression scale and HAM-D or 24-item Hamilton depression scale) (Montgomery and Asberg, 1979; Hamilton, 1960) and self-rating scales (BFS and BFS' for depression and Cattell for anxiety) (Von Zerssen et al, 1974; Krug, Cattell et al, 1976).

Electrophysiological measures

CNV was recorded according to a procedure previously described (Timsit-Berthier et al., 1984) and using the following paradigms : after a first stimulus, a short "warning" tone, the subject has to stop a series of flashes, the "imperative" stimulus, by pressing on a button.

RESULTS

Results for clinical rating scales and CNV amplitude measures are shown in Table 1.

TABLE 1
RESULTS

	Range	Mean	SD
MADS	19-56	36.8	7.3
HAM-D	24-54	36.2	6.5
CNV amplitude	2.5-40	13.8	8.8

CNV amplitude exhibited a very significant relationship with the severity of depressive symptomatology assessed by the two observer's scales (Table 2, figures 1 and 2).

TABLE 2
CORRELATIONS OF CNV AMPLITUDE WITH CLINICAL RATINGS (Pearson's correlation coefficient)

	r	dF	p
HAM-D	0.44	57	< 0.05
MADS	- 0.54	57	< 0.01
Cattell	0.15	57	NS
BFS	0.42	57	< 0.03
BFS'	0.40	57	< 0.06

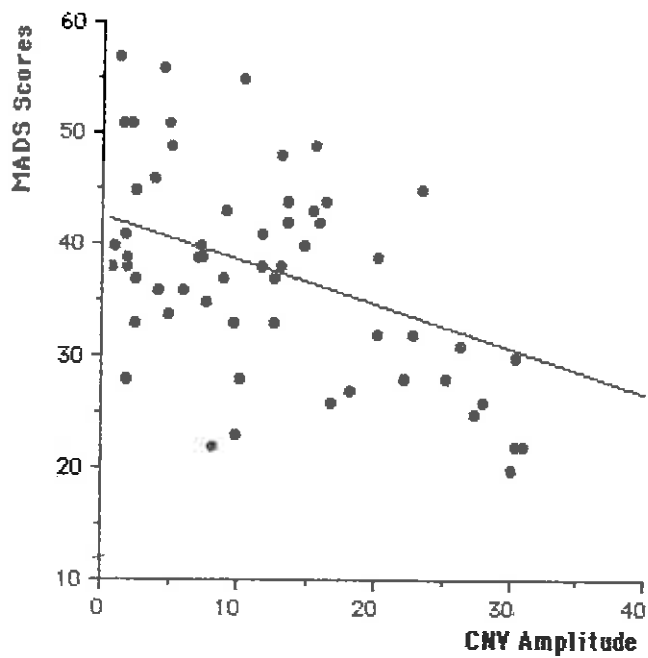


Fig. 1. Correlation between CNV and MADS
($N = 59$, $r = -0.54$, $p < 0.01$)

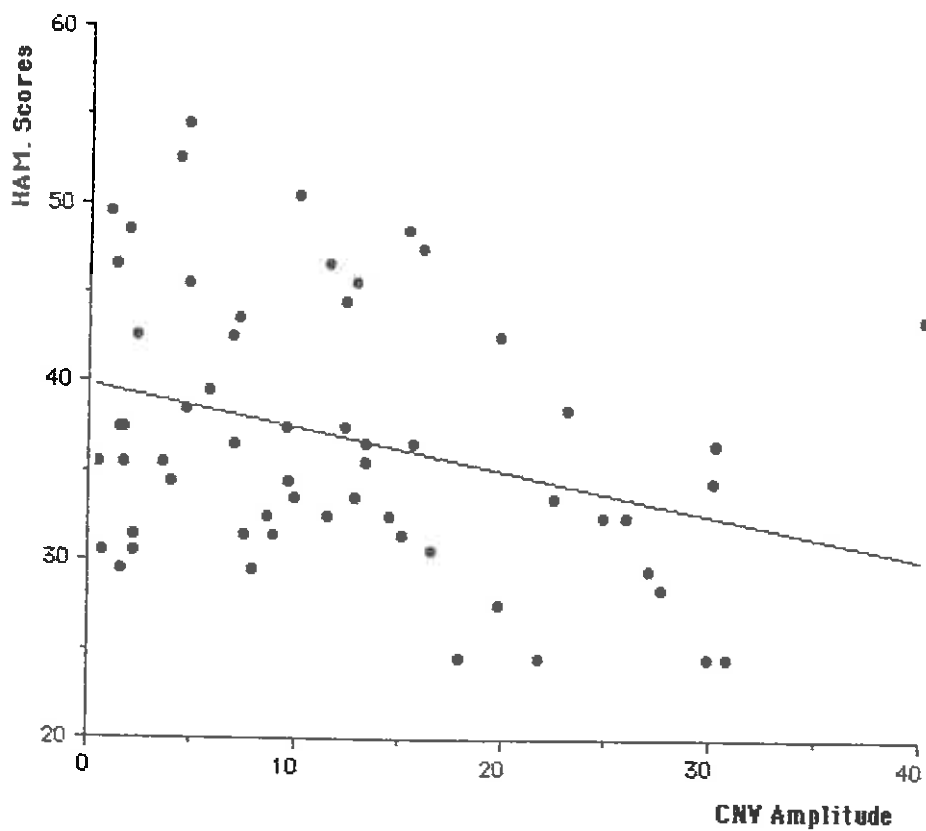


Fig. 2. Correlation between CNV and Hamilton
($N = 59$, $r = -0.44$, $p < 0.05$)

With regard to self-rating scales (Table 2), a significant correlation existed between CNV amplitude and BfS scores while a trend toward significant correlation was noted with BfS'. There was no correlation with the anxiety scale of Cattell.

DISCUSSION AND CONCLUSION

These results indicate that CNV amplitude is related to severity of depression, with an inverse relationship. Low CNV amplitude is associated with a particular severity of depression.

These results present a double interest : first, in psychophysiological research, secondly, in clinical practice. CNV can help not only to objective depression but also to assess the intensity of depressive symptoms and therefore can contribute to the therapeutic choice.

These findings can also been interpreted according to the biochemical hypothesis of CNV developed by Marczyński (1978) where CNV amplitude would be controlled by catecholaminergic activity. Therefore, depressed patients with low CNV amplitude would exhibit reduced catecholaminergic function. This hypothesis need to be tested in subsequent studies using biochemical and neuroendocrine procedures as well as the treatment response to selective antidepressants.

REFERENCES

- ASHTON H, GOLDING JF, MARSH VR, THOMPSON JW, HASSANYEH F, TYRER SP. Cortical evoked potentials and clinical rating scales as measures of depressive illness. Psychological Medicine, 1988, 18, 305-317.
- GIEDKE H, BOLZ J, HEIMANN H. Evoked potentials, expectancy wave, and skin resistance in depressed patients and healthy controls. Pharmakopsychiatry, 1980, 13, 91-101.
- HAMILTON M. A rating scale for depression. Journal of Neurology, Neurosurgery, and Psychiatry, 1960, 12, 56-62.
- KRUG SE, SCHEIER IH, CATTELL RB. Handbook for the IPAT-ASQ. Institute for Personality and Ability Testing, Champaign, IL, 1976.
- MARCZYNSKI TJ. Neurochemical mechanisms in the genesis of slow potentials : a review and some clinical implications. In Otto D (Ed) Multidisciplinary Perspectives in Event Related Brain Potential Research. U.S. Government Printing Office, Washington, D.C., 1978, 25-35.
- MONTGOMERY A, ASBERG M. A new depression scale designed to be sensitive to change. British Journal of Psychiatry, 1979, 134, 382-389.
- TIMSIT-BERTHIER M, GERONO A, ROUSSEAU JC, MANTANUS H, ABRAHAM P, VERHEY FHM, LAHERS T, EMONDS P. An international pilot study of CNV in mental illness. Second report. In Brain and Information : Event-Related Potentials, vol. 425. Annals of the New York Academy of Sciences, 629-637.

TIMSIT-BERTHIER M, MANTANUS H, ANSSEAU M, DEVOITILLE JM, DALMAS A, LEGROS JJ. Contingent Negative Variation in major depressive patients. In Johnson R, Jr, Rohrbaugh JW, Parasuraman R (Eds), Current Trends in Event-Related Potential Research (EEG Suppl. 40), Elsevier Science Publishing, 1987, pp. 762.

VON ZERSEN D, STRIAN F, SCHWARZ D. Evolution of depressive states, especially in longitudinal studies. In Pichot P (Ed.), Psychological measurements in psychopharmacology. Mod. Probl. Pharmacopsychiat., 1974, 7, Karger, Basel, pp 189-202.

WALTER WG, COOPER R, ALDRIDGE VJ, McCALLUM WC, WINTER AL. Contingent negative variation : an electrical sign of sensori-motor association and expectancy in the human brain. Nature, 1964, 203, 380-384.