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Course of Depressive Mood and Psychomotor Activation in Endogenous Depression

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Summary. The course of the depressive mood during depressive phases was measured by a self-rating mood scale and analyzed by various algorithms. Agitated, depressed patients often reveal a continuous decline in the depressive mood; retarded, depressed patients, on the other hand, often show brief and marked fluctuations in mood during remission. Although various effects occur due to treatment, especially differences between the effects of electroconvulsive therapy (ECT) and antidepressants, the described changes in mood appear to be predominantly due to psychomotor activation. The relationship between these courses of depression is discussed and interpreted on the basis of biochemical and psychopharmacologic findings.

Key words: Endogenous depression – Course of the depressive mood – Agitated and retarded depression – ECT – Antidepressants.

Introduction

One possible classification of endogenous depressions for differentiating subgroups is based on psychomotor activation, the most relevant symptom phenomenologically. This subdivision has been used in various forms of classification such as syndrome diagnosis (Angst, 1966), descriptive taxonomy (Lehmann, 1969), and factor patterns (Grinker, 1966). Moreover, this classification makes symptom-specific treatment possible, using antidepressants which have more of a sedative or an analeptic effect (Kielholz, 1976; Benkert and Hippius, 1976; Lewi and Colpaert, 1976). Different physiologic reactions for these various groups of patients were also reported. Such differences were found in salivary secretion (Loew, 1965), in parameters of skin resistance (Lader and Wing, 1969), and in electromyographic activity (Whatmore and Ellis, 1962).

In a longitudinal study, differences between agitated and retarded, depressed patients during the remission of a depressive phase were found in the cardiovascular reaction patterns and in the course of the depression (Strian et al., 1977).

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It has been assumed that retarded, depressed patients undergo marked alternations in mood during electroconvulsive therapy (ECT) (Ploog, 1950). On the other hand, the depression of agitated patients appears to improve more continuously. However, sudden changes in mood are not at all confined to ECT; they also occur spontaneously or during treatment with antidepressant drugs. Such alternations were described as switch processes (Bunney et al., 1972). Moreover, a preceding study showed that disease-dependent factors and therapeutic effects are both of major importance in disjunctive remission (Strian et al., in press, 1979).

The purpose of this study was to compare the course taken by the depressive mood in both agitated and retarded patients and its relation to different somatic treatments. The course of depression, classified by syndromes, was evaluated in relation to therapeutic influences.

Methods

1. Subjects

The course of one or more treatments in 105 patients with a diagnosis of endogenous depression was studied. Of these, 134 treatment periods were analyzed. The age of the patients ranged between 17 and 73 years, the average being 45.6 years. There were 77 women and 28 men: 69 patients were diagnosed as phasic, unipolar, endogenous depression (ICD No. 296.2); 9 patients, in the depressive phase of a bipolar, cyclic, manic-depressive disease (ICD No. 296.3); 24 patients as involutional depression (ICD No. 296.0); and 3 patients as schizo-affective psychosis with depressive symptomatology (ICD No. 295.7). ECT was carried out in 36 cases (under anesthesia with muscle relaxants, 8.5 treatments on the average). Amitriptyline was administered to 59 patients, maprotiline to 15 and desipramine to 9. Clomipramine was given in 15 cases by intravenous infusion. Klicpera et al. (in press, 1979) have written a detailed description of the sample.

2. Procedure

The patients rated themselves on the mood scale every other day during the treatment period (Befindlichkeitsskala, Bf-S by von Zerssen, 1976). Two parallel forms of the scale were used. The scale is highly reliable, valid and based on a unidimensional concept of depression. Self-rating by the patients correlates to a large extent with the clinical rating by the psychiatrist (Schwarz and Strian, 1972). The data obtained from the mood scale were computed with the assistance of the Munich Psychiatric Information System. The therapeutic method and data from the patients' case histories were documented as absolute values or as ordinal scale-transformed values.

A classification of the patients' psychomotor behavior was made on the basis of two factors, agitation and retardation on the Hamilton scale. The Hamilton scale was filled in by the treating psychiatrist before treatment. Distinct agitation or retardation was established when the intensity of the symptoms of agitation and retardation reached a level of 3 or 4 on the scale and persisted during the following two weeks of treatment. Patients fulfilling these criteria were classified as severely agitated or severely retarded. In the remaining cases, the patients were classified according to the prominent items of Hamilton agitation or retardation. Other psychophysiologic findings (sleep disturbance, vegetative disorders, disturbances in concentration) were rated with the aid of a scale incorporating four degrees of intensity.

3. Data Analysis

A graph was plotted for each patient from the continuous self-rating of the depressive mood. This graph represents mood changes during the treatment period. An attempt was made to

express the different aspects of the course of the depressive mood for each patient by a number of algorithms. Various parameters were computed from a preprocessed diagram obtained by the sliding calculation of mean values. The parameters refer first to time and speed of improvement and, second, to the fluctuations within the course of the depressive mood. A detailed description of the parameters used has been given by Strian et al. (in press, 1979).

In summary, P-parameters represent the severity of depression and refer to the mean values of the initial, the improvement, and the remission period—defined by points beyond which the patients reported consistently less depression than the (derived) maximum (T_1) or minimum (T_2) of the depressive mood. The parameter improvement time (ΔT) is the difference between T_2 and T_1 and the parameter improvement rate (Q), the ratio of improvement ΔP/improvement time ΔT. The variability parameters were based in part on the original course of the Bf-S, e.g., number of changes of signs (F_1) or on the preprocessed graph. The instability measures were computed for the entire course of the depressive mood (I_t) and for the abovementioned time intervals, i.e., instability before start of improvement (I_1), instability during improvement (I_2), and instability after onset of remission (I_3). The statistical analysis was conducted by group comparison with nonparametric tests (Siegel, 1956). According to the scale level, either the chi-square test or the U-test were used.

Results

1. Group Differences

The group of agitated, depressed patients is older on the average ($\bar{x}$ = 53.0 years) than the group of retarded, depressed patients ($\bar{x}$ = 50.7 years, $P<0.05$). The severely agitated and severely retarded differ less in age (Fig. 1a). In agitated patients, the duration of depression averaged 13.3 years, in retarded patients, 7.4 years ($P<0.01$; Fig. 1b). The duration of the actual phase does not differ in agitated and retarded patients (Fig. 1c). The same is also true for the psychophysiologic findings: sleep disturbances, vegetative complaints, and concentration impairments (Table 1).

2. Different Courses of the Depressive Mood

The course of the depressive mood shows a more or less marked fluctuation in most patients. However, different types of remission were found by analyzing the characteristic values in agitated and retarded patients. Agitated patients are more likely to have a continuous decline in the depressive state; retarded patients, a remission characterized by marked changes in mood. The latter varies mainly between 10 to 20 scale values of the Bf-S during the examination period of one or two days. Figure 2 shows a continuous remission of the depressed mood in the case of agitated depression (2a) and a discontinuous remission in the case of retarded depression (2b).

The statistical analysis of the characteristic values for all groups of agitated and retarded, depressed patients showed significant differences ($P<0.05$) only for instability after onset of remission. A trend of increased variability measures was found for retarded patients, but these differences were not significant (Table 2a). However, when comparing severely agitated and severely retarded depressive patients (patients who could clearly be classified by their psychomotor activation), both groups differ significantly in almost all variability measures (Table 2a). These differences were especially true for the instability of the decline phase,

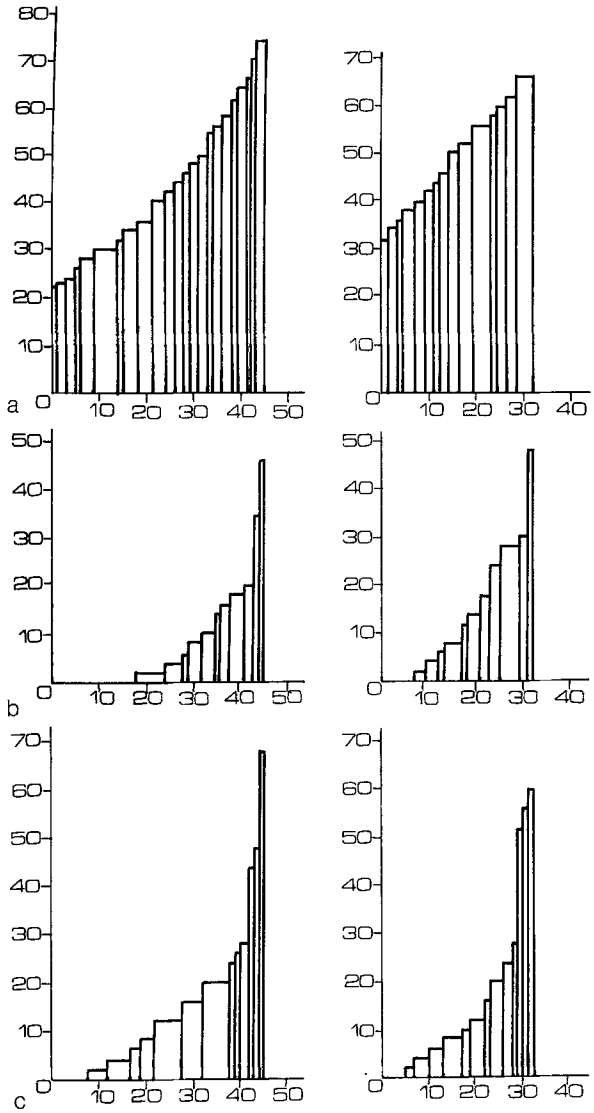

Fig. 1 a–c. Cummulative frequencies of the patients treated with ECT or with drugs. **a** Age; **b** period of time in years since the first manifestation of the disease; **c** duration of the actual depressive phase in weeks. Left side: retarded depressives; right side: agitated depressives

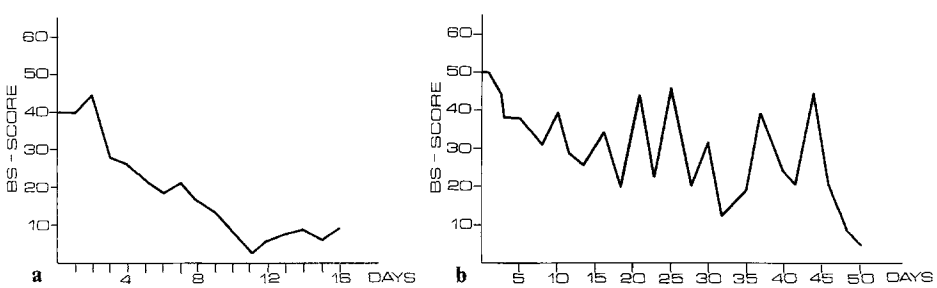

Fig. 2 a and b. Different courses of the depressive mood: **a** Continuous remission in a patient with agitated depression; **b** discontinuous remission in a patient with retarded depression

Table 1. Case history and psychopathologic findings in agitated and retarded depressives: the total group of agitated ($N = 32$) and retarded ($N = 45$) depressives are correlated to the severely agitated ($N = 16$) and the severely retarded depressives ($N = 24$)

		Retarded depressives ($N = 45$)	Agitated depressives ($N = 32$)	Severely retarded depressives ($N = 24$)	Severely agitated depressives ($N = 16$)
Age	$\bar{x}$	43.05	50.77 *	46.15	48.15
	s_x	14.92	10.87	16.53	16.53
Duration of illness in years	$\bar{x}$	7.45	13.32 **	8.15	15.71 *
	s_x	9.62	12.22	9.43	13.25
Number of depressive phases	$\bar{x}$	2.76	4.55	2.80	5.47
	s_x	3.50	8.69	4.64	11.87
Duration of the actual phase in weeks	$\bar{x}$	13.22	14.97	12.96	17.56
	s_x	13.78	15.79	17.03	20.44
Sleep disturbance	$\bar{x}$	1.91	2.09	1.92	2.69 *
	s_x	1.02	0.96	1.10	0.60
Vegetative disturbances	$\bar{x}$	1.80	1.91	1.88	2.19
	s_x	1.01	0.93	1.04	0.91
Disturbances in concentration	$\bar{x}$	0.89	0.88	1.00	1.00
	s_x	1.09	1.19	1.16	1.16

* $P < 0.10$; ** $P < 0.05$

Table 2a. Variability of the depressive mood in agitated and retarded depressives

		Retarded depressives ($N = 45$)	Agitated depressives ($N = 32$)	Severely retarded depressives ($N = 24$)	Severely agitated depressives ($N = 16$)
Number of changes of signs (F_1)	$\bar{x}$	0.58	0.55	0.54	0.54
	s_x	0.18	0.13	0.15	0.14
Number of strong mood swings (deterioration) (F_2)	$\bar{x}$	0.14	0.11	0.15	0.10
	s_x	0.09	0.08	0.09	0.08
Instability prior to improvement (I_1)	$\bar{x}$	5.55	5.24	5.92	5.86
	s_x	3.50	3.57	3.37	3.98
Instability during improvement (I_2)	$\bar{x}$	8.39	7.41	8.96	6.48*
	s_x	3.83	4.59	3.80	3.64
Instability after onset of remission (I_3)	$\bar{x}$	5.37	3.95*	5.23	3.60*
	s_x	3.81	3.24	3.36	3.62
Overall instability (I_0)	$\bar{x}$	8.11	6.98	8.39	6.31*
	s_x	3.20	3.86	2.97	3.41

* $P<0.05$

Table 2b. Differences in the effectiveness of antidepressive treatment in agitated and retarded depressives

		Retarded depressives ($N = 45$)	Agitated depressives ($N = 32$)	Severely retarded depressives ($N = 24$)	Severely agitated depressives ($N = 16$)
Duration of treatment *(T_t)*	$\bar{x}$	39.88	45.22	43.33	42.56
	s_x	23.31	17.80	21.43	19.45
Regression *(R)*	$\bar{x}$	−0.64	−0.64	−0.72	−0.69
	s_x	0.71	0.50	0.78	0.61
Duration of improvement in time *(ΔT)*	$\bar{x}$	26.53	24.67	23.00	26.07
	s_x	19.15	16.45	12.50	17.59
Improvement rate *(Q)*	$\bar{x}$	0.92	11.39	1.14	1.01
	s_x	0.99	1.52	1.06	0.93
Number of strong mood swings (improvement) *(F_3)*	$\bar{x}$	0.19	0.19	0.19	0.20
	s_x	0.10	0.12	0.11	0.14
Initial value *(P_1)*	$\bar{x}$	36.77	38.39	36.55	38.02
	s_x	8.76	9.42	9.61	11.67
Final value *(P_2)*	$\bar{x}$	21.42	18.26	17.91	21.18
	s_x	11.22	12.94	12.10	15.45
Absolute improvement *(ΔP)*	$\bar{x}$	15.35	20.13	18.64	16.84
	s_x	10.64	10.70	11.56	10.68

Table 3. Case history and psychopathologic findings in agitated and retarded depressives under treatment with ECT or drugs

		Retarded depressives		Agitated depressives	
		ECT ($N = 13$)	All antidepressant drugs ($N = 32$)	ECT ($N = 9$)	All antidepressant drugs ($N = 23$)
Age	$\bar{x}$	41.44	43.70	49.53	51.25
	s_x	13.59	15.58	8.13	11.90
Duration of illness in years	$\bar{x}$	4.41	8.68	17.43	11.71
	s_x	5.16	10.57	11.12	12.48
Number of depressive phases	$\bar{x}$	2.62	2.82	2.33	5.46
	s_x	2.22	2.98	1.32	10.22
Duration of the actual phase in weeks	$\bar{x}$	20.63	10.22 *	15.33	14.81
	s_x	18.45	10.28	16.00	16.09
Sleep disturbance	$\bar{x}$	2.08	1.84	2.67	1.87 *
	s_x	0.95	1.05	0.50	1.01
Vegetative disturbances	$\bar{x}$	1.54	1.91	2.44	1.70 *
	s_x	1.13	0.96	0.73	0.93
Disturbances in concentration	$\bar{x}$	0.92	0.88	0.78	0.91
	s_x	1.19	1.07	0.97	1.28

* $P < 0.10$

Table 4a. Variability in the depressive mood in agitated and retarded depressives under treatment with ECT or drugs

		Retarded depressives		Agitated depressives	
		ECT ($N = 13$)	All antidepressant drugs ($N = 32$)	ECT ($N = 9$)	All antidepressant drugs ($N = 23$)
Number of changes of signs (F_1)	$\bar{x}$	0.46 ***	0.63	0.45	0.57
	s_x	0.14	0.18	0.17	0.11
Number of strong mood swings (deterioration) (F_2)	$\bar{x}$	0.15	0.14	0.06 [a] ***	0.13
	s_x	0.10	0.08	0.08	0.74
Instability prior to improvement (I_1)	$\bar{x}$	4.99	5.67	4.61	5.51
	s_x	4.35	3.28	3.77	3.55
Instability during improvement (I_2)	$\bar{x}$	7.28	8.82	5.30 *	8.30
	s_x	4.30	3.62	3.46	4.80
Instability after onset of remission (I_3)	$\bar{x}$	6.67	4.88	5.38	3.35
	s_x	4.79	3.34	4.84	2.17
Overall instability (I_0)	$\bar{x}$	7.12	8.46	5.57	7.58
	s_x	3.49	3.08	3.22	4.02

* $P<0.1$; *** $P<0.01$

[a] Retarded depressives (ECT) vs agitated depressives (ECT)

Table 4b. Differences in the effectivity of ECT and antidepressants in agitated and retarded depressives

		Retarded depressives		Agitated depressives	
		ECT ($N = 13$)	All antidepressant drugs ($N = 32$)	ECT ($N = 9$)	All antidepressant drugs ($N = 23$)
Duration of treatment *(T_t)*	$\bar{x}$	28.69 **	44.34	31.67 ***	50.52
	s_x	10.94	25.53	10.89	17.29
Regression *(R)*	$\bar{x}$	−0.75	−0.59	−1.10	−0.44 ***
	s_x	0.66	0.73	0.60	0.29
Duration of improvement in time *(ΔT)*	$\bar{x}$	20.73	28.89	13.22***	29.53
	s_x	8.63	21.52	5.78[a] *	17.15
Improvement rate *(Q)*	$\bar{x}$	0.80[a] **	0.97	2.04	1.16 **
	s_x	0.73	1.08	1.32	1.54
Number of strong mood swings (improvement) *(F_3)*	$\bar{x}$	0.22	0.17	0.20	0.18
	s_x	0.12	0.09	0.16	0.10
Initial value *(P_1)*	$\bar{x}$	35.42[a] **	37.29	43.55	36.21 *
	s_x	6.59	9.51	7.01	9.61
Final value *(P_2)*	$\bar{x}$	23.87	20.49	21.67	16.82
	s_x	11.28	11.25	14.45	12.38
Absolute improvement *(ΔP)*	$\bar{x}$	11.55 ***	16.80	21.88	19.39
	s_x	8.74	11.07	10.75	10.88

* $P<0.1$; ** $P<0.05$; *** $P<0.01$

[a] Retarded depressives (ECT) vs agitated depressives (ECT)

the remission level as well as for the overall instability ($P<0.05$). Thus, there is a higher variability for severely retarded patients during the course of remission. Significant differences in the speed and improvement of the mood scale graphs did not appear in all groups (Table 2b).

3. Treatment Effects

The different courses taken by remission in retarded and agitated, depressed patients under ECT and drug treatment were examined. In all groups no significant differences were obtained from the case histories for standardized data, for impairment of health condition, or for disturbances in performance (Table 3).

Retarded, depressed patients reveal marked changes in all variability measures under ECT treatment as compared to agitated patients ($P<0.10$, Table 4a). No significant differences in variability occurred between ECT or drug-treated patients, although a trend to more stability is possible under ECT treatment (Table 4a). The remission of the depressed mood in retarded patients treated with ECT took longer and occurred more slowly than in agitated patients. These differences were confirmed by characteristic values: time of improvement ($P<0.01$) and speed of improvement ($P<0.05$). The starting level for the Bf-S graphs was higher in agitated patients than in retarded, depressed patients ($P<0.05$). The remission level was equal for both groups. Therefore, the difference between the levels was higher for the agitated patients ($P<0.05$; Table 4b).

Retarded, depressed patients, if treated with antidepressants, underwent more fluctuation in the remission period than the agitated patients ($P<0.10$; Table 4a). The same trend was indicated by overall instability, but no differences in the two groups were seen in the other instability measures. The remission level of the retarded, depressed patients was above that of the agitated ($P<0.01$; Table 4a, b).

Discussion

The different courses of remission of the depressive mood have attracted little attention compared to circadian rhythms (Waldmann, 1972; Supprian, 1975a and b) and compared to the long-term phasic course of endogenous depression. The courses in this study lie between these two extremes, although it is not clear whether a relationship exists. The clinical relevance of the course taken by the depressive mood is always mentioned (Ploog, 1952; Jenner et al., 1967; Bunney et al., 1972). A description of the different courses remission takes might be valuable as indicators of depression. It is a well-known psychopathological phenomenon that emotional lability and so-called mixed pictures play an important part during remission and during the transition from the depressive to the manic state and vice versa (Court, 1968; Downing and Rickels, 1974; Berner, 1977).

In an earlier study, two types of courses were observed: a continuous remission and a discontinuous remission characterized by fluctuations in mood (Strian et al., in press, 1979). This study could not prove ECT to be a dependent factor in the discontinuous course. No significant distinction can be made among the groups of ECT or dug-treated patients. However, there is a clear correlation

with psychomotor activity. Retarded, depressive patients undergo more frequently a course of remission characterized by marked changes in mood; agitated patients more often have a remission characterized by a continuous improvement in mood. Although ECT seems to intensify emotional lability, such fluctuations also occur during treatment with antidepressants. In this connection, antidepressants with an analeptic component (desipramine) are more often associated with a discontinuous course and emotional lability than antidepressants with a sedative component (amitriptyline).

Although this study is based on psychometric methods, a comparison with some results from biochemical or psychopharmacologic studies in depression is of interest. Usually an antidepressant is chosen because of known target symptoms. Antidepressants can be classified as an imipramine (or desipramine) type with an analeptic effect, and as an amitriptyline type with a sedative effect (Hippius and Matussek, 1974; Lewi and Colpaert, 1976).

Biochemical analysis has shown that patients with low urinary excretion of noradrenaline (NA) metabolite 3-methoxy-4-hydroxyphenylglycol (MHPG) respond better to imipramine, whereas patients with normal MHPG excretion respond better to amitriptyline (Beckmann et al., 1974; Schildkraut, 1974). Furthermore, it has been reported that depressive patients treated with sleep deprivation have a marked NA synthesis during remission (Matussek et al., 1974). Delion-Jones et al. (1975), however, observed a trend of lower MHPG excretion in retarded, depressed patients, but did not find significant differences compared with agitated depressed patients. These pharmacologic findings do not definitely prove a distinct correlation with psychopathologic phenomena. Nevertheless, they suggest that the different courses observed in the depressive mood can be represented by different pathways in the brain metabolism of biogenic amines. Animal studies with ECT application may be of interest here. In these studies, differences were observed between the acute and long-term effects of ECT. Modigh (1976) found a long-lasting increase in the amount of transmitters available at the postsynaptic NA receptors, whereas corresponding mechanisms in DA and 5-HT neurons were only detectable for short periods after ECT application. This long-lasting postsynaptic NA increase could also result from the increased sensitivity of postsynaptic DA neurons which is closely related to ECT (Carlsson et al., 1976; Strömbom, 1976). The time-related differences of ECT on the reactivity of noradrenergic cyclic AMP were also described by Vetulani and Sulser (1975). The responses of the cyclic AMP generating system under the effect of ECT showed less than 30% after 18 hours and less than 50% after 42 hours. Grahame-Smith (1976) reported that the hyperactivity response caused by increased 5-HT or DA function cannot be influenced by a series of ECTs.

Thus, one might speculate that in agitated, depressed patients continuous remission occurs via a gradual reduction in psychomotor activity, whereas in retarded, depressed patients, discontinuous remission is initiated via a brief activating mechanism.

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