

Breathlessness in Depression

By B. H. BURNS

INTRODUCTION

Breathlessness is a difficult symptom to define (Howell and Campbell, 1966). Comroe (1966) spoke of the value of obtaining detailed accounts, in the patients' own words, of how they experience their breathlessness. Olsen (1964), who wrote that, 'the problem of defining dyspnoea becomes a little easier if it is considered as a complex of completely subjective symptoms,' also stated 'it is recognized that difficult breathing may be observed by the physician without the patient being aware of respiratory embarrassment'.

As early as 1934 Baker, in a study of patients with sighing respiration, reported that many were depressed and that the condition at that time was unresponsive to treatment. Fraser and Sargant (1938) made the unelaborated statement that 'in a few cases of acute hyperventilation, the attacks occurred during the acute stage of a depressive illness'. Dyspnoea is mentioned in an undifferentiated series of 'physical symptoms in endogenous depression' by Ayd (1961); and, depression occurred in 12 per cent of Lewis's (1941) patients with the 'effort syndrome'. The characteristics of respiratory symptoms in depressive illness have not been clearly demarcated. Patients with such symptoms frequently present as medical out-patients.

The purpose of the present paper is an attempt to delineate the respiratory symptoms described as breathlessness in depressive illness and to distinguish them from those experienced by patients with obstructive airway disease.

METHOD

Depressive Illness (D.I.) Group. Thirty-three patients who complained of breathlessness with a concurrent depressive illness, seen in the Royal Infirmary, Manchester, formed the basis of the present study. Twenty-four had

been referred to the Respiratory Clinic of the University Department of Medicine in a three-year period and 9 to the University Department of Psychiatry. The first group of 24 patients had had extensive pulmonary function tests, some of the details of which have been reported earlier (Burns and Howell, 1969). All had a forced expiratory volume in the first second (F.E.V.₁) of greater than 1 litre (mean 2.4 litres) and a resting arterial pCO₂ below the upper limit of normal for the laboratory of 47 mm. Hg., (mean 40.3 mm. Hg.). All the patients in this group had a current depressive psychosis (W.H.O. 1967 Classification Number 296, see Table III).

Obstructive Airway Disease (O.A.D.) Group. Thirty-three patients with complaints of breathlessness and moderate to severe obstructive airway disease are described for comparison. The severity of the organic pulmonary disease was considered to be appropriate to their breathlessness, (Burns and Howell, 1969), since the F.E.V.₁ was found to be less than 1 litre in all of them (mean 0.6 litres). Eighteen had a resting arterial pCO₂ of over 47 mm. Hg. (mean 50.6 mm. Hg.). Cases of allergic airway disease, including asthma and chronic airway disease associated with sputum eosinophilia, were deliberately excluded from this study.

Detailed information concerning breathlessness, history and mental state in the D.I. Group and the O.A.D. Group was standardized by means of a questionnaire which considered the following:

1. Onset, duration and circumstances of breathlessness, e.g. exertional or non-exertional.
2. Subjective experience of breathlessness.
3. Evidence of hyperventilation.
4. Factors related to obtaining relief.
5. Precipitating factors in the preceding three years.
6. Previous and family history.

7. Psychiatric symptomatology and mental state.

The D.I. Group were treated for depression and followed up for at least one year (mostly for more than three years) to assess any relationship between the resolution of depression and the respiratory symptomatology.

The patients with depression and breathlessness were younger (mean age 51.5 years) than those with advanced obstructive airway disease (mean age 58.5 years). This was not a significant difference in proportions. There were 17 male and 16 female depressed patients, and 23 male and 9 female in the O.A.D. Group, a non-significant difference.

RESULTS

The frequency of the main characteristics of the breathlessness described by the patients in each group is shown in Table I. The significance of the difference between the two groups was determined by using χ^2 with Yates correction.

The breathlessness in the D.I. Group was marked by a sudden onset, in contrast with its more insidious development in the O.A.D. Group. This coincided with the simultaneous onset of the principal symptoms of depression and of a depressive psychopathology (Table III).

Most of the depressed patients experienced breathlessness at rest, which was episodic, fluctuating even within minutes and bearing little relationship to exertion. On a simple exercise tolerance test, ventilation was frequently out of proportion to the severity of the exercise. They often panicked and hyperventilated at the outset or even before exercising. Other disorganized respiratory rhythms were both observed and recorded on a spirogram (Fig. 1), in particular sighing and rapid shallow breathing. The disorganized respiratory rhythms disappeared with sleep. A striking fact emerged that the patients with depression emphasized the difficulty in breathing in, whilst those in the O.A.D. Group usually complained that the main difficulty was in breathing out.

TABLE I
Characteristics of breathlessness in depressive illness (D.I.) and obstructive airway disease (O.A.D.) groups

	D.I. Group n = 33		O.A.D. Group n = 33	
	N	%	N	%
A. More Common in D.I. group				
1. Poor relationship with exertion ..	30	91	3 **	9
2. Occurrence at rest	29	88	5 **	15
3. Gross recent increase	29	88	6 **	18
4. Variation with social situation ..	28	85	5 **	15
5. Dominant inspiratory difficulty ..	28	85	9 **	27
6. Association with acute hyperventilation	27	82	5 **	15
7. Episodic fluctuation (even within minutes)	26	79	0 **	0
8. Association with fear of sudden death ..	26	79	1 **	3
9. Morning worsening unrelieved by expectoration	24	72	3 **	9
10. Occurrence in conversation	24	72	8 **	24
11. Absence of benefit from stopping smoking	21	64	10 *	30
12. Multiple nocturnal attacks	19	58	9 *	24
13. Relief by sedatives or alcohol	12	37	6	18
B. More common in O.A.D. group				
1. Marked bronchial irritability present†	22	67	32 **	97
2. Relief by rest	12	36	31 **	94
3. Insidious deterioration	4	12	26 **	79
4. Dominant expiratory difficulty ..	2	6	15 **	46

** = $p < 0.01$, * = $p < 0.05$

† Bronchial irritability is defined as the effect of entering a smoky atmosphere, or going from warm to cold air, or from various irritating fumes such as diesel and cooking, in inducing cough and tightness in the chest.

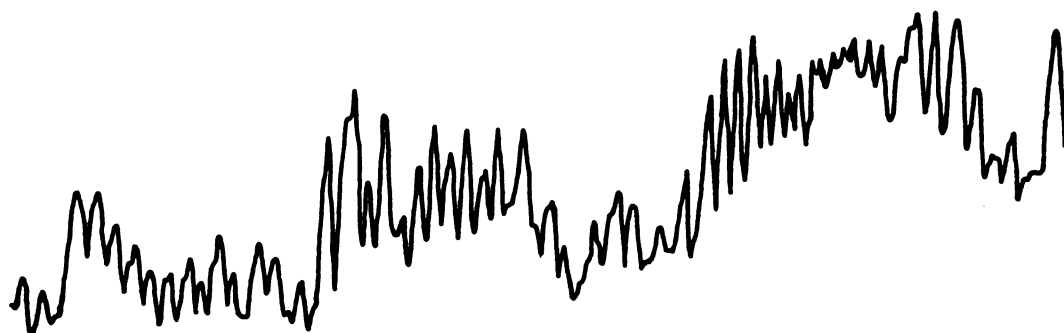


FIG. 1.

Eighty-two per cent of the D.I. Group had suffered from panic attacks, sometimes at night, often associated with acute hyperventilation and terror of sudden death. The symptoms attributable to hyperventilation have been described by Lewis (1953 and 1954) and Burns and Howell (1969). Recurrent attacks of dizziness, sweating, palpitations and parasthesiae were often mentioned. The patients might not have noticed that they were breathing deeply during these episodes. The hyperventilation attacks experienced by 27 of the D.I. Group were recurrent (3 or more attacks), whereas recurrence occurred in only one subject with advanced obstructive airway disease.

Those in the O.A.D. Group who experienced breathlessness at rest or during conversation, or woke at night breathless, had the most advanced ventilatory incapacity. They for the most part had respiratory failure, with resting arterial $p\text{CO}_2$ s over 60 mm. of mercury and a low F.E.V.₁ ($\cdot 3$ of a litre in one case).

Besides symptoms of hyperventilation, 21 of the D.I. Group complained of a persistent unfamiliar, unpleasant sensation of heaviness on the sternum, independent of exertion. This was most commonly described as 'Like a weight on my chest' and 'a heaviness here (sternum), a horrible feeling, I could not breath in, I felt all the time that I was about to die'. Other descriptions included: 'My breathing is getting heavier and heavier.' 'It is as if something heavy lies on my chest, like cement, a strange feeling that I can't describe.' Such sensations of pressure on the

chest were often present for several hours, especially during the fluctuations of depression of mood, which were typically worse in the mornings. The morning worsening invariably lasted longer than one hour, sometimes into the afternoon. In contrast, the morning tightness experienced by the O.A.D. Group usually improved within an hour especially after a hot drink and bringing up sputum. Two of the D.I. Group spontaneously stated that the sensation of heaviness on the sternum was distinctly different from the sensation of morning tightness.

Patients in the O.A.D. Group did not experience heaviness on the chest at rest. Only one used the expression that his 'breathing became heavy', and then only on exertion. More commonly a tightness was described, such as: 'There's a tightness in the chest, I can't get rid of air'; or 'There's something blocking my breathing like a steel casket'; or 'A tightness in breathing out on exertion'. Another common variation was, 'My chest seems full, I can't get the breath away.'

Twenty-nine of the 33 in the D.I. Group had persistent depressive delusions associated with their sensations of breathlessness. These were expressed as: their lungs were failing and that they must have cancer of the lung (13); that their heart was failing (11) and that they had an embolus (1), tuberculosis (1), brain tumour (1), blood disease (1), and cancer of the stomach (1). Seven had multiple hypochondriacal depressive delusions. Twenty-five thought death was imminent (independent

of fears of sudden death in an actual hyperventilation attack), some from an unknown impending catastrophe. Ten wanted to die, and one thought he was dead, eight described feeling 'like an old man'.

Sixteen of the 33 patients with depression had had a total of 30 previous episodes of depression (Table II). In 26 of these, breathlessness had been a major symptom, and in 12 frequent attacks of acute hyperventilation appeared to have occurred.

Twenty-two patients in the D.I. Group had experienced the death of a first degree relative or spouse during the preceding three years, and a total of 30 such relatives had died during that period. Thirteen patients had witnessed such a death within the previous year, with considerable emotional impact.

Psychogenic factors other than death were much more common in the D.I. Group, especially stress factors within the family. These included illness other than death, feuds between members of the family, and

marital difficulties. Some of these disturbances post-dated the onset of the patients' depression.

Ten of the O.A.D. Group had experienced a superficial depression of mood which resolved with good news or company and was usually tinged with self pity. There was no morning worsening of mood, and the thought content was not profoundly depressed. The principal symptoms of depressive psychosis occurred significantly more frequently ($p < 0.01$) in the D.I. Group than in the O.A.D. Group (Table III).

General irritability, constipation and restless nights (middle insomnia) were common to both groups. The complaint of consistent early morning awakening, in which the patient cannot get back to sleep again, occurred in all 33 of the D.I. Group and in only 3 of the O.A.D. Group. Of the depressed patients 82 per cent were off work, compared with a quarter of the O.A.D. Group. Further, 70 per cent of the depressed patients had been housebound for more than two months, com-

TABLE II
Distribution of factors in the preceding medical and social history

<i>Previous history</i>	D.I. Group n = 33		O.A.D. Group n = 33	
	N	%	N	%
Smoked cigarettes	25	76	28	85
Lower respiratory tract disease (total) ..	23	70	26	79
Cough and sputum continuously for 3 months or more each year, for at least two years	22	67	33 **	100
Depressive illness (at least one attack) ..	16	49	1 **	3
Breathless on moderate—severe exertion (grade 3+) independent of attacks of depression	9	27	33 **	100
One or more attacks of acute bronchitis in past three years	7	21	22 **	67
<i>Family history in first degree relatives only</i>				
Lower respiratory tract disease (total) ..	26	79	16 **	49
Depressive illness	14	42	1 **	3
Eczema, hay fever, asthma	5	15	4	12
<i>Psychogenic stress factors in the past 3 years</i>				
Bereavement (total)	25	76	9 **	27
Death of at least one first degree relative or spouse	22	67	6 **	18
Witnessed the death less than one year ago	13	39	1 **	3
Disruption of the family other than by deaths	16	49	3 **	9

** = $p < 0.01$, * = $p < 0.05$

TABLE III
Distribution of the principal symptoms of depressive illness

	D.I. Group O.A.D. Group	
	n = 33	n = 33
Moderate to severe depression of mood ..	33	0
Loss of all interest ..	33	2
Depressive thought content, including suicidal ideas, depressive delusions and self reproach ..	33	3
Early morning awakening	33	3
Anergia	33	20
Weight loss of over 4 lbs.	31	8
Depression worse in the mornings	30	0
Anorexia	29	5
Psychomotor retardation	26	0
Loss of libido	24	5

pared with only a quarter of the O.A.D. Group. Both these differences were significant ($p < 0.01$).

TREATMENT AND FOLLOW-UP

Of the D.I. Group, 17 received psychiatric treatment as in-patients, 16 as out-patients, 9 had electroconvulsive therapy and 24 tricyclic anti-depressant drugs. In all 33 cases the current episode of depression resolved. During a 12 month follow-up there were 6 patients who had a recurrence of depression. In all of them there was a recurrence of the sensation of heaviness on the chest and separate hyperventilation attacks. Disorganized respiratory rhythms, especially sighing, also recurred.

Exertional breathlessness (Grade 3+) remained in 9 patients, those who had experienced breathlessness on exertion prior to their depressive illness. These had a lower mean F.E.V.₁ than the rest of the D.I. Group. Non-exertional breathlessness persisted in only 2 patients, and took the form of abortive attacks of acute hyperventilation.

DISCUSSION

Inspiratory and expiratory difficulty. The depressed patients in this study complained that their principal difficulty with breathing was associated with increased effort on inspiration; this was in marked contrast to the expiratory difficulty emphasized by those with advanced obstructive

airway disease. Doris Baker (1934) similarly reported that her patients with sighing respiration experienced the greatest effort on inspiration, which she contrasted with asthma. Inspiratory cramps can, however, occasionally occur with anxiety in an attack of asthma and in the terminal stages of such an illness.

It was noted that in those depressed patients with stridor, it was inspiratory. Gasping, with prolonged inspiration, occurs with acute anxiety. In the panic attacks of the depressed patients the chest cage would remain elevated, giving rise to a raised end expiratory level and the sensation of being unable to get any more air in. This would return to normal when the patient was induced to relax.

Expiratory difficulties, on the other hand, occur in patients with airway disease and parenchymal pulmonary disease. This is because there is narrowing and softening of the airways, especially peripherally together with a reduction of the elastic recoil of the lungs in expiration. Therefore, for a number of mechanical reasons, narrowing of the airways interferes more with expiration than inspiration.

Hyperventilation. This study has shown that recurrent and prolonged attacks of hyperventilation were commonly experienced by patients with depressive psychosis, who also complained of breathlessness.

In descriptions of the chronic hyperventilation syndrome, Lewis (1954) and Sparrer and Davis (1964) pointed to the invariable presence of an underlying psychological disturbance, sometimes with 'strong depressive features' (Lewis, *ibid.*). The above findings suggest that one should be cautious in seeing most attacks of psychogenic hyperventilation as conversion hysterical phenomena occurring predominantly in hysterical personalities (Fraser and Sargant, 1938).

Psychogenic precipitation and fears of sudden death, especially in the initial attacks, were frequently noted in the patients of this study. These were also reported by Lewis (1953 and 1954), Sparrer and Davis (1964), and Wahl (1966).

At night the depressed patient often had a short attack of panic and hyperventilation on going to sleep, possibly induced by bad dreams

with a depressive content. In addition, such patients regularly complained of early awakening and being unable to sleep again, when they were restless and depressed, but not usually gasping for breath. The few subjects in the O.A.D. Group who awakened breathless at night were in respiratory failure. Here the interruption of sleep by breathlessness occurred late in the night, for example 4 a.m., but the patient would often sleep again.

'Vital feelings'. A second category of breathlessness occurred in the depressed patients in which they were conscious of the effort of breathing at rest even when there was little change in pulmonary ventilation, or sometimes associated with sighing. A sensation of heaviness, or pressure on the chest was described by Schneider (1959) as occurring in depression. He called these symptoms 'Vitalgefühle'—translated (for lack of a better expression) as 'vital feelings'. Schneider wrote: 'Where the mood represents the vital cyclothymic depression of spirits, which so often fills the total canvas; as such it tends to have some local expression either in the head, chest or stomach.' The sense of physical localization of the depression ('vital feelings') Schneider thought was almost pathognomonic of depressive psychosis. A sense of pressure on the chest or on top of the head are probably the most common modes of experiencing 'vital feelings'.

A striking feature of the breathlessness described by the patients with depression was its fairly sudden onset and cessation, corresponding exactly with the onset and resolution of the depressive illness, which contrasts with the more insidious development in obstructive airway disease. Most of the D.I. Group did not experience breathlessness before the onset or after the resolution of their depressive illness.

The O.A.D. Group had a significantly greater number of attacks of acute bronchitis during the preceding three years, which accounted for episodic exacerbation of breathlessness. Those in the D.I. Group, in contrast, experienced a continuously fluctuating pattern in the experience of their breathlessness, sometimes varying within minutes.

The fact that three-quarters of the D.I. Group were off work and housebound was a

reflection of their total incapacity, even greater than those with advanced airway disease. The depressed patients complained bitterly of exhaustion and weariness, so that sometimes the affective change was not readily apparent. It is to such cases that the descriptive title 'depressio sine depressione' has been given.

The prevalence of eczema, hay fever and asthma in the family history of the two groups does not differ grossly from their prevalence in random samples of the population (Leigh and Marley, 1967; and Crofton and Douglas, 1969).

SUMMARY

Sixty-six patients with breathlessness as a prominent symptom were investigated. The experience of their breathlessness was studied in detail. Thirty-three had advanced obstructive airway disease with an F.E.V.₁ of below 1 litre. A second group of 33 had a depressive illness; in addition most of this group had chronic bronchitis and some a mild degree of airways obstruction.

There were distinct differences in the way in which the two groups of patients experienced their breathlessness. In those with depression breathlessness occurred at rest and the main difficulty was on inspiration. They experienced a persistent 'heaviness' on the sternum, and their breathlessness fluctuated rapidly and was frequently associated with hyperventilation and sighing respiration. Depressive delusions of imminent death were present, most commonly related to intractable fears of lung cancer and heart failure. The somatic symptoms disappeared with psychiatric treatment and resolution of the depressive illness.

Such symptoms were not experienced by the group with advanced obstructive airway disease. Their breathlessness was exertional, of insidious onset and with the main difficulty on expiration. Recurrent hyperventilation attacks occurred in only one of the thirty-three. Their breathlessness was relieved by rest, expectoration and stopping smoking.

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REFERENCES

- AYD, F. J. (1961). *Recognising the Depressed Patient*. New York: Grune and Stratton.
- BAKER, D. (1934). *Lancet*, *i*, 174.
- BURNS, B. H., and HOWELL, J. B. L. (1969). *Quarterly Journal of Medicine*, *28*, 277.
- COMROE, J. H. (1966). *Breathlessness*. Proceedings of a Symposium. Editors: J. B. L. Howell and E. J. M. Campbell. Oxford: Blackwell.
- CROFTON, J., and DOUGLAS, A. (1969). *Respiratory Diseases*, Blackwell, 394.
- FRASER, R., and SARGANT, W. (1938). *British Medical Journal*, *i*, 378.
- HOWELL, J. B. L., and CAMPBELL, E. J. M. (1966). Editors of *Breathlessness*. Oxford: Blackwell.
- LEIGH, D., and MARLEY, E. (1967). *Bronchial Asthma: a Genetic, Population and Psychiatric Study*. London: Pergamon Press.
- LEWIS, A. (1941). *Proceedings of the Royal Society of Medicine*, *34*, 533.
- LEWIS, B. I. (1953). *Annals of Internal Medicine*, *38*, 918.
- (1954) *Journal of the American Medical Association*, 1204.
- OLSEN, A. M. (1964). In *Dyspnoea*. Editors: A. L. Banyai and E. R. Levine. Oxford: Blackwell.
- SCHNEIDER, K. (1959). *Clinical Psychopathology*. Translated by Hamilton, M. W. New York: Grune and Stratton.
- SPARRER, J. H., and DAVIS, H. L. (1964). In *Dyspnoea*. Editors: A. L. Banyai and E. R. Levine. Oxford: Blackwell.
- WAHL, C. W. (1966). *American Handbook of Psychiatry*. Vol. III. Editor: S. Arieti, New York: Basic Books.

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