MIGRAINE AS A STRESS DISORDER

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Introduction

In November 1948 there was opened, in the York Clinic at Guy's Hospital, a small unit for the investigation and treatment of physical disorders which appeared to be the product of stress. The first patient to be admitted to the unit was a woman of 34 with migraine (Audrey). The attacks were severe and frequent, often two in a fortnight.

Audrey stayed in the clinic for five weeks. She had many interviews with her physician and was examined by the clinical psychologist. Her behaviour in the social group of the ward was closely observed by a nursing staff trained in psychiatric methods. Audrey was a pleasant, serious girl who worked as a shorthand typist. She did all the work she was given, however much that might be; it did not occur to her to refuse work on the ground that she was overburdened, and as she toiled through the heap of papers there mounted up within her resentment against her superior for imposing so heavy a load, and dissatisfaction with herself at her inability to complete the task. She felt like complaining but could not, and kept her feelings to herself. When tension rose beyond a critical point, she was visited that evening by a severe headache or a migraine attack with teichopsia and vomiting. She was obscurely aware of the relation of tension to the attacks but had not acted upon the knowledge. During her stay in the clinic this relationship was explored in talks with doctors, nurses and other patients, and the sources of tension were laid bare. Audrey grasped at once the concept of the migraine attack as an overflowing of accumulated tension. She gained insight quickly and accepted with ease the suggestion that her attitude towards work might be changed. With this she became easier and more relaxed in manner and less apprehensive of her responsibilities. Both headache and migraine attacks faded away as she grew into her new pattern of living: over the last year she has had but one

attack of migraine, and that less severe than formerly.

The immediate response to psychotherapy in this patient stimulated us to look further into the correlation of migraine attacks with the patient's emotional life. In this paper we describe the results of clinical and psychometric examination of 20 patients with migraine and the effect of therapy upon them.

Material and Method

The series contains 16 women and four men. The age range is 18 to 51, and the mean age 35. Nine were investigated and treated as outpatients and 11 admitted to the research unit for a few weeks.

A detailed history was taken from each patient and the determinants of migraine attacks enquired into. The psychologist (Dr. Kaldegg) submitted every patient in the series to a battery of psychometric tests, some cognitive and some projective; the Wechsler-Bellevue and Progressive Matrices belong to the former category, and the Thematic Apperception Test (TAT), Rorschach and Mosaic tests to the latter. Records were kept, for patients admitted to the clinic, of their behaviour among their fellow-patients in the ward; the character of their work in the occupational therapy department was observed, and the manner of their approach to a task.

The diagnosis of migraine was confirmed in 16 patients by a neurologist or by another physician. The form of the attack in the other four corresponded to the classical description of migraine.

Nine patients were referred to us by other physicians in the hospital, and it seemed possible that this group might be a selected one in that the patients had been thought likely to benefit from psychiatric therapy. In order to bring the whole series more nearly to a random sample of the migraine population, some general practitioners in the area were asked to send us any sufferers from
migraine who were attending at that time. Eleven patients who reached us in this way are included in the series. On balance, then, the series of 20 may be regarded as a fairly representative sample, although there is a preponderance of women.

Headache, nausea with or without vomiting, and prostration during the attack were common to 19 patients in the series; one had headache, teichopsia and prostration only. Some disturbance of vision was reported by 12 patients. Other symptoms, apart from headaches and migraine attacks, were present in 11 patients; dysmenorrhoea in three, menorrhagia in two, bodily pains in three, neurodermatitis in one, and alopecia areata in one. One patient had uncinate attacks, for which no organic cause was found. Three patients complained of spells of depression and one of anxiety attacks. Thirteen patients suffered from headaches distinct from the migraine attack itself. Two patients had multiple symptoms; one of these was a 'chronic invalid.'

Clinical Findings

Determinants of the Migraine Attack

The principal determinant of attacks in every patient in the series was sustained emotional tension. Some patients had occasional attacks for which no cause could be found, but in general the more thorough was our knowledge of the patient as a person the fewer attacks there were which could not be accounted for. Often the important issues did not become manifest at the first interview.

A man of 41 had attacks with fair regularity about every third week. He was a shrewd, sensible, hard-working man whose physical and mental health had always been good. His jcb was steady and secure and his home life happy. He was not aware of any 'worries.' At his second visit he said that one week in three he was compelled to work in a dusty and stuffy basement, folding mailbags. He was at first inclined to ascribe the attacks to the atmosphere, but later admitted that he was intensely resentful at being made to do work of such a lowly grade.

Only seldom did the patients, at the time they came to us, have insight into the nature of their illness. To a direct question at the first interview, they usually denied that their attacks were associated in any way with tension or strain.

Time Relations of the Attack

The migraine attack is often separated from its antecedent stress by an interval of time which may be as long as a day. A common pattern is that the attack follows, on the morning after, a day of strife or intense application to work. A latent period of one to three hours is not unusual; rarely it is 36 hours.

If tension is great enough the attack may begin when it reaches its peak or as it subsides; this seems to be more characteristic of attacks which are the product of a brief and acute emotional storm, usually anger, than of those which follow a prolonged period of tension. A short latent period of one to two hours was thus more common in the R group (see below) than in the other two groups. For the patients in the O group, many Saturday mornings were spoilt by migraine. Some patients had attacks of both the immediate and the delayed type; the former was generally associated with a spell of resentment.

The Sources of Tension

The following classification was adopted: Mainly resentment (R), six; mainly compulsive over-activity (O), six; general tension from multiple causes (G), eight. The causes of tension in the G group included such things as interference with routine, unsatisfied sexual impulses and anticipation. Many patients could be placed in more than one of these categories; the classification is an attempt to isolate the principal sources.

Example of R group:
A woman of 30 (Kate) was constrained by the housing shortage to live in the same house as her mother-in-law (Mrs. P.); they shared a kitchen. Mrs. P. liked to help in the kitchen and to advise about the running of the house and the management of the children. When Kate could bear the petty interference no longer and expostulated, the old lady would reply with a parable and Kate's demarche was without effect. Resentment reached a peak and exploded into a migraine attack about once in two weeks.

Example of O group:
A woman of 30 (Prudence) helped her husband in the shop. When trade was busy she felt compelled to work on and on without a halt until everything was attended to, although she knew that this course might end in a headache. She could easily have organized her work so that a break was possible, but she felt so uneasy if any task remained undone that she had to do it forthwith, however tired she might feel.

Example of G group:
A woman of 45 (Sylvia) said of her migraine attacks that all kinds of things could bring them on: over-work, extra responsibility, going on a journey, coming up to hospital. She often had attacks with the period, and the frequency and severity of attacks increased after the birth of the second child. 'I think nerves have a lot to do with it. Just me! Always been like this. Head-
ache attacks a lot at week-ends when the family is at home.'

Other Precipitants of Attacks

We enquired carefully into the other agents besides emotional tension which were associated with attacks and found none. One patient said that bright lights upset him and caused headache, but our impression was that this was a statement of an emotional reaction and not a physical event. The same conclusion applies to the association of attacks with the menstrual period. Seven of our female patients said that attacks were more likely to occur at, during or after the menstrual period. This increased liability to attacks is, in our view, a consequence of the universal increase of tension at period time, especially in the pre-menstrual phase.

Personality Pattern of the Migraine Patient

We found no common personality pattern in this series. The majority were serious, competent, practical people; obsessional trends were probably more common among them than in a random sample of the normal population, but four patients (three women and one man) had a personality pattern of predominantly hysterical type: one was a 'chronic invalid,' another became a chronic invalid at the time of the menopause, two were egocentric, immature and histrionic.

The intellectual level of the series as a whole, as judged by their clinical appearance and general efficiency in life, was about average.

Three patients showed sufficient disturbance in the psychiatric sphere—anxiety, depression, compulsions and the like—to warrant medical attention on this ground alone. It is significant that none had sought advice except for migraine.

The psychometric characters of the group are given below.

The 11 patients who were treated in the research unit all attended the occupational therapy department of the York Clinic. Their behaviour in the department was observed and the following note on it prepared: The patients all showed a keen interest in handicrafts and a desire to make something themselves. They tended as a group to be perfectionistic and persevering, but there were exceptions, and in three or four the standard of work was not high. They were inclined to be fussy in their work, and more than half the group insisted on having all their tools and equipment at hand and refused to improvise. Eight patients attended painting sessions; free choice of subject and colour was allowed, and the favourite subject was landscape. On the whole the patients seemed to prefer cold blues, greens and blacks, and few used reds and yellows.

The individual and group behaviour of the in-patients was also observed and recorded from day to day by the nursing staff. It was noted that both men and women were anxious to find their place in the social group of the ward. The men showed quicker adaptation in this respect, and usually took a more active and dominant part in the general routine of the ward and in social functions. Their personal relationships seemed to be more easy than those of the women. Most of the patients, once they had established themselves, showed resentment at any interference in their activities, and reacted rather aggressively to any assertion of authority on the part of the staff. The patients, as a group, were neat, compared with the other patients in the clinic; their rooms were kept in good order and the arrangement of their possessions hardly ever changed. Most of the male patients admitted to the existence of stress at work, and the way in which they tackled the tasks given to them indicated that their approach was perfectionistic.

The most outstanding of the traits common to the group were: a liking for order and tidiness; states of tension arising from minor stimuli; rigidity of routine. All the patients seemed to benefit from their stay in the clinic, and attacks were in most patients much less frequent than they had been before.

Correlation of Illness and Stress

(a) Onset. In 15 of the 20 cases the migraine attacks made their first appearance in circumstances offering special difficulty to the patient, which aroused or augmented emotional tension.

Kate's first attack was at the age of ten. Her father was 'always ill' and frequently in hospital; her mother used to go out, leaving her, as the eldest girl, in charge of the other five children. She got no thanks for doing the housework and taking care of the family; indeed, her mother, who was an ill-tempered and abusive woman, would give her hidings at intervals. She was bitterly unhappy and ran away from home at 14.

Attacks began in a woman of 51 (Eva) after she had lost her house in an air raid and had had to be evacuated from London.

More than half of our patients (13) suffered from spells of headache which were distinct from the migraine attack proper. These headaches were also related to tension, though the relationship was of a different form from that of the migraine; there was very seldom a long latent period. In all these patients the transition from simple headache to migraine took place at a time of stress.

(b) Course. The course of the migraine followed the trend of the patient's emotional life with remarkable constancy. Phases of tranquillity and
content were marked by decrease or disappearance of the attacks, and phases of disappointment, deprivation, family friction or overwork by relapse or exacerbation. This pattern was readily discernible in 18 of the 20 patients.

Eva was reinstated in a flat in London, but the flat was in a noisy and disagreeable neighbourhood near the river. Eva did not like the place or the people; while she was living in the flat she had attacks on the average once a week; when she took a holiday with relatives in the country, she was free of attacks. This association was observed several times over.

In those of our female patients who were married and had children, an increase in the frequency of attacks usually followed the birth of each child, as the burden of responsibility grew heavier.

This long-term correlation of stress with the severity of the migraine was more easily established than the point-to-point correlation of single attacks. Patients who were slow to perceive the latter could, as they looked back, see how the illness had accompanied the ‘bad patches’ in their lives. This pathway to insight proved to be valuable in the less intelligent person.

Psychometric Findings

All the patients in the series were given two intelligence tests, the Progressive Matrices (Raven) and the Wechsler-Bellevue scale, and two projective tests, the Rorschach and the Mosaic. Sixteen of them were also given the TAT (Thematic Apperception Test). Although the TAT and the Mosaic test contributed greatly to the understanding of the patient’s personality, the results of these tests do not lend themselves readily to direct comparison, and they will not be considered in this paper. The main features of the Wechsler and the Rorschach test results will be outlined here and a more detailed report will be given elsewhere.

The Wechsler Test

Since the belief is widely held that more intelligent people are likely to fall victim to migraine, special attention was paid to the testing of intelligence. The range of intelligence quotient (IQ) of our patients is shown below in tabular form:

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Five patients scored less than 106 and six over 120; the remaining nine were in between. Half the series, therefore, scored between 106 and 120, and an approximately equal number lay above and below this range. After making allowance for the American standardization of the Wechsler test, it may be said that these findings afford some support for the hypothesis that migraine patients have higher than average intelligence.

The Wechsler test consists of a verbal part and a performance part, and each part has five subtests. The ten sub-tests are scored separately from the verbal part is derived a verbal IQ, and from the performance part a performance IQ. The two may be combined to form a full-scale IQ.

The relationship of the ten scores to each other has some diagnostic significance, and the values of the sub-tests give a picture of the patient’s intellectual make-up. The values for the migraine series were compared with those for a control group and a group of patients with various ‘psychosomatic’ disorders (Kaldegg, 1950). The first feature of interest which emerged was that 17 of the 20 migraine patients did better in the performance part of the test than in the verbal part, as compared to 13 of the controls and 13 of the patients with other disorders. The higher performance IQ indicates that the migraine patients had a practical approach to life, and were not easily upset by the test situation. In one patient the discrepancy between the two IQs was 27, in favour of the performance part of the test, and this unusually large difference gave a clue to some of the possible sources of tension determining the migraine attacks.

The patient (Beryl) was a woman of 51 with elementary school education. She had learned shorthand and typing, and had spent her life in one and the same job as a clerk. She was thoroughly unhappy in this job. In the clinic her work in the occupational therapy department was closely observed, and the observations confirmed the results of the Wechsler test in that she was found to be well suited for manual work; it was noted that she derived great pleasure from it. It was clear that her aptitudes were not those which could fit her for the job she was doing, that she had a continual struggle to get the work done and that she was starved of the satisfaction of working with her hands.

On two sub-tests (comprehension, picture completion) the migraine patients as a whole did well. Both of these demand sound judgment. On one of the performance sub-tests (digit symbol), however, there was a tendency to do rather badly through slowness, which brought the score down. This sub-test taps the ability to learn mentally and manually, and there was reason to believe that the slowness might be due in part to a habit of mind which required some time to warm up to a new task.
With few exceptions the migraine patients were able to concentrate well and were not unduly disturbed by anxiety. Most of them, within the limits of their natural endowment, functioned smoothly in the intellectual field.

The Rorschach Test

Of the projective methods the Rorschach is one of the most widely used. The test material consists of ten standard ink blots printed on cards. Five cards are grey, two contain some red and three are multi-coloured. The patient is asked to say what part of the card reminds him of. The answers are recorded and scored, and the observer notes what part of the card is seen and how it is seen. The inner resources of the patient's mind and the character of his affective life may be assessed from the results of this test. The Rorschach has the virtue of going below the surface of personality and disclosing the balance of forces within.

The records of four patients showed emotional lability and other features which may be termed hysterical. Two others appeared rigid and negativistic to such an extent that a breakdown sooner or later seemed probable. No uniform personality pattern was found in the series. There was one feature which most of the patients had in common; the way in which the emotional life was handled. Rational control seemed to dominate it. The life of the emotions was well balanced and unlikely to get out of hand, but this was perhaps achieved at the expense of warmth and depth of feeling, and the approach was rather cool and cautious. This control by reason contrasted strongly with the personality pattern in a group of duodenal ulcer patients, most of whom were highly emotional, and had great difficulty in the management of their affective life. ‘Popular’ responses (those which are given by most normal people) were much commoner in the migraine series than in the duodenal ulcer patients (Kaldegg, 1950b). The presence of ‘popular’ responses is taken to indicate the capacity to see the obvious and to think along common-sense lines. The migraine patients were prepared to accommodate themselves to reality and to trust and use their common sense. Conscious anxiety was not prominent in the records, but there were many signs of latent tension.

Summary

Most of the patients in this series were level-headed, cautious people who strove to remain in command of a situation and tried to avoid that which might involve them in unexpected upheavals. They like to keep their own time and rhythm and were sensitive to any disturbance of their orderly emotional life and interference with their routine. These findings suggest one pattern of pathogenesis of the migraine attack; a situation which cannot be kept under control, or a break in rhythm, sets up tension, and this tension is experienced as an upsetting of emotional balance. Tension tolerance in these patients is low, and tension itself is resented. This secondary resentment, added to the original tension, precipitates the attack.

A woman of 30 (Prudence) worked with her husband in a shop. When trade was brisk and the customers crowded in, she found herself getting gradually more tense; she felt that the work would never be done in time and scolded herself for worrying about it. Her migraine attacks usually came on a Wednesday, the day when the pressure of work was highest.

A woman of 28 (Susan) had frequent rows with her sister Pam' and her migraine attacks generally attended one of these. Pam was three years older and had always assumed the dominant position. ‘When I was younger,’ Susan said, ‘I used to obey. Now I do the opposite on principle. They lived in the same house and any contact produced tension. Susan raged inwardly at Pam for being so contrary and at herself for her failure to handle the situation better. She experienced strong hostility to Pam (‘If I hit her I would murder her’) but none of it could be expressed.

Therapy

The aims of therapy were to bring the patients to a clear recognition of the place of the migraine attack in his mental life, to help him discern the sources of tension and to reach a better adjustment to himself and to others. The method was the therapeutic interview; discussion, catharsis, interpretation. The usual time interval in the early stages was one week. The rate of response to therapy was a function of several variables, of which the chief were the patient’s intelligence and the degree of his ‘resistance’ or inertia. We employed small doses of sodium amytal (1 gr.) and of bellergal twice daily where tension was severe and difficult to control; those patients who responded well to therapy soon found that drugs were unnecessary. This combination of drugs may be used at a time of crisis to tide the patient over and protect him from attacks.

We kept contact with all our patients and the period of follow-up thus ranges from a few months to 2½ years.

The results of therapy were:

Much improved, no attacks or attacks few and slight, six; improved, attacks reduced in frequency and severity, ten; no change, two.

Two patients improved very considerably and kept well for about a year, then relapsed; the re-
lapse in one of these coincided with the menopause and in the other with an *affaire de coeur* which went badly.

One of the two patients who did not improve (Pat) suffered from an obsessional state so severe that after following the course of her illness for over two years we came to the conclusion that leucotomy might finally have to be considered.

The therapy of migraine and its potentialities and perplexities will be discussed at greater length in another paper (Davys, 1951).

**Migraine as a Stress Disorder—The Literature**

Harold Wolff and his collaborators have written much on this topic, and Wolff himself in his book *Headache and Other Head Pains* (New York, 1948) gives an admirable account of the physiology, psychogenesis and treatment of migraine. In his paper on personality pattern in migraine (Wolff, 1937) he describes a psychiatric survey of 46 patients; the description is made under several headings, such as orderliness, inflexibility, social relations, etc., and the implication is that all the patients had these features in common. The pattern corresponds, as Wolff says, with that named by Meyer the obsessional ruminative tension state, and one is left with the impression that this pattern was seen in greater or lesser degree in every patient. As our results show, we do not concur with Wolff in this finding.

Alvarez (1947) says that the migraine patient is usually tense, reacts intensely to events, tends to worry, tires easily and often suddenly, and sleeps poorly. He is as a rule above average intelligence and is willing to assume responsibility, thus exposing himself to extra stress. The frequency and severity of attacks depend largely on the amount of strain which the patients suffer. Treatment should be directed to the study and remedy of life problems. We agree with this recommendation, but the personality pattern which Alvarez outlines does not apply to all our patients.

Fromm-Reichmann (1937) believes that migraine patients cannot stand being hostile to those they love; this hostility has to be repressed, and finally shows itself in the physical symptoms of the attack. In the series of cases studied by Marcussen and Wolff (1949) attacks were usually preceded by an episode to which the patient reacted with rage and resentment, but these feelings had to be suppressed. This reaction sometimes followed on a period of gradually accumulating tension. The precipitating event was often a trivial one which in the ordinary way would not have been disturbing.

Vertue in his elegantly written paper (1950) tells of the disappearance of a migraine headache while listening to Tchaikovsky’s Fourth Symphony. Music, as he says, has the power of abolishing the emotional unrest from which the headache springs.

In a review of the effects of leucotomy, Partridge (1950) noted that five patients were relieved of migraine by the operation. Since the chief effect of leucotomy is diminution of tension, this is good evidence that tension is a determinant of migraine attacks.

**Conclusions**

Our conclusion is, then, that emotional tension is a principal determinant, if not the sole cause, of migraine attacks. We did not find that the patients in our series had been exposed to any extraordinary hardships, but because of the nature of their personality pattern they were prone to experience in certain situations, an unduly intense state of feeling which if it could not be discharged in action set off a migraine attack at once or after a latent period.

The measure of our success in abating the frequency and intensity of the attacks in these patients was the degree to which we could reach the sources of tension and deal with them; where this was not possible treatment was of no avail.

A pertinent question is why these patients reacted to stress with migraine and not with some other disorder. Eight patients gave a family history of migraine, and a further four of ‘headache’; this may point to a genetic transmission of a liability to migraine attacks.

**Summary**

The results of psychiatric investigation and treatment of 20 migraine patients are described.

No common pattern of personality was found. The most important determinant of attacks in every patient in the series was emotional tension.

After treatment six patients had no attacks, or few and slight attacks only; ten patients had attacks which occurred less often and were less severe; two patients were unchanged. Two patients improved considerably then relapsed in circumstances of special stress.

Some mechanisms of production of the tension which predisposes to migraine attacks are discussed.

**Acknowledgments**

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kidneys. The rupture itself occurred classically at the posterior aspect of the dome where the bladder wall is weakest due to the divergence of muscular fibres in this area. It was surprising that the child showed so little signs of shock but it has been often pointed out that in this type of injury such a thing is not unusual and shock only becomes marked several hours after the accident. It is this which is responsible for the delay in getting the patients to hospital, and once there, in instituting active steps to close the bladder quickly.

Our patient made a smooth recovery without developing infection of the peritoneal cavity despite the fact that some 14 hours elapsed before operation. Intravenous pyelography has been advocated as an aid to diagnosis in doubtful cases instead of instilling a radio-opaque substance into the bladder, which by some is alleged to be dangerous. However, provided all is in readiness for immediate operation it would appear to be without danger. Bacon (1943), in fact, goes so far as to say that cystography is the most significant single diagnostic procedure.

Since Walther first closed a ruptured bladder successfully in 1859, the accident has always carried a high death rate. The mortality figures for uncomplicated intraperitoneal rupture are variously given as 10 to 12 per cent. if operation is delayed 12 hours, rising steeply to 60 per cent. if 24 hours elapse before treatment. Weyrauch and Peterfy (1940) give an overall figure of 50 per cent., and Bacon (1943) finds a total mortality of 44.2 per cent. and a surgical mortality of 36.5 per cent. The majority of these statistics, of course, refer to patients treated before the introduction of chemotherapy.

The rarity of this accident in children is presumably allied to the rarity of very distended bladders in this age group. The organ has not yet been cortically trained to a high standard of social security, and is emptied regularly before intravesical tension rises to any great height.

I wish to thank Mr. David Levi for permission to publish this case.

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are grateful to our colleagues in the hospitals and elsewhere for sending the patients to us and to the patients themselves for taking part in the study.

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