concluded, "... the evidence, such as it is, indicates that the defective fertilized ovum is due to intrinsic germ-plasm quality rather than to its environment, and is the main factor in the production of spontaneous abortion." If this view be correct, a therapeutically nihilistic attitude towards spontaneous abortion, be it isolated or repeated, seems inevitable until such time as we can exert a more direct influence on the germ-plasm itself.

We must, however, mention the report by Jones and Delfs (1951), who studied extensively the endocrine patterns in women with histories of abortions, and who based therapy (with thyroid, progesterone, and vitamin E) on the finding of deficiencies of these factors. There were 74 pregnancies in their series in women who had had three or more consecutive abortions; 41 gave indications of hormone deficiency and were treated appropriately, 35 going to term (85% success); 23, also apparently deficient, were left untreated, and only five went to term (22% success); while 10 patients who presented no evidence of hormone deficiency were given no treatment and had five term pregnancies (50%). It is difficult to reconcile these figures with our own, but it may be pointed out that the considerably greater success rate in the treated deficient cases, as compared with the untreated non-deficient cases, seems to argue strongly in favour of a psychological effect of the treatment, in addition to, if not in place of, its endocrinological effect.

Summary

The outcome of pregnancy in a series of 113 women who, prior to the pregnancy in question, had had two or more consecutive spontaneous abortions before the twentieth week has been studied. The 53 control patients, who received no specific therapy, produced 39 live babies (75% success); 60 patients received implants of six 25-mg. pellets of progesterone and gave birth to 48 live babies (80%). This difference is not significant. In the control group 20 patients had had three or more consecutive abortions and produced 11 live babies (55%); in the implanted group 27 patients had had three or more previous abortions and produced 20 live babies (74%). Again the difference is not significant. The success rate for the control group is far higher than currently accepted estimates would have had one expect, and the calculations on which these estimates have been based are criticized.

Studies of pregnanediol excretion on these patients provide no support for the view that progesterone deficiency is an important cause of repeated abortion, and failed to show any influence from the implanted progesterone. They gave some evidence for the development of a temporary fall in progesterone production in some cases, but none for the reduction of the incidence of such a development in the implanted patients. Many of the abortions seemed to occur in spite of adequate pregnanediol excretion.

If, as seems likely, germ-plasm defects account for more abortions than do abnormalities of uterine environment, a pessimistic view of any therapeutic attempts appears justifiable. On the other hand, the prognosis for the untreated patient who has suffered a series of abortions in former pregnancies may be much better than has hitherto been supposed.

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REFERENCES

- Bacharach, A. L. (1940). *British Medical Journal*, 1, 890.
 Bevis, D. C. A. (1951). *Lancet*, 2, 207.
 Bishop, P. M. F. (1937). *Guy's Hosp. Rep.*, 87, 362.
 — and Richards, N. A. (1952). *British Medical Journal*, 1, 244.
 — and Doll, R. (1950). *Ibid.*, 2, 130.
 Eastman, N. J. (1947). In J. V. Meigs and S. H. Sturgis's *Progress in Gynaecology*, p. 262. Heinemann, London.
 Hertig, A. T., and Rock, J. (1949). *Amer. J. Obstet. Gynec.*, 58, 968.
 Jones, G. E. S., and Delfs, E. (1951). *J. Amer. med. Ass.*, 146, 1212.
 Mall, F. P., and Meyer, A. W. (1921). *Contr. Embryol. Carneg. Inst.*, 12, 1.
 Malpas, P. (1938). *J. Obstet. Gynaec. Brit. Emp.*, 45, 932.
 Smith, O. W. (1948). *Amer. J. Obstet. Gynec.*, 56, 821.
 Somerville, I. F., Marrian, G. F., and Kellar, R. J. (1948). *Lancet*, 2, 89.
 Streeter, G. L. (1931). *Sci. Monthly, Wash.*, 32, 495.
 Swyer, G. I. M. (1949a). *Lancet*, 1, 104.
 — (1949b). *British Medical Journal*, 2, 830.

PAIN IN THE TRUNK

BY

JAMES CYRIAX, M.D.

Physician, Department of Physical Medicine, St. Thomas's Hospital

AND

JONATHAN GOULD, B.Sc., M.R.C.P., D.P.M.

Associate Chief Assistant, Department of Psychological Medicine, St. Bartholomew's Hospital

Symptoms referable to the moving parts of the body are often encountered in both physical and psychological medicine, and considerable difficulties are apt to attend differential diagnosis. On the one hand, pain, though of organic provenance, may continue unaltered for long periods without giving rise to much in the way of physical signs. This is a particularly common feature of symptoms occurring in the trunk, and it is a well-known fact that backache, for example, may continue without appreciable alteration for years. On the other hand, pain of equal persistence setting up no objective signs to explain its source characterizes a number of psychogenic disorders. Moreover, nothing prevents a psychiatrically ill patient from developing a disorder of the moving parts irrespective of the mental state. Problems then arise that can be solved only by close collaboration between the two disciplines concerned.

It is our common experience that patients with purely psychiatric disorders have often received some years' physiotherapy before the true nature of their symptoms has been realized. Again, we find that, in a patient with obvious neurosis, symptoms of organic origin are often mistakenly dismissed as part of the psychiatric syndrome. Once detected, organic disorders can frequently be successfully treated in their own right, irrespective of concurrent psychiatric disability.

We have found that the greatest difficulties arise when the complaint is of pain in the trunk. Some cases are first seen in the psychological medicine, others in the physical medicine, department.

While we concern ourselves here with symptoms and signs affecting the back, exactly similar considerations apply to the other moving parts of the body. Our purpose in dealing with a restricted field is to draw attention to the fact that much so-called neurotic backache has an organic component. A relatively simple physical examination on the one hand and the consideration of various psychiatric criteria on the other make it fairly easy to decide how much weight to give to each factor.

Physical Examination

Since the disorder may show itself purely subjectively, the patient should be examined in a subjective way. In other words, many movements are tested, and each time the patient is asked whether or not the movement hurts. A pattern thus emerges that identifies the organic lesion, if there is one. If a muscle is strained, its contraction against resistance must hurt, but not the contraction of other muscles, nor such passive movements of joints as do not stretch that muscle. Alternatively, if complaint and signs indicate an articular lesion, muscle signs must correspondingly be absent. If one movement is limited at a joint, others are always limited too in a known proportion—and so on. All this is obvious enough to medical men but far from clear to patients, who, when an organic lesion is absent, will be found to answer at random, since they cannot tell whether some passive or resisted movement should hurt or not, be strong or weak, be limited or of full range; hence an incongruous pattern emerges. However neurotic a patient may be, if he has an organic lesion the pattern that he puts forward is on the whole tidy and self-consistent. If he has none, his emotionally determined answers contradict each other (if viewed as symptoms of a physical lesion) and quickly reveal the absence of a local disorder.

The physician should work out a routine for himself. He must start by examining a part of the body from which the alleged symptoms could not spring, passing on to relevant regions later. For example, if movement of the scapula or arm sets up as much lumbar pain as the lumbar movements themselves do when tested later, great doubt is thrown on the presence of an organic lesion.

The proper examination of any part of the spinal column involves:

1. Inspection of the whole trunk. Some postures are diagnostic in themselves—for example, spondylitis deformans—or a localized kyphos may be visible.
2. Noting the range and degree of painfulness of each active movement of neck, thorax, and lower back. For example, in thoracic spondylitis deformans it is the limitation of movement seen on lumbar spinal movements that explains the cause of the pain in the chest.
3. Testing the muscles about the joint while this is held still—that is, the *resisted* movements.
4. Testing the joint while the muscles are relaxed—that is, the *passive* movements.
5. Testing for dural pain—that is, pain in the trunk elicited by neck-flexion.
6. Testing the mobility of the nerve-root at the intervertebral foramen (lumbar spine only). The third lumbar nerve is tested by prone-lying knee-flexion, and the fourth and fifth lumbar and first sacral roots by straight-leg raising.
7. Testing conduction along the relevant nerve-roots. At the lower four cervical joints the pattern of muscle weakness identifies the level of a root palsy (Cyriax, 1950). The same applies to the third lumbar to the first sacral nerve roots.
8. Testing conduction along the spinal cord (cervico-thoracic spine only). Central disk protrusion, meningioma, and neuroma may compress the spinal cord and set up a spastic paralysis in the lower limbs, with resultant incoordination and extensor plantar response.
9. Palpation for deformity. An angular kyphos at the thoraco-lumbar spine characterizes hemivertebra, tuberculous caries, wedge-fracture, secondary malignant deposit, senile osteoporotic collapse of one body, adolescent osteochondritis, and complete erosion of two adjacent intervertebral disks. A shelf at the lower lumbar region shows

the presence of spondylolisthesis. When this is of the concealed variety—that is, present on inspection, palpation, and radiography only when the patient stands—a diagnosis of psychogenic pain is commonplace.

10. Radiology.

11. Occasionally, contrast myelography. This is worth performing only in case of pressure on the spinal cord or suspected neuroma of the cauda equina.

Though this may seem a formidable list of diagnostic procedures, clinical examination does not in fact take long. As the examination continues, the confusion of the psychiatric patient's answers becomes increasingly obvious as his responses identify the "lesion" as existing about this joint, then near another; first at a muscle, then at a joint or nerve. Final correlation of his answers reveals a self-contradictory pattern inconsistent with any organic lesion. By contrast, whether neurotic or not, the answers of a patient with an organic disorder are not confused; for he describes a congruous pattern. The positive findings are consistent with each other, and all point to the same structure. On the negative side, when irrelevant movements are tested, these are all stated by him not to be painful, weak, or limited.

Some minutes' examination of the trunk—or indeed of any moving part—on these lines serves to single out from the patients attending a physical medicine department those who have purely psychological symptoms, and also to identify local lesions in those whose obvious emotional state has led to primary reference to the medical psychologist. The malingerer also declares himself clearly.

Back Pain as a Psychiatric Symptom

Pain in the back is not usually the presenting symptom in psychiatric illness. While it is our common experience that the vast majority of complaints of pain in the back have some organic foundation, there are some typical pictures of psychogenic back pain. Over-simplifying these typical syndromes for the sake of clear presentation, we may describe: (1) vague aches and pains all over the back (and often involving other parts of the body as well)—for example, Case 5. (2) Soreness, and/or throbbing and/or aching, at the site of an old usually well-remembered lesion, the physical effects of which have quite obviously passed off, the character of the pain lately having changed. (Often such a complaint relates to the site of a blow or injury—for example, Case 6.) (3) Pain likened to a knife or a red-hot poker, radiating up and down the spine, and extending characteristically into the occiput and other parts of the head. In some hysterical patients lumbar puncture is the precipitating factor. (4) Bizarre complaints of painful experience felt in the back, occurring in schizophrenic, paraphrenic, hypochondriacal, and organic mental conditions. While these complaints are part of a general psychotic picture, organic disease is occasionally also present. (5) The neurotic elaboration and oversteering of pain due to organic conditions such as arthritis, dysmenorrhoea, disk lesions, etc. The overt neurotic reaction may command so much attention that the organic factor becomes overlooked.

Differentiation of Physical and Psychogenic Pain

The differentiation of organic from psychogenic pain in the back follows standard lines. The criteria available are not completely satisfactory or foolproof. The recognition of well-known organic and psychiatric syndromes is assumed, and the case of the carefully briefed malingerer is disregarded. The main points are:

1. *Description of Pain.*—Too much reliance should not be placed on the manner of description, but organic pain is described with apt affect, having regard to the general make-up of the person. Psychogenic pain is described with affect that is often inapt or incongruous—the well-known oversteering of symptoms, or the less obvious indifference about an apparent disablement.

2. *Localization of Pain.*—Organic pain is generally localized, or spreads in one direction only. The patient is able to demonstrate unequivocally the site and radiation of his symptoms. Simple terms are used—slight, severe, bad, colicky, burning, etc. Psychogenic pain is often diffuse; radiation is often variable, in the patient's description and on questioning; location becomes vague on an attempt at delineation. The pain is often difficult to describe and the patient tends to indicate the extent of the suffering instead.

3. *Precipitating Factors.*—In organic disorder these are usually well known and identifiable by the patient, even though on occasion he may tend to withhold them as "too silly"—for example, turning the head to look sideways may initiate pain behind the shoulder-blade. Tact may be needed to elicit the known precipitating cause. In psychogenic pain these are usually vague—"comes on for no reason," or imputed to "overwork," "overstrain," but infrequently to "worry" as such.

4. *Relieving Factors.*—In organic pain these are recognized; but again, in some conditions, particularly slipped disk, may be withheld—for example, packing neck with two pillows—as "silly." In psychogenic pain these are often vague—or at times a little *outré*. They are, however, rarely withheld, as the patient exploits them on occasion; massage, special arrangements of lights, and even spontaneously discovered trance-states may be employed (Gould, 1953).

5. *Previous History.*—In organic pain the history generally reveals marked physical trauma, but this may at times be noticeably absent—for example, lumbago coming on after some hours' sitting. In the simple case no overt history of psychiatric stress is obtained. Particularly in relation to movement of a fragment of an intervertebral disk, the precipitating activity may be quite minor or banal. In psychogenic pain the extended psychiatric history reveals evidence of emotional stress to which the patient has responded by the production of neurotic symptoms at critical periods from school-going, puberty, etc., onwards. There may be a history of neurotic reaction—perhaps resembling in some respects the present symptoms—which resolved more or less completely with or without treatment, treatment (if any) having been psychiatric or apparently suggestive.

Psychogenic causation of current symptoms may be regarded as established when the onset of the symptoms can be traced to one or more sources of significant emotional stress. This does not necessarily exclude a coincidental physical cause. Sometimes one may be able to establish antecedent and apparently causally related psychogenic factors, and yet judge, from the behaviour of the individual in similar circumstances at other times, that these factors are relatively unimportant on this occasion.

In spite of the usefulness of these criteria, cases may be encountered in which one is able to build up a suggestive chain of events indicating psychogenesis, and yet find the total personality and the past history so out of keeping with the diagnosis of psychogenic pain that the latter is doubted and further physical examination is advised.

Identification of Organic Pain in a Psychiatrically Ill Person

Provided one is well acquainted with the pattern of the psychiatric illness and the symptoms to which it gives rise in the individual case, this may prove a relatively simple matter. Symptoms more or less closely corresponding to those mentioned above under the organic heading may make their appearance; yet the symptomatology of the established neurosis persists. Furthermore, the patient's attitude to the symptom is usually much more matter-of-fact. In addition, from a psychiatric point of view, no "purpose"—symbolic or "practical"—appears to be served by the symptoms. In such cases it is possible to treat the local lesion in its own right by appropriate methods, and to relieve the patient of the organic symptoms while leaving the neurotic pattern unchanged. In other cases, however, the physical symptoms become neurotically elaborated (see Cases 1, 2, and 3).

Psychiatric Illness Presenting with Local Spinal Symptoms

The technique of examination by which the presence of a local spinal lesion may be identified has been described. When spinal or back symptoms exist in the absence of a local lesion, the psychogenic nature of the illness may become quite clear on examination, as in Case 5 and in

conversion hysteria. In other cases, though the diagnostic evidence strongly suggests psychogenesis, opportunity is not afforded by the patient for sufficient psychiatric investigation and treatment of the relevant factors, even though he may lose his symptoms (as in Case 4) during treatment essentially acting by suggestion.

The same event may give rise to both physical and psychiatric sequelae: this is, of course, very well known—for example, after head injury and when compensation is in the balance. Excluding such cases, we find true co-genetic physical and psychiatric symptoms to be uncommon when the pain is in the trunk. While Case 4 might well have been an example of this in the early stages of her illness, the physical component had undoubtedly all but vanished at the time she came under our care. Case 6, however, provides an excellent example of co-genesis, which, as will be noticed, occurred in a patient who later experienced a psychotic episode. The history of the treatment of this case demonstrates the well-known theme that the cure may promise to be, or may be, worse than the disease.

Case 1

A married man (a schizoid psychopath) aged 36, with three children and a much-involved emotional life, had at the age of 34 received treatment by electroplexy for a persistent intercurrent depressive episode, which thereupon resolved completely. Now, as a result of further emotional stress, he had again become depressed, although much less so, and was again referred for electroplexy. At the time of his attendance for the first treatment of the second course it was noticed that he limped a little. On questioning he admitted to pain in the left leg which had been present on and off for three months, for which he had been unsuccessfully treated by an osteopath. The pain had become very much worse during the preceding two days. A slipped disk was suspected and electroplexy therefore withheld for fear of increased displacement during the convulsion. On examination a pulpy protrusion at the fourth lumbar level (with limitation of straight-leg raising and diminution of the ankle-jerk) was diagnosed. Treatment by traction brought about reduction. During the period of this treatment the turbulence of his emotional life quietened, and his depression resolved without further treatment.

Comment.—This case illustrates the intercurrent spinal disorder, with the matter-of-fact attitude on the part of the patient, who would not spontaneously have mentioned his pain. The resolution of his depression is to be related to the events in his personal life and not to the spinal traction!

Case 2

A spinster schoolmistress aged 43 had suffered severely for four years from hysteria. This was manifested in symptoms of spasm affecting the gullet, bladder, and bowels; dermatographia; choreiform movements; various disorders of gait; pains in the back and head; fugue states. The syndrome occurred in bouts, usually in the vacations, the patient otherwise maintaining a keen, active, and efficient grasp of her job. Since adolescence, when she had had "chorea," she had been prone, on occasion, to bouts of illness with various selections of symptoms from the above-mentioned group. Her two sisters were very "nervous," one apparently pre-psychotic.

A few months after she came under our care she complained of severe backache. This she was able to locate below the shoulder-blade to the left of the spine, but would on no account allow palpation of the part because of the "extreme tenderness." At the time she was in a mild fugue state. The history was that the pain first came on when she was pushing up a large window with a pole, and had recently become worse when, travelling by car, she had, on a bumpy road, turned her head to look backwards. As soon as her mental state allowed examination of the spinal movements, she was seen for assessment of the possibility of a spinal lesion.

In spite of manifest exaggeration, clinical examination of the trunk disclosed the pattern of movements characterizing a left-sided mid-thoracic disk lesion, but she was not able to bear the touch of a finger-tip on the skin of her back. Hence manipulative reduction was carried out (somewhat unwillingly) under anaesthesia and full reduction secured. The result was immediate cessation of the pain at the posterior thorax, but the clouded consciousness persisted for a while. A year later this pain returned as the patient fell, grasping for a door jamb in an attempt to save herself. On this occasion she was in a less disordered emotional state, and consequently could permit manipulation without anaesthesia, which was again successful.

Comment.—This case illustrates the alternative reaction to the intercurrent physical condition (in contrast to Cases 1 and 3). In this instance a severely disordered hysterical over-reacted markedly to the lesion. When it was possible to discount the patient's reaction to her pain, the history and her description of its effects were typical of a spinal lesion, which was treated in its own right. The pattern of the neurosis remained unchanged.

Case 3

A married woman aged 33 who had had a miscarriage nine years earlier and who, since this event, had remained infertile and suffered from a chronic depressive state, was on the last account submitted to electroplexy. Her personality was tense, anxious, and dependent, and the psychiatric past history indicated a disposition to depressive bouts with phobic anxieties and bodily preoccupation, though earlier these had been milder and less sustained. Electroplexy induced a satisfactory improvement in the psychiatric state, but at the second treatment the patient complained of pain in the back. X-ray examination showed no fracture. Clinical examination suggested a disk lesion at about the fourth thoracic level. She quite cheerfully accepted her pain and continued with electroplexy. After this was completed, traction proved successful in abolishing the thoracic pain.

Comment.—This case illustrates clearly the intercurrent (iatrogenic) local lesion, and it was noticeable that the patient treated the pain in a most realistic manner—that is, quite differently from her attitude to her psychogenic symptoms.

Case 4

An ex-nurse, married seven years, had, since the birth of her child two and a half years earlier, suffered from pain in the right thigh and buttock, such that she held herself lop-sided. After four months she was put in a plaster jacket, which so increased the pain that it had to be removed eight hours later. After another four months, laminectomy was performed, but nothing abnormal was found. For five weeks she remained free from pain; then it returned, and persisted until coming under our care (fifteen months). She stated that she always woke comfortable and straight, pain and deformity increasing as the day wore on.

She sidled into the room, dipping on her right leg—quite a different gait from the limp of a patient with sciatica. Her lumbar spine was held vertically; her thoracic spine deviated to the right and the neck deviated grossly in the same direction. Examination of the trunk and lower limbs elicited the inconsistent responses that characterize psychogenic pain, but straight-leg raising on the right, though of full range, was painful at the extreme and that ankle-jerk was sluggish. It seemed, therefore, that a slight residual organic lesion existed. After a month's treatment by daily traction she stated that her back and limb no longer hurt. Her gait and posture had improved, but were by no means normal, in spite of daily training by a physiotherapist.

Psychological investigation revealed that she had been, socially, a very active and outgoing person, and had continued her nursing career until the middle months of her pregnancy. The onset of the pain in the leg and the sub-

sequent operation disorganized her life and made it impossible for her to enjoy sports and dancing as she had done. She was able to maintain much less contact with her friends. There was little doubt that the patient was almost aware of the hysterical exploitation of her illness. Although she averred that she wished "to do everything to get well," she declined psychological treatment and put her hopes in physiotherapy, which was indeed bringing about a very rapid amelioration of her symptoms, although it was aimed only at stretching her hysterically fixed spine. In the patient's own words, "Now that something is being done, I am sure I will get well."

This patient denied any ambivalence with regard to the birth or rearing of her child, although the causative conflict was probably centred about the change in the pattern of her life consequent upon maternity.

Comment.—This case illustrates the extreme neurotic (hysterical) elaboration of a minor physical symptom, and may be regarded as predominantly hysterical.

Case 5

A woman aged 41, married nineteen years and childless, had been seen on two occasions at a year's interval on account of severe pain all over the back for three years. She had been in and out of several hospitals. Examination revealed the incongruous responses typical of psychogenic pain, and no local lesion of the moving parts was detectable anywhere. Psychiatric examination was advised.

The symptom picture suggested either a depressively coloured anxiety state or masked depression, and included spinal and generalized vague aches and pain, fatigue, depression, and irritability. Anxiety was manifest, both generalized and specific with regard to marital and domestic matters.

Significant points in the case history were: the mother suffered a psychosis on the death of the patient's father when she (the patient), the youngest of the family, was 2 years old. In consequence she was reared by a kindly aunt, who died six years later. Thereafter the patient was very unhappy, always sensitive, diffident, and lacking robust health or outlook. At 23—that is, one year after marriage—tuberculosis of the spine was misdiagnosed and treated by rest in bed for eighteen months. The marriage had been frictionful on several counts. (1) The mother-in-law, neurotic and elderly, shared the home for the first seventeen years of the marriage. (2) The husband, now aged 50, had suffered with a peptic ulcer for thirty years, and was a tense irritable man. (3) The sexual relations were impaired by ejaculatio praecox and frigidity. Furthermore, while the patient desired children and had sought help for her infertility, her husband refused to co-operate. Two years before she came under our care she had suffered from a vague illness with pain in the spine and body, mild depression, and marked anxiety with sleeplessness. Since then she had remained nervy and had not completely recovered. In recent months her condition had deteriorated. Her present spinal symptoms reminded her of her past "tuberculous" illness.

A narco-exploratory session was decided upon in order to establish the psychiatric diagnosis, but before this could be done the patient, after discussing matters with her husband, learned that he would on no account submit to an examination regarding his fertility and that, while he would welcome a daughter, he had had a lifelong fear that a son would destroy his marital peace. The decision to adopt a daughter resolved both the situation and the patient's symptoms.

Comment.—This case well illustrates the purely psychiatric illness presenting with purely physical symptoms.

Case 6

A single woman aged 46 complained of a rhythmic tic of the left eyebrow involving the left side of her face and neck and at times spreading to the right eyebrow. In addition

she complained of pain in the back between the shoulder blades, to the right of the spine. These symptoms had their onset some three years earlier, when, meeting the unexpected advances of an old acquaintance, she jerked her head and body violently backwards to avoid being kissed. At this moment something "snapped" in her back, audible to both of them, and local pain was felt at once. On waking next morning her face was twitching. The gentleman in question had a tic of one side of his face.

A diagnosis of co-genetic hysterical facial tic and local spinal lesion was made, and, as the patient was convinced of the organic nature of her tic, which she adamantly regarded as a physical consequence of the pain in her back, psychotherapy was postponed and the spinal condition treated first.

Examination showed that the patient was twitching all over, but principally on the left side of her face. Her replies when the moving parts of the neck, scapulae, upper limbs, and thorax were tested were perfectly consistent, and pointed to a thoracic disk lesion at the fifth level. Manipulative reduction was carried out, and when she attended two days later all movements were of full range and painless. This somatic relief had not affected her tic.

Thus the first response to treatment was loss of all symptoms in the back, but some months later a throbbing backache, synchronous with the pulse, developed. This, however, did not interfere with physical activity such as gardening and golf, as had the original symptoms. Psychotherapy, initially by means of narco-analysis and later by means of hypnosis, brought about subjective improvement only.

The patient, whose mother and sister were psychotic, had herself experienced a psychotic episode (for which she was treated by electroplexy in a mental hospital) one year or so after the traumatic incident. In spite of this history, but cautiously in view of it, hypnosis was undertaken in an attempt to suppress the facial tic. After some difficulty she was put into full trance and the facial tic was reduced and then abolished by direct suggestion. (Narcoanalysis had already afforded an adequate review of her problem, with apparently sufficient abreaction.) The improvement was transient, being followed by worsening and change in character of the spinal symptoms, which now included sensations of vibration, together with a return and spread of the facial tic. Psychotherapy was terminated.

Comment.—It would appear in this case that, not only did physical and psychoneurotic symptoms follow the same trauma, but when the later developing psychosis was relieved by electroplexy the neurotic symptoms served as channels of expression of residual psychic tension. Interference proved not devoid of danger, for, although physical treatment could relieve the local physical lesion, this was reactivated psychogenically.

Conclusions and Summary

Patients suffering from psychiatric illness may also suffer from local lesions in the moving parts of the body. Owing to the prominence of the psychogenic symptoms, the existence of the organic lesion may be overlooked or ignored. We have considered the problem of pain in the back as illustrative of this general thesis.

A system of examination is described which permits satisfactory differentiation of local lesions from psychogenic dysfunction.

The relationship between the physical lesion and the psychiatric state may be adventitious; but it may, as in one case cited, be caused by the physical aspect of the situation, which also provided the psychic trauma (Case 6).

The symptoms due to organic lesions can be differentiated from the rest of the symptom picture and treatment of the local lesion is often successful.

Patients suffering from psychiatric illness alone may present with symptoms relating to the moving parts of the body. They may respond to treatment directed to the psychiatric disability.

REFERENCES

- Cyriax, J. (1950). *St. Thomas's Rep.*, 6, 171.
Gould, J. (1953). *J. ment. Sci.*, 99, 273.

PYRIMETHAMINE (DARAPRIM) AS A PROPHYLACTIC AGENT AGAINST A WEST AFRICAN STRAIN OF *P. FALCIPARUM*

BY

Sir GORDON COVELL, M.D., D.P.H., D.T.M.&H.

P. G. SHUTE

AND

M. MARYON

(From the Malaria Laboratory, Horton Hospital, Epsom)

Goodwin (1952) recorded his personal experience of pyrimethamine in the prophylaxis of malaria during a visit to equatorial Africa extending over a period of one year. Towards the close of the tour, while taking 5 mg. of the drug daily, he allowed himself to be bitten by four *Anopheles gambiae* which had fed on patients with gametocytes of *Plasmodium falciparum* in the peripheral blood, and in which sporozoites were subsequently demonstrated in the salivary glands. He concluded that in his case a daily dose of 5 mg. of pyrimethamine had proved a satisfactory suppressant of this strain of the parasite. So far as we are aware, there is no other published record relating to the prophylaxis of falciparum malaria by this drug in non-immune subjects.

Present Investigation

The object of the investigations here recorded was to ascertain whether a weekly dose of 25 mg. of pyrimethamine is sufficient to prevent an attack of falciparum malaria in a non-immune subject. The strain of parasite used was obtained in January, 1953, from an African child resident in Ilaro, a township about 50 miles distant from Lagos, Nigeria. Blood from this child was inoculated intramuscularly into a patient suffering from neurosyphilis. Subinoculations were later made into two other neurosyphilitic patients. All three developed overt malarial attacks, but in only one case were gametocytes produced in sufficient numbers in the peripheral blood for satisfactory infection of a batch of mosquitoes.

The mosquitoes used for transmission were *A. stephensi* (Type), a colony of which was established at Horton during the winter of 1947-8 from specimens imported by air from the Malaria Institute of India, Delhi. A batch of about 700 insects was allowed to feed on the gametocyte carrier.

The subjects of the prophylactic trial were 14 patients in Horton Hospital, two of whom had previously undergone malaria therapy for neurosyphilis with *P. vivax*. None of the others had any history of malarial infection.

They were arranged in seven pairs, each pair receiving the weekly dose of 25 mg. of pyrimethamine on a different day of the week (see Table). The first pair (A and H) took