the second occasion; and (2) the fact that intracutaneous sensitivity tests made it reasonably certain that the impurities in the penicillin preparations were implicated more than the penicillin in causing the symptoms.

Case History

On the night of July 24, 1945, a female patient aged 34, three weeks post partum, developed a sudden rigor. There was a painful induration and redness of the right lower quadrant of the right breast. During the next 24 hours her temperature varied between 102° and 103° F. (38.9° and 39.4° C.). From July 25 to 27 16,000 units of sodium penicillin were administered intramuscularly every three hours, together with sulphathiazole (2 g. stat., followed by 1 g. four-hourly for three days). Her temperature returned to normal within 48 hours and the local breast lesion cleared up completely within 72 hours.

Two weeks later urticarial weals appeared on the scalp. During the next five or six days there developed a massive urticaria and angioneurotic oedema of the face, trunk, and limbs, with severe pruritus. There was no rise in temperature. The patient complained of a feeling of tightness in the chest; she was very pale; the pulse was thin, with a rate of 80 to 90 a minute, her normal rate being about 60. Sitting up caused severe vertigo. Adrenaline and ephedrine were administered, but did not relieve the urticaria or the pruritus, and about 12 hours later paroxysms of tachycardia developed, with a pulse rate of 120 and upwards. Without further specific treatment the condition cleared up completely within five to six days. On account of the long interval between penicillin therapy and the onset of the allergic symptoms, penicillin was not suspected as a possible causative agent.

On Feb. 22, 1946, the patient complained of a red painful swelling in her right thumb. Within the next 12 hours the swelling increased rapidly and her temperature rose to 101.5° F. (38.6° C.). A course of 16,000 units of sodium penicillin intramuscularly at three-hourly intervals, together with sulphathiazole (2 g. stat., followed by 1 g. four-hourly), was started the next day. The first injection of penicillin into the gluteus maximus was extremely painful and the patient felt collapsed. The pulse volume was fairly good, with a frequency of 62 a minute. Recovery followed within half an hour. The penicillin injections were continued for five days without further untoward effects. The local and general condition improved rapidly, apart from a feeling of tightness in the chest on the fourth day of treatment, and after seven days the patient was quite well.

On March 5, 1946, 12 days after the start of penicillin treatment, oedema of the eyelids was noticed, and the patient complained of a general feeling of weakness. In the evening she was in a state nearing collapse, with slight rigors. The temperature was 99.6° F. (37.6° C.) and the pulse was thin and rapid. Patches of urticaria appeared on the arms and back. The next day there was a generalized giant urticaria with angioneurotic oedema. The patient was somnolent and very difficult to rouse, took no food or drink, and passed no urine during the next 24 hours. The pulse rate was 80-90.

The drowsiness persisted on the following day, and the patient had pains in the wrists and feet, which were swollen. The next day she complained of soreness and tightness of the throat, and on inspection an oedema of the fauces, and of the uvula in particular, was noticed. This passed off within 12 hours. On the fourth day the general condition had begun to improve. The oedema of the face was less, but oedema of hands and feet was still pronounced. The patient now began to take food, and there was rapid improvement during the next few days. On the ninth day she was normal except for a general feeling of weakness, which persisted about two weeks.

Eight weeks after the allergic symptoms had subsided skin-sensitivity tests were carried out to determine whether penicillin or sulphathiazole had caused the severe reaction. Patch tests and intradermal injections were the methods employed. All patch tests with solutions of penicillin (20,000 units per ml.), "soluthiazole," and physiological saline were negative.

In the intracutaneous tests the following solutions were used: (1) a commercial preparation of impure penicillin (yellow); (2) a commercial preparation of pure crystalline (white) penicillin—both in a concentration of 16,000 units per ml.; and (3)

the disodium cinnamylidene dibisulphite derivative of sulphathiazole. The latter, known under the trade name of "soluthiazole," is in the form of a 45% solution, and was diluted one in five with sterile distilled water in order to obtain an isotonic solution. Quantities of 0.02 ml. of these solutions and of physiological saline as a control were injected intradermally into the upper arms, and the following reactions at the site of the injections were observed: penicillin (yellow), ++; penicillin (white), (+); soluthiazole, 0; 0.85% sodium chloride, 0.

The marked reaction to yellow impure penicillin strongly suggests that the impurities played the main part in producing the severe allergic condition, though the very weak reaction to pure crystalline penicillin also seems to implicate the penicillin as a rather mild allergen. The tests excluded sulphathiazole as a possible allergen.

Discussion

Although there are statements in the literature that renewed penicillin therapy does not necessarily produce a repetition of allergic symptoms, this case shows that the severity of the reactions may be increased considerably, and there is a possibility that each subsequent attack may tend to increase the degree of sensitivity still further. It is well to remember that there may be a considerable lag period between the administration of penicillin and the beginning of allergic manifestations. Occurrences as the one described should tend to discourage the use of penicillin in trivial infections which would clear up with the traditional conservative methods.

Willcox (1946) described the use of "benadryl" in cases with mild allergic symptoms, particularly those of urticaria after penicillin therapy. This was not freely available at the time. It remains to be seen whether severer symptoms such as the ones described in this case can be controlled effectively by antihistamine preparations.

We are indebted to Messrs. May and Baker Ltd. for a sample of "soluthiazole" and information regarding isotonic solution of the preparation; and to the Glaxo Laboratories Ltd. for a sample of white crystalline penicillin.

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CHRONIC BATTLE NEUROSIS TREATED WITH LEUCOTOMY

BY

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From the time of Dunkirk onwards various ways of using physical methods in the treatment of acute and chronic battle neuroses have been a subject of research in this unit. Sleep treatment and barbiturate abreaction (Sargant and Slater, 1940), "front-line" sedation (Sargant, 1941, 1942), and modified insulin treatment (Sargant and Craske, 1941) have now found a generally recognized place in different stages of the rehabilitation of those breaking down under battle stress. The value of these treatments emphasizes the physiological aspects of many neurotic conditions, but so far there has been no report of the use of leucotomy in this particular group. It is the purpose of this paper to report a case in which great improvement resulted after this brain operation, one of the effects of which appears to be to reduce self-perpetuating tension within the nervous system.

The possible application of leucotomy to the rehabilitation of the chronic battle casualty has been held up by a natural reluctance to employ it except in the final stages of psychiatric treatment. Since 1941, however, the possibilities of leucotomy in helping various types of chronic civilian neuroses have been carefully studied. Over thirty patients have now had the operation done, either at this hospital or at the Atkinson Morley Neurosurgical Unit by Mr. W. McKissock, or at the West End Hospital for Nervous Diseases by Mr. G. Knight. Certain criteria which may help to distinguish the suitable from the unsuitable patient have gradually emerged and have finally enabled this case of chronic battle neurosis to be operated upon with a reasonable probability of success.

Case Report

The patient, a man aged 36, was admitted to the Sutton Emergency Hospital on Aug. 31, 1946. There was no history of serious neurotic or psychotic illness in the family. He was one of eight children, all considered stable, but the patient had been a more sensitive child than the rest. He had done reasonably well at school, was keen in sports, had completed a full seven-years apprenticeship as a printer, and was in regular work at this trade and in a munitions factory until he volunteered for the Army from a reserved occupation in 1942. His wife described him as happy, good-tempered, hard-working, and certainly not nervous, though still sensitive to criticism by others. He was perhaps over-particular about his personal appearance and habits, but conscientious about his work and interested in his home. Until the illness it had been a happy and successful marriage.

After preliminary training in amphibious warfare he had landed on the beach-head with the first batch of tanks on D Day. From then onwards he was in the heavy tank fighting in France, Belgium, Holland, and Germany. Many of his friends were gradually either killed or burnt to death in their tanks and the patient increasingly expected each day's fighting to be his last. "I had made up my mind that probably I was going to be killed and could not get out of it." During the investigation of possible traumatic incidents that might have caused his symptoms so many of them were found in his fighting experiences that they proved impossible to evaluate or disentangle. He managed to escape twice after his tank had received direct hits, and for some months he met battle stresses with a mounting tension and aggression but no breakdown, though he first started to feel pains in his legs at this time. Near Cologne he had received the second direct hit on his tank, which was blown open. Somehow he escaped in a dazed state and crawled to safety, with a small wound and fractured bone in his foot. He was sent back to England for treatment. When seen by his wife in hospital in November, 1944, he had obviously changed as a result of his battle experiences. He gradually became worse nervously in hospital, and was unable to face a return to duty some four months later when his foot was better, and was finally admitted to a military neurosis centre. He was discharged from the Army after some months' further treatment and was given a few shillings pension a week.

On return to civilian life he tried to resume work with his old firm as a printing-machine operator in August, 1945. He did so, but with increasingly frequent periods off work through pains in the legs, lethargy, headaches, irritability, and poor sleep. He became very sensitive to all criticism and irritable with his wife. His finances became desperate, and articles from the home had to be sold, which further increased his anxiety. When admitted to Sutton Emergency Hospital he was irritable, and begged for relief of his symptoms. He had severe headaches, fatigue, depression, and nagging pains in his legs. He was afraid of himself, was continually worrying about his war experiences, and felt that people criticized him because of his behaviour. On examination he was mildly depressed, was unable to settle at reading or any other occupation, was preoccupied with severe pain in his legs for which no organic cause could be found, was disgruntled at the treatment he had received with regard to his pension, and was worried that he would never get better. He

often expressed the opinion that it would have been luckier for him to have died in battle with his friends than to live on as he was. Schizophrenic symptoms were not present, but he was mildly paranoid, hypochondriacal, and tense under a superficial display of shallow affect. Home life, previously very happy, had been near breaking-point—despite an understanding, normal, and very helpful wife—because of his irritability, sudden tendency to flare up, and perpetual preoccupation with his neurotic symptoms. He was the same in hospital—continually demanding relief of his many pains, varying in attitude between superficial appreciation and sullen criticism of all efforts to help him. He sat in the ward most of the day watching the activities of others, but unable to occupy himself at anything. Apart from compulsive rumination there were no motor acts present of an obsessional kind. His intelligence was average and his memory good.

During nine months of very intensive treatment in hospital prior to leucotomy the patient had had many hours of psychotherapy, but always seemed unable to gain insight into his symptoms. In a dozen sessions of therapeutic exploration of battle experiences, using intravenous barbiturates or ether, many traumatic incidents were gone over, accompanied by a release of great emotion, but with little effect except to relieve some of his headache. Large doses of barbiturate were necessary to help his symptoms of tension, and he gained the greatest relief when insulin sopor was given twice a day, producing a more calm, relaxed, and friendly state but no permanent change. When tension could be relieved, however, he lost the apparent shallowness of his affect, was genuinely appreciative of help, and the pains in his legs were less evident. Because the presenting symptoms might be masking an atypical depression electric convulsion treatment was also tried alone, and then combined with insulin sopor; but it worsened rather than improved his condition and had to be stopped. A final attempt was made to abreact repressed traumatic material as he came out of insulin comas specially given for the purpose, but again with no lasting success. On several occasions he was sent home for periods of leave to see if he was any better in his home environment as a further check on treatment. Before operation, and despite all the treatment given, his condition was practically unchanged except for some relief of his headaches in the frontal region. He was still repeatedly demanding relief for his various pains, and felt an increased hopelessness of ever getting better.

Before operation he was submitted to Dr. L. Minski for an independent psychiatric opinion. The comment was as follows: "My impression of this man is that he is a hysteric—he is histrionic, talks glibly of his pains, etc., and is apathetic. He is not really depressed, but is self-centred and shallow. On talking of his pension he becomes irritable and fidgety, and my impression is that he is largely a compensation neurosis. Quite frankly, I agree that psychological and ordinary physical methods of treatment are not likely to help him, but I don't know what effect leucotomy will have on him. I can find no antisocial traits in his pre-neurotic personality."

With the wife's and the patient's consent, both having been warned of the risks entailed, leucotomy was performed on June 9, 1947, by Mr. W. McKissock. There was little post-operative confusion and the patient was up and about in six days. He was, however, lethargic and careless about the ward immediately after the operation, but this rapidly improved. He reported an immediate lessening of his symptoms, and within six weeks was asking to return to work. His whole attitude had changed to one of pleasant co-operation, friendliness, and sociability with other patients and the doctors. The pains in his legs were now rarely present and did not bother him. Tension was absent. He was sent home to spend three weeks with his wife before starting work. The patient and his wife were both subjected to an intensive questioning at the end of the three-weeks trial period. The wife insisted that he was now to all intents and purposes like he had been before his illness. He had again become kind, considerate, cheerful, good-tempered, and less sensitive. No mention had been made of the pains in his legs; his tension and self-pity had gone. He was still lacking in energy, but anxious to be back at work, and rather inclined to switch his interest of the moment too quickly while waiting.

The patient's examination bore out these favourable reports, as did his whole attitude and manner. He said he felt well again, looked it, and was anxious for permission to start work immediately. He now felt quite confident about returning to his job as a printer, which had been kept open for him. There was no euphoria or elation in his attitude but a reasonable appreciation of his past illness, what had been done for him, and what he should try to do in future to keep well. At the time of writing he is back at his old job, and both his work and home life are reported as satisfactory, with an increasing restoration of his old energy. In the face of repeated questioning his wife maintains that except for his energy "he is now as I first knew him."

Intelligence has shown slight drops of 116 to 110 in Wechsler and 48 to 45 in matrix testing. Some of this small drop may be due to reduced capacity for sustained attention and transient amnesic effects of the operation, the scores in the Wechsler being reduced only in information and vocabulary subtesting. Dr. M. Desai was also asked to do Rorschach tests before and after operation, with no reference to the clinical notes or history of the patient. He made the following summary of the changes observed in tests two days before and seven weeks after the operation. "The pre-leucotomy record indicated a rigid, uncompromising attitude, with hardly any regard for practical issues. In his second record there is a very marked swing towards normality, with willingness to compromise. The suspiciousness and projected hostility, the feelings of depression, insecurity, and unsureness which prevailed in his first record have disappeared. There is a reduction in the patient's tendency to get disorganized in the face of emotional stimuli. The uncontrolled emotionality which characterized his first record is very considerably reduced, and he shows in the second record an inclination towards more adapted emotional reactions. These changes seem to be due, however, not so much to an increase in control as to a reduction in sensitivity to external stimulations. Another aspect of the tendency is the patient's greater reliance, as shown by the tests, on his own inner resources than was the case before the operation. The general trend seems, therefore, to be towards a much more normal adaptation and a greater willingness to co-operate with his environment than that found in his first record."

Discussion

The improvement of this patient has been among the most gratifying in the several thousand cases of war neurosis treated at Sutton in the past seven years. Relapse at a later date cannot be excluded, but, for various reasons connected with our follow-up of other patients, it is not considered probable. Those who have been ready to predict a gross deterioration in general personality, intelligence, or social behaviour whenever leucotomy is attempted may wish to reserve judgment on the opinion of the patient's wife and the doctors treating him that such gross changes were absent. But this has also not been an uncommon finding in our civilian neuroses selected for operation. The after-effects of brain operations and of cerebral trauma in general depend a lot on the previous personality of the patient. The better it is, and the better preserved it remains up to the time of operation, the fewer have been the undesirable after-effects with leucotomy. Another possible reason for the absence of marked deterioration in many of our patients may have been the attempt to modify, so far as is possible, the severity of the operation to suit the particular patient's symptoms. For the more extensive the brain damage inflicted the more such sequelae could be expected.

In a small group of chronic schizophrenics, treated along with the much larger number of neuroses and depressions, an added deterioration has, however, often followed the operation. Schizophrenic dilapidation and disordered brain function may become more clarified and obvious. Such a dilapidation is rarely seen in the better-preserved basic personalities. Decision to operate in a particular case has become somewhat easier recently by the finding that the more loath one has been in the past to carry out the

operation because of a continued preservation of general personality the better the quality of the eventual result. With its use in this type of patient it is of course necessary to have confidence, based on a long active experience in treatment, that as good a recovery by the other means now available is not to be expected.

This, however, helps to explain why some of our patients after leucotomy have been able to return to work as estate agents, clerks, housewives, calculating-machine operators, chefs, office managers, and the like after long illness and incapacity. But only one schizophrenic patient out of nine has done as well as these cases.

Certain temporary and permanent changes may be seen in all types of patient, such as lack of a former spontaneity and drive, some distractibility, a heightened irritability, a lessened capacity to worry deeply about the misfortunes of others, and the easier acceptance of imposed standards of social behaviour and morals. But not even these are consistent findings. Hebb (1945) has reported a case in which both frontal lobes were removed for traumatic scarring causing epilepsy. No deterioration due to the removal could be detected in careful mental testing some years after the operation. Such changes have not always been easy to demonstrate clinically at an even earlier stage in some of our best results. And those present are often of academic and research interest rather than practical objections to the treatment, if cases are skilfully chosen for the operation from chronically suffering and severely incapacitated patients and operative interference is not too extensive.

It has already been pointed out that the present case of chronic battle neurosis was chosen as a result of previous observations and research on civilian neuroses. The reasons were as follows. The patient was considered incurable by other known methods after nine months of intensive study and active treatment in hospital and an illness of two and a half years' duration. The family history was good, and the patient's personality before illness showed none of the traits that suggest a more doubtful result with leucotomy, such as lack of basic drive, the presence of constitutional aggressiveness, marked general psychopathic qualities, severe manic-depressive mood swings, or tendencies to hysterical or schizoid withdrawal in the face of ordinary stresses. Favourable factors were a good previous social adjustment and drive, some over-meticulousness and sensitivity, a long period of proved stress well borne before final breakdown, and the presence during the whole illness of severe tension and rumination. This tension, seemingly aroused in the first place by battle experience, appeared to have finally become self-perpetuating in the nervous system, localized in intolerable hypochondriacal preoccupations, and superficially masked by hysterical, demanding, and paranoid attitudes without real insight. An important observation was that drugs which temporarily reduced tension, such as insulin and the barbiturates, helped the patient to become better integrated and to gain temporary insight and relief of symptoms. His condition was worsened by treatments that increased tension, such as convulsion therapy and wrongly directed forms of psychotherapy. Another important point was that both his home and his old job were still waiting for the patient if he recovered: the results of any treatment are often nullified by its delay till it is too late to remedy the social consequences of prolonged mental illness. There also seemed to be no real motivation to a continuance of illness if disabling symptoms could be abolished and working capacity and self-esteem restored. Such cases may be the exception rather than the rule in the average run of chronic war neuroses, but they are certainly to be found in all sections of the community and often struggling along outside ordinary psychiatric hospitals.

One further reason for reporting the case should be mentioned. The patient's wife became very alarmed, as have other relatives recently, when the operation was first suggested. This was in part because of her general practitioner's fears about leucotomy, which could have been derived from the correspondence column of the *British Medical Journal*. It is hoped, as a result of this report, that others who might benefit from this operation in the future will not lose their chance of being helped solely because of misinformed opinion or theoretical prejudice. A reasonable caution is bound to follow a careful study of actual results.

Further Note.—During proof correction the patient was again seen by one of us (C.M.S.) on November 4, 1947. He is working regularly with his old firm and his work on a printing machine is reported as satisfactory. He is still tired in the evenings and goes to bed earlier than usual. Frequency of micturition, present before the operation, is now increased. The wife reports a few minor bouts of irritability have occurred, which quickly pass; otherwise he remains thoughtful and considerate. He is again taking her to dances and resuming his old social contacts. He is normal sexually, his appetite is good, and he has gained weight.

Our thanks are due to Dr. L. Minski for providing the patients and the facilities for research at Sutton, and to colleagues at Sutton who have allowed us to examine leucotomy patients under their care.

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Medical Memoranda

An Unusual Knee Injury

The unusual nature of the following case makes it worthy of record.

CASE REPORT

A young airman was admitted to hospital complaining that he could not straighten his right knee. He said that he and a friend had been cycling along a main road, when their cycles had become locked so that they had both been thrown to the ground. On inspection there were sundry abrasions and an obvious lateral dislocation of the patella. Routine radiographs (Figs. 1 and 2) showed, much to my surprise, that there was also present a long metallic foreign body with a chisel-like edge. In view of the fact that there was no evidence of splitting of the bone it was considered that the foreign body was most probably lying in the suprapatellar pouch, and that one of the abrasions must be a partially closed wound of entry.

FIG. 1.—Radiograph showing lateral view of foreign body.

At operation unexpected difficulty was experienced in reducing the patellar dislocation. The suprapatellar pouch was empty, and on extending the incision downward the foreign body was found. Only about 1/4 in. (0.64 cm.) was projecting from the inferior surface of the medial femoral condyle. It was firmly wedged and great force was required to pull it out, when it was revealed as being 1 3/4 in. (4.7 cm.) of the distal end of a 1/8-in. (0.3-cm.) screwdriver.

The patient made a good recovery. Radiographs taken five weeks after the operation showed no irregularity of the articular cartilage. He was given faradism and after six weeks was discharged to an R.A.F. hospital, with no free fluid, and with full extension and active flexion to 80 degrees. A fortnight later he returned to his unit on light duties.

COMMENT

To explain the presence of the screwdriver I had to suppose that the piece had been lying in the road and had been knocked up into a vertical position by the falling cycle and had been in this position when the patient's knee fell on it. This rather

FIG. 2.—The foreign body from another aspect.

far-fetched theory held the field till the friend, who had been told of the findings, arrived with the rest of the screwdriver, which he had found in the tool-bag of his cycle in the condition shown in Fig. 3. Presumably the point of the screwdriver had

FIG. 3.—The broken screwdriver.

come out through the tool-bag flap in the fall, entered the femur, and got broken off, the rest of the screwdriver having fallen back into the tool-bag. The screwdriver was of poor quality, and the break was a fatigue fracture at the point of torsion.

The mechanism of the accident has been explained, but the absence of even a small split in the femur from an instrument which had penetrated a distance of 1 1/4 in. (3.8 cm.) and was so well adapted for shearing off the entire condyle is rather surprising. Perhaps the fact that the screwdriver entered slightly across the grain, coupled with the sudden breaking of its shaft, is the explanation.

I am indebted to Mr. Lloyd, radiographer to the hospital, for the x-ray prints; to Mr. Beven, of Messrs. Baker Perkins, Ltd., for the opinion on the screwdriver fracture, and to Mr. Guscott, of the same firm, for the photograph.

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Two Mongol Children in a Family

The rarity of the occurrence of two mongol children in the same family is sufficient warrant for putting any case on record. Brousseau in his monograph on mongolism quotes Goddard as stating that in an experience of 322 cases he had never met with more than one affected child in a family, nor had Schlapp, working among the mental defectives in New York. My own experience in more than 200 cases has been similar.

In the present instance both parents were strong and robust dalesfolk, and at the birth of the first child—a boy now 9 years of age—the father was 32, the mother 21. The second child, a girl, was born fourteen months later. There have been no subsequent pregnancies. Both babies were breast-fed, and both