PARATHYROID DEFICIENCY PRESENTING AS EPILEPSY

BY

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Parathyroid deficiency may occasionally present as epilepsy. When this occurs there is almost always evidence also of tetany, latent or overt, though this may be trivial compared with the fits. Moreover, the pattern of the fits may be unusual and suggest the possibility of a reduced serum calcium concentration. Thus the attack may begin or end with carpo-pedal spasm. Occasionally generalized convulsive movements may occur without loss of consciousness and be terrifying to the patient. Sometimes the movements are of a peculiar athetotic variety and resemble the mobile spasm seen in some cases of Kinnier Wilson's disease. This may be linked with the fact that in long-standing cases calcification in the basal ganglia may be demonstrated radiologically—a point of some diagnostic value.

The range and variety of convulsive attacks which may occur has been reviewed by Robinson, Carmichael, and Cumings (1954) in discussing three cases of idiopathic hypoparathyroidism. Such attacks include many varieties of motor epilepsy and some which appear clinically to be petit mal. These authors conclude that the cerebral cortex may participate directly in the increased excitability caused by low serum calcium and readily demonstrated in peripheral nerve.

Diagnostic difficulties may arise, since some patients show an association of papilloedema, fits, and tetany; but Grant (1953) pointed out that the fits and papilloedema may be abolished by the administration of "para-thor-mone," and might thus be the result of electrolyte imbalance and consequent cerebral hydration.

The following case is considered worth recording because in the presence of a focal brain lesion fits occurred only when serum calcium was lowered. The case also illustrates clearly the part played both by the cerebral lesion and by the electrolyte imbalance in determining the pattern of the epileptic attacks.

Case Report

A woman aged 52 had had a partial thyroidectomy for thyrotoxicosis in 1953. Symptoms subsided, but a year later dysphagia developed and progressed. In 1955 a post-cricoid biopsy was performed, and showed grade 3 thyroid carcinoma. On December 22, 1955, Mr. R. G. Macbeth performed a radical thyroidectomy and first-stage pharyngectomy. Extensive local spread was revealed at operation, and deep x-ray therapy was started.

On January 13, 1956, she had what was thought to be a fit, though the onset was not observed, and when first seen she was breathing stertorously, was cyanosed, and was frothing at the mouth. There was no personal or family history of fits, faints, or migraine. She was started on phenobarbitone, 1 gr. (65 mg.) three times a day. On January 14 she had another seizure, in which clonic movements, mainly of the left side, were observed. On the following morning she was found to be weak in the left arm, with some increase in tendon reflexes and an up-going toe on the left side. On January 17 full neurological

examination revealed a slight left spastic hemiparesis, with some reduction of passive movement sense and an extensor plantar response on the same side. There was no papilloedema.

At noon on January 18 she had another fit, which was observed at its onset. It began with carpo-pedal spasm in both hands. The spasm spread over the whole of the left side and consciousness was lost. Clonic movements then occurred, but only on the left side, although there were stertorous breathing, cyanosis, and frothing at the mouth. The movements lasted for about 10 minutes, and consciousness was regained in about 30 minutes. Because of the carpo-pedal spasm at the onset of the attack, and because some myotatic irritability was present, the serum calcium was estimated and found to be 6.2 mg. per 100 ml. Intravenous calcium gluconate was given, and calcium lactate, 10 gr. (0.65 g.) three times a day was combined with parathormone, 25 units four times a day. Forty-eight hours later the serum calcium was 7.3 mg. per 100 ml. and 24 hours after this (January 21) it was 9.4 mg. per 100 ml. On January 24 her treatment was changed from parathormone to dihydrotachysterol, 3 ml. daily by mouth. The phenobarbitone was continued. There were no fits during these six days.

On January 25 she had another left-sided fit, and on January 27 an attack which was witnessed in full. On this occasion the onset was with carpo-pedal spasm, and there was slight risus sardonius before the spasm, and clonic movements spread to the whole of the left side. The serum calcium, estimated at the end of the attack, was 7.1 mg. per 100 ml. Dihydrotachysterol was increased to 4 ml. daily and extra milk was given in addition to calcium lactate. On January 29 serum calcium was 9.6 mg. per 100 ml. The left hemiparesis was now worse, and by February 4 a virtually complete left spastic hemiplegia, with gross sensory loss, was present. Cerebrospinal fluid was not examined, but skull x-ray films were normal. The electroencephalogram showed a localized slow-wave abnormality in the right parietal region.

It was thought that she probably had a metastasis in the right Rolandic area, but radioactive iodine showed no uptake in this region. On February 3 and 4 there was vomiting and regurgitation through the gastric tube, so that little, if any, of her dihydrotachysterol was retained. On February 6 she had two further focal motor fits in the left arm and leg. The serum calcium at this time was 6.1 mg. per 100 ml. As vomiting had subsided and she was now retaining her medicine, no change in treatment was made. Thereafter she had no further fits, but the hemiplegia and diminishing responsiveness called for a right parietal burr-hole biopsy, which established the presence of a tumour. During the next 10 days she deteriorated steadily, and she died in coma on February 16. Full necropsy was not obtained, but extensive infiltration of growth was seen at the site of operation in the neck, and the regional glands were involved. Histological examination of portions of the brain tumour was carried out, but its appearance was regarded as more that of a primary glioma than of a thyroid secondary, though clinically the latter was more likely.

Comment

This case showed clearly that a low serum calcium was an important factor in precipitating fits. When the serum calcium was maintained at normal or near-normal levels the fits did not occur; when it fell they reappeared. Moreover, the pattern of onset of the attacks, with carpo-pedal spasm, was also determined by the serum calcium level. The local lesion in the right hemisphere, however, appeared to dictate the further course of the fits, in which clonic movements were confined to the left side.

It provides an unusually clear demonstration of two precipitating factors, general and local, combining to produce symptomatic epilepsy. Electrolyte imbalance and local brain lesion can each of themselves produce an epileptic attack. Here a combination of the two seems to have been the necessary stimulus. Even when the cerebral tumour

was present and was probably actively expanding, fits occurred only when the serum calcium fell. It is of further interest that each of the two causal factors contributed recognizable features to the pattern of the attacks.

Summary

A case is described with a focal brain lesion and parathyroid deficiency in which fits of the focal pattern expected from the brain lesion occurred only when the serum calcium was lowered.

Our thanks are due to Mr. R. G. Macbeth and Dr. Frank Ellis for the opportunity of studying this case.

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FAILURE OF PENICILLIN TO PREVENT POST-OPERATIVE CHEST INFECTION

BY

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Penicillin and other antibiotics have been widely used in recent years in an attempt to reduce the incidence of post-operative chest infection. There has, however, been considerable doubt about the efficiency of penicillin in reducing the incidence of these complications when given prophylactically, and many authors have pointed out that they still occur, despite advances in surgery and anaesthesia and the use of antibiotics.

Hasslinger (1956) reports a striking series of 443 patients who underwent partial gastrectomy. Of these, 153 were given prophylactic penicillin. The number of patients with post-operative febrile bronchitis was 23 in the penicillin group and only one in the group who were not given any prophylactic antibiotics. Again, McKittrick and Wheelock (1954) reported on a series of 60 patients submitted to gastrectomy; 36 were given prophylactic antibiotic coverage without any advantage being gained by its use.

This paper describes a clinical investigation undertaken in an attempt to assess the value of penicillin given prophylactically for the prevention of post-operative chest infections.

Methods

For 18 months patients undergoing operations in alternate months were given an injection containing procaine penicillin G, 300,000 units, crystalline penicillin G, 100,000 units, and dibenzylethylenediamine dipenicillin G, 200,000 units, at the same time as the pre-operative injection. Patients operated on in the intervening months received no prophylactic penicillin.

Emergencies were excluded from the series. Most of these emergencies required antibiotics for conditions other than chest infections. All cases requiring gut resection, or considered to need antibiotics by mouth for any reason other than chest complications, were also excluded, as were patients who were given antibiotics post-operatively for threatened or established peritonitis. All other patients were included in the investigation, a careful note being made of their history of bronchitis and their smoking habits.

Physiotherapy was standardized for both groups, being given as a routine before and after operation. Any chest infection which did develop was treated on its merits, antibiotics being prescribed when indicated.

The investigation was essentially a clinical one relying primarily on clinical and not x-ray assessment of the chest condition of the patients. All patients were examined

before operation and daily afterwards for three days. When a severe infection normally warranted a radiograph of the chest it was done, and all cases diagnosed clinically after operation as atelectasis or consolidation were verified by chest films. It was not thought necessary to rely on films to assess the pre-operative chest category in the absence of physical signs.

Estimation of what constitutes a post-operative chest infection is not easy. Following the procedure used by Ellis and Shooter (1952), patients were placed before and after operation into one of the following five categories: group 1, normal; group 2, with cough, but without sputum or physical signs; group 3, with cough and sputum, but without physical signs; group 4, with cough, sputum, and physical signs of infection; or group 5, with a definite pulmonary lesion such as consolidation or collapse.

Patients were regarded as having a post-operative chest infection if, after operation, there were respiratory signs and symptoms that were not present before operation. A change of one step between pre-operative and final post-operative chest grouping was considered to indicate a mild post-operative chest infection, whereas a patient whose post-operative chest category was two or more grades worse was assessed as having a severe post-operative infection.

Results

The particulars of patients included in this investigation are given in Table I, which shows that in respect to the items recorded the two groups were comparable.

TABLE I.—Particulars of Patients in the Investigation

	No. of Patients	No. with History of "Bronchitis"	No. of Smokers	No. of Females	Average Age
Penicillin series	219	21	90	104	42
No penicillin "	221	28	92	106	38

Briefly, the main operative procedures undergone by the patients in the two groups were: (1) hernia operations of all kinds; (2) gall-bladder and common-duct procedures; (3) interval appendicectomies; (4) laparotomies, excluding gut resections; (5) operations on the sympathetic nervous system; (6) thyroidectomies and other general surgical procedures on the head and neck; (7) general surgical procedures on the limbs, such as ligation of varicose veins; (8) minor operations on breast and chest wall; and (9) minor ano-rectal and bladder procedures.

The complete results are given in Table II, which shows the correlation between the pre-operative and post-operative grading. The numbers between the heavy lines are those of patients with a mild (one-stage) post-operative infection, the numbers printed in italics are those with a severe (two stages or more) post-operative infection. It will be seen that an appreciable number of patients in each group had a lower grading after the operation. The results shown in Table II are summarized in Table III. A study of this table shows that the penicillin group did in fact do very slightly better than the control group, but that the difference was exceedingly small, and a statistical test shows that it could have easily occurred by chance.

On further analysis these results were shown to hold good if the comparison was applied separately to smokers and

TABLE II

Pre-operative Grading	Penicillin Group						No-penicillin Group					
	Post-operative Grading						Post-operative Grading					
	1	2	3	4	5	Total	1	2	3	4	5	Total
1	133	12	14	5	5	169	142	18	17	9	2	188
2	8	6	1	3	—	18	5	6	2	2	—	15
3	3	1	7	—	—	11	2	1	8	3	—	14
4	2	—	2	15	2	21	0	—	1	3	—	4
5	—	—	—	—	—	—	—	—	—	—	—	—
Total	146	19	24	23	7	219	149	25	28	17	2	221