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Some Therapeutic Methods Used to Control Epileptic Behavior

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INTRODUCTION

Epilepsy has been known by many names and has appeared in many forms from the dawn of history until the present day. Coincident with the disease has been the attempt to alleviate the suffering connected with it and to discover the basic causes of it. It was thought, until comparatively recent times, to be a direct manifestation of the presence of evil spirits within the body. This, and the great control exercised by religious groups in the past, retarded any medical or even pseudo-medical interpretation of it except by a very few learned ancients. The usual treatments by the religio-medicos consisted of exorcism, or mystical solemnities designed to dispel these spirits from the human body. The methods used were all too often those of torture, either induced by others, or self-inflicted upon various portions of the anatomy. The exorcism by various and painful means of faith-founded maiming and self-torture is now a half-recorded fragment of man's search for methods, techniques, and magic formulas to cure his varied debilities and physical infirmities.

It will be necessary, in this paper, in order to discuss some of the therapeutic techniques, to present, in outline, some of the causes, variations and expressions of epileptic behavior.

For purposes of clarification and to enhance my own appreciation of the subject, I am going to divide this paper
into five parts: 1) what epilepsy is, 2) what are its causes, 3) how it is apparent and what forms it takes, 4) methods of control and cure in use, 5) the threshold of therapeutic endeavor.

WHAT EPILEPSY IS

Funk and Wagnalls' dictionary defines epilepsy as "a chronic nervous disease characterized by recurrent paroxysm." This definition is not complete enough. The word epilepsy does mean paroxysm, or seizure, but it is necessary to include in the definition the lapse of consciousness which occurs. A more exact definition would be:

"Epilepsy is a recurrent disturbance in the chemico-electrical activity of the brain which manifests itself in a symptom complex of which impairment of consciousness, perturbation of the autonomic nervous system, convulsive movements or psychic disturbances are the essential components." (3, p. 938).

CAUSES OF EPILEPSY

Although there is disagreement on the matter, the fundamental cause of epilepsy seems to be an hereditary predisposition. This is determined by a record made by an electroencephalograph of the electrical waves of the brain. Any variation from the norm is an indication of cerebral dysrhythmia (4). Although cerebral dysrhythmia is a comparatively common phenomenon, only 5% of those having the abnormal brain waves ever have seizures. Built on this fundamental cause, and supporting it, or acting independently, are a variety of contributing causes. Brain defects. These include congenital inabilities of the
brain to grow normally and are caused by injury, malnutrition before birth, defective circulation, and various infections which settle in the brain. These infections may leave scar tissue on the brain and later in life be contributing causes of epilepsy. The following conditions are included in this category (4): meningitis, abscess of the brain, encephalitis, general paresis caused by syphilis. Various cranial injuries, hemorrhages, and tumors may also be causes.

Functional disorders. These are important to a considerably lesser degree and arise from various toxic conditions. It is only as these physical disorders act upon the brain that seizures occur. Kidney diseases and complications arising from pregnancy may cause toxic states and be contributing factors. Chronic alcoholic intoxication and chronic diseases of the heart act in the same manner. Glandular deficiencies also, in some cases, cause seizures.

Emotional disturbances. Various emotional conditions including shock and fear experience may be considered as psychic trauma and the cause of seizures. There are, however, many cases for which no physical cause can be found and some of these may have as their basis an emotional situation.

Conclusion. These include only a selection of possible causes and possibly the best summation would be that given by Dorcus & Shaffer:

"In view of the findings to date, it seems wisest to think in terms of psychobiological integration and consider essential epilepsy as a manifestation of some profound biologic derangement undoubtedly embracing psychologic and physiologic factors. (2, p. 291)."
WHEN EPILEPSY IS APPARENT AND WHAT FORMS IT TAKES

Childhood. Epileptic seizures appear with greatest frequency in infancy and childhood, although they may appear during any period of life. Lennox lists the following as reasons for the early appearance of epileptic behavior: 1) the early emergence of hereditary traits, 2) the high number of injuries (especially to the head) at birth, 3) because of the developmental pattern of the nervous system.

Adult. There is evidence to indicate that the later in life attacks begin, the smaller the part played by heredity. Lennox further reports that 29% of patients had their first attacks after the age of twenty.

Types of Epilepsy

Two distinct types of epilepsy are known in both children and adults: "symptomatic", and "idiopathic" epilepsy. "Idiopathic" epilepsy is due to some inherent, non-physically diagnosable fault in the brain, whereas "symptomatic" epilepsy is a disease of known physical origins.

Seizure States: Grand Mal

Aura. The aura is a medical term and is the Latin for "wind". It consists of varied symptoms which precede the attack and serve as a warning. The aura usually appears to about one half the victims a few seconds before consciousness is lost. The preliminary sign may be giddiness, buzzing noises in the ear, flashes of light before the eyes, tingling numbness in an extremity, or epileptiform phenomena. The importance of the aura is that it often indicates which part of the brain is affected.
This serves as an aid to therapeutic treatment.

**Tonic stage.** This stage, immediately following the aura, is one of extreme contraction of the body-musculature preceded by unconsciousness. This condition lasts about 30 seconds to 90 seconds and is characterized by rigidity of the muscles, suspended respiration and duskiness of the face caused by the momentary cessation of breathing. Falling occurs as a result of the spasm and loss of consciousness. The transition to the next stage ensues.

**Clonic stage.** This appears when the muscle spasm changes to a rhythmical jerking movement. This condition lasts three or four minutes and is best described as "a rhythmic contraction and relaxation of the musculature which causes the saliva to foam and froth to appear at the lips." (2, p. 295). During this period the victim gradually becomes more relaxed, normal breathing is resumed, and control of the bladder and bowels may be lost. Much sweating takes place and there is a possibility that the victim will bite himself.

**Coma.** The coma appears as the final stage and one which may last a few minutes to a few hours. During this time a return to consciousness takes place and the victim, in a dazed condition, may carry out certain habitual acts semi-automatically, such as removing his clothes.

**Aftermath.** The aftermath consists of a variety of conditions and often may not be present at all. The victim may suffer headaches, muscular soreness, vomiting, or general depression.

**Discussion.** This is just the general outline of the course
a grand mal attack may take. The pattern varies and, in some cases, there may be a warning, or disturbance for some days preceding the attack. Others go through a state of active excitement both before and after the seizure. This is known as epileptic furor and the victim may be dangerous during these frenzies (2). In rare cases, a condition known as status epilepticus occurs during which a series of attacks follow one another without consciousness being regained between each attack. This condition requires active therapy.

Seizure States: Petit Mal

The predominant characteristic of this form of attack is loss or partial loss of consciousness. This lasts only a few seconds. There is some rhythmic twitching of the eyelids or eyebrows (4) and the victim may drop whatever he has in his hands. Falling only occurs rarely and there are no unpleasant aftereffects. This seizure is the most frequent of all the epileptic seizures and for therapeutic treatment their early recognition is important as they may precede the grand mal attacks. This form of attack occurs especially at puberty and results in no mental impairment.

Seizure States: Jacksonian

The convulsions or spasmodic movements are restricted in location to an extremity. The victim, who does not lose consciousness, watches the convolution proceed upward toward the brain. This seizure is an indication of an irritation of the brain at a specific point and recognition of this fact is important for therapy.
Seizure States: Psychic

These psychomotor seizures are characterized by amnesia. The victim will act as though he were conscious and perform purposeful activities without being subject to command. There is no memory of this period which may last from a few minutes to a few days. There are varying categories and degrees to seizure from a sharply defined antisocial act, to a disagreeable tendency, to a form of tonic spasm, or overt physical hostility. This field of epileptic behavior seems to need much more research and verification of states. It appears that when behavior differences are included that this becomes a tendency of all who are frustrated, unhappy, or maladjusted.

Borderland Conditions

These conditions may be variations of epilepsy or biologically related states. Some forms of psychic seizures would certainly have to be included. These borderland conditions are known as: vegetative seizures, behavior disorders, narcolepsy, syncope, carotid sinus reflex, and hysteria. The following is a summari- zation of Lennox's (4) findings:

Vegetative seizures. This is a rare case involving a disturbance in the middle of the brain and the sympathetic nervous system. The seizure is slight, consciousness is retained, and vomiting and nausea are caused because the affected nerves are those controlling the involuntary, or automatic functions of the body.

Behavior disorders. These may be mood disturbances in persons having the more active seizures or they may be only "temper tan- trums" in children, and evidence of "psychopathic personality"
in adults. It is only recently that they have been considered as related to epilepsy.

Narcolepsy. This is another rare condition and is not definitely related to epilepsy. It is characterized by continual falling asleep. Cataplexy, a sudden limpness of the muscles due to a sudden change in emotional reaction, may accompany this seizure. Therapy has been aided recently by benzedrine, which relieves many victims.

Fainting. Syncope is often taken for an epileptic attack. It usually occurs during adolescence and under particular conditions of exhaustion, or shock and often is preceded by giddiness and nausea. Consciousness is restored very quickly and the experience is not damaging. Habitual fainters are more disposed to epileptic seizures than non-fainters.

Carotid sinus reflex. Another rare type of fainting attack seemingly caused by "a collection of nerves which lie on the big artery in the neck" (4, p. 47). These attacks can be effectively prevented by the use of atropine or benzedrine, or by surgical attention and removal of the afflicted nerves.

Hysteria. Attacks of hysteria are thought to be due to a severe emotional shock. They occur when others are present and violent muscular movements ensue although the victim does not hurt himself. These seizures are due to "subconscious impulses or conflicts and are not accompanied by abnormal electrical waves of the brain" (4, p. 47).

The Electroencephalograph

This is an instrument which picks up, amplifies, and records
the electrical pulsations of the brain. The use of this
device has given new meaning to the cause and possible treat-
ment of epileptics.

"There is abundant experimental work on the
use of the electroencephalograph which corrob­
orates the view that an attack of epilepsy is
associated with the development of abnormal
rhythms in the cerebral cortex and is there­
fore a paroxysmal cerebral dysrhythmia."
(2, p. 298).

The value of this instrument as an aid to therapeutic
treatment has been repeatedly demonstrated. The recordings
serve as an index which, in some cases, acts as a warning of a
grand mal attack. Indications of location of brain lesions are
also obtained. Most important, however, is that the device
serves as a measure of the effect of "drugs and changes of body
physiology"(3, p. 943). When the rhythms have slowed, the
effects of phenobarbital and bromides can be noted.

METHODS OF CONTROL AND CURE IN CURRENT USE

Reduction of Seizure Frequency

Physico-chemical changes. If the body chemistry can be changed,
the frequency of the seizures will also be changed. Seizures
are inhibited when an acid state is caused in the body.

"Acidosis can be induced by fasting, by the use
of a ketogenic diet, by the ingestion of acids
or acid forming salts, by breathing high concen­
trations of carbon dioxide, and most easily of
all by strenuous muscular exercise or work."
(3, p. 947).

A cut-down in the fluid intake of the body and the resulting
drying reduces seizures to some degree as will an "alteration
in the various chemical substances, in the blood such as sugar,
calcium, cholesterol." (4, p. 75).

Prophylaxis. The possibility of attacking the problem at its primary stage has been given much consideration and the various eugenicists' proposals to limit the offspring of those persons who are either subject to seizures or who have congenital cerebral dysrhythmia (3) are applicable to specific individuals but, for the larger group, mankind as a whole, they are impracticable because of the mass disruption of happiness and the necessity of taking brain wave measurements of the population as a whole which would result from this.

Those individuals who are predisposed to infections attacking the brain (as indicated by the presence of cortical dysrhythmia) should be given special care and there should also be a determined effort on the part of all persons to avoid head injuries. The diseases which lead to epileptic states or weaken the system so that seizures are possible should be more carefully investigated and, if possible, more effectively controlled. Lennox (4) lists the most important of these as syphilis, meningitis, encephalitis, St. Vitus dance, and mastoid infections.

Certain symptoms, such as isolated convulsions, with spasmodophilia, or gastric upsets, which are now considered benign should be more thoroughly investigated because of the high percentage of those persons whose epileptic conditions started in this manner.

If these symptoms and a bad family history which shows tendencies towards epilepsy, and perhaps a congenital cerebral dysrhythmia, are present, the individual should certainly maintain "a normal mental and physical life with abstinence from alcohol, and
from double-ended candle burning. . . and use (of) anti-
convulsant drugs." (4, p. 97).

**Physical Treatment**

**Surgery.** Hereditary causes cannot, of course, be treated but the contributing causes can be. In some cases surgery may be required to remove a scar on the brain or a tumor which is active in producing a focal cortical lesion.

**Activity.** Various forms of physical and mental muscular activity are also helpful especially in reducing the number of petit mal seizures.

**Contributing conditions.** There are sixty-odd conditions, mentioned by Lennox (4), any one of which, if present, may be associated with seizures and should be remedied. These include infections in teeth, tonsils, sinuses, mastoid cells, gall bladder, appendix, genito-urinary tract, and endocrine disturbances and allergy.

**Ketogenic diet.** The ketogenic diet may also be used. This diet results in the formation of ketone acids and is rich in fat foods but poor in proteins and carbohydrates. If undertaken, it must be done with care and meticulousness because it is not easy to follow as all food must be measured and substitutions may only be made on advice of a doctor. As Lennox says:

"Nothing is gained from a partial ketogenic diet. It is either 'whole hog, or none!'" (4, p. 144).

**Dehydration treatment.** Dehydration treatment is used because it has been observed that patients are better when their tissues are dry. The requirement of this treatment is the ingestion of three
glasses of fluid daily. This is difficult to adhere to because of the loss of weight involved, and the dry skin and constant thirst.

Electrical convulsion therapy. Caplan, in his article on convulsion therapy, says:

"The idea of trying to replace the irregular major fits of epilepsy by convulsions artificially induced under controlled conditions of time and place, is an eminently reasonable one." (1, p. 784).

Caplan used these electrically induced convulsions on 27 subjects in good physical condition, all having frequent grand mal attacks. He found that, on the average, attacks decreased during treatment from 5.2 to 2 monthly, but that the effect was only transient and that the original frequency of attacks was noted one month after this treatment stopped.

"The treatment must be given as a form of continued replacement therapy because its effects are transient." (1, p. 784).

There was no information on use with petit mal attacks.

Treatment During A Seizure

Petit mal. The victim undergoing a petit mal attack needs no treatment as his unconsciousness lasts but a few seconds and falling is rare.

Grand mal. If the warning is long enough, or the seizure has been indicated by the electroencephalographic record, a double dose of the particular drug the person is using may be taken. Mental concentration has been known to drive off a predicted attack.

When there is not enough warning and the victim is unable to control his condition outside aid must be administered if it is present. The victim should be protected from harm and from embar-
rassment. He should be lowered to the floor, a coat or some-
thing else pillowed under his head, and, if possible, a hand-
kercchief or other soft object placed between his teeth.

Post-seizure care in the form of rest and aspirin for head-
ache should be attended to as his condition is not always as it
superficially seems after seizure.

Jacksonian epilepsy. This variety of convulsion may, in some
cases, be arrested by squeezing or rubbing of the afflicted limb.

Psychic seizure. The victim of this sort of seizure should be
protected and his violence, if any, controlled by humoring.

Occasionally drugs may be given to quiet the victim but only under
a doctor's prescription.

Pharmacological Treatment

There are four known drugs which tend to control attacks.

These are: bromides, phenobarbital, dilantin, and tiadione. Drugs
of this sort must be taken every day, faithfully, under a doctor's
supervision or prescription. After two consecutive years of
freedom, the medication can be stopped. It may be stopped sooner
if the electroencephalographic findings indicate that the brain
waves are improved.

Bromides. These are little used at present because they cause
drowsiness and disfiguring skin eruptions and serve least effec-
tively to control convulsions.

Phenobarbital. This drug is best for use when the patient has
only grand mal seizures. It is the least expensive and the most
easily administered. Toxic effects are fewer than with the other
drugs. Administration is either by pill or by intravenous injec-
tion. The use is limited, however, in cases of mentally retarded persons who might be injured by its sedative actions and because of the drowsiness and lethargy which it causes.

Large doses can cause psychotic conditions, dizziness, excitement or none and such reactions are found in those allergic to it.

Dilantin. This is used extensively in grand mal and psychomotor seizures and is more effective, in most cases, than phenobarbital. It will not cause drowsiness but there are certain effects which must be rigidly controlled and vigilantly observed. These include strict attention as to dosage quantity, and strict adherence to regular drug consumption at the highest individual intake capacity. Approximately three-fourths of the patients using this drug properly are relatively free of seizures. Other effects which must be reduced are incoordination of muscular movements, allergies, stomach discomfort, gum inflammation, and more rarely, excess growth of hair, loss of weight, excessive fatigue, or undue excitement (4).

Tridione. This is a new anticonvulsant drug and is most effective in petit mal seizures where the number is reduced, and the severity lessened. It also has proven effective in relieving psychomotor states:

"tridione was effective in reducing or eliminating psychomotor seizure characterized by sudden unprovoked outbursts of screaming or wild aimless running." (5, p. 663).

Tridione has been used successfully in cases where the other drugs have entirely failed and with myoclonic seizures.

There have been some deleterious results especially on older people where there has been a high incidence of toxic effects.
This tends to limit its usefulness. Robinson sums up these delimiting effects.

"Drowsiness leading to anorexia occurred predominantly in infants, musculopopular rashes or urticaria in children and adults; and 'glare' phenomenon in adolescents and adults." (5, p. 663).

Other drugs. Other drugs are used, but to a lesser extent, and less effectively. These include: meparal, which is occasionally effective in treatment of grand mal; glutamic acid, used in petit mal and psychomotor cases; caffeine, in cases of petit mal; and benzedrine, also for petit mal (4).

Conclusions. The various drugs used to control epileptic attacks have been limitedly successful. When grand and petit mal attacks are present in the same patient different drugs are often given, and in various orders. But, in general, it is by process of experimentation that any particular drug is found able to perform efficiently in controlling the seizures of a particular patient.

**Psychological-Social Treatment**

**Psychological difficulties.** The shame and fear connected with the seizure may be a causative factor in building up antisocial attitudes and special care must be taken of the patient to see that he does not become overly despondent or hopeless as to his condition. Lennox says:

"Maintenance of the patient's emotional equilibrium and of his morale, and the possibility of preventing mental deterioration through intellectual, social and moral stimulation are too often neglected." (4, p. 115).

**Psychoanalysis.** Some doctors believe, in line with the Freudian theory, that certain repressed subconscious states are contributing causes of epilepsy and as such can best be handled by psycho-
analysis. Often a combination of treatments is required: psychoanalysis for the hysteria, and physiological for the chemical causes. In no case should the epileptic condition be ascribed entirely to psychological causes because, as yet, there is insufficient evidence to support such a claim.

Conclusion: As a primary aid to therapy, there should be an attempt to "soften" the harsh, critical environment that all epileptics face today. This can be done by making certain that the patient is in sympathetic hands and that his friends are acquainted with the nature of his disease. Above all the general public needs much more information and education as to what epilepsy is and what can be done to handle active convulsions. Ensuing psychological difficulties may in some cases need to be handled by psychoanalysis but always in conjunction with medical treatment of a more direct sort.

THE THRESHOLD OF THERAPEUTIC ENDEAVOR

Therapy in epilepsy has progressed immeasurably since its positive scientific inception in 1857 with the use of bromides. Progress is still on the threshold; new drugs are continually coming to light, and medical research is forever continuing. What is needed is an intensification in the public mind of the great numbers of people who have a latent tendency toward epilepsy as indicated by the electroencephalographic findings. The public must realize that epilepsy is everybody's problem, and that it can be controlled. Therapy today attacks the disease as it now exists; the hope for all epileptics is research into the abnormal gene which makes the hereditary predisposition to seizures.
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