that the anaesthetic agents had no significant effect on the vomiting rate.

There were a greater number of intra-abdominal and lumbar operations in the control group, but the difference in the incidence of vomiting was still significant if these were eliminated (see Table II). The distribution of the other operative procedures was satisfactory.

The mean recovery time was 26.75 ± 3.69 minutes in the perphenazine series and 17.30 ± 2.26 minutes in the control series, a difference of 9.45 ± 4.33 minutes; this difference is significant at the 5% level—that is, the results might be expected by chance in less than 1 in 20 trials. An increase in recovery time of this order is not unacceptable.

No side-effects were observed, and there was no complaint of discomfort at the site of injection in any case.

Table III compares the reduction in vomiting rate with similar reports upon other agents.

TABLE III

Report	Series	Post-operative Vomiting Rate
Albert and Coakley (1954)	Control	28.8%
	Chlorpromazine	13%
Burtles and Peckett (1957)	Control	32%
	Promethazine	18%
	Chlorpromazine	18%
Present report	Control	21%
	Perphenazine	7%

Summary

A trial has been made of the efficacy of perphenazine in the prevention of post-operative vomiting in a group of 200 patients. The vomiting rate was 21% in the controls and 7% in those receiving perphenazine.

The mean recovery time was 17 minutes in the controls and 27 minutes in the perphenazine series.

More females vomited than males in the ratio of 2.5:1.

There was no indication that any differences between control and perphenazine-treated groups regarding pre-medication, anaesthetic agent, or operation contributed significantly to the difference in vomiting rate.

No side-effects of the drug were observed.

Our thanks are due to Dr. Brian Lacey for the statistical calculations. We are indebted to our colleagues and to the nursing staff for their co-operation. The perphenazine was generously supplied by the Schering Corporation, Bloomfield, New Jersey, U.S.A.

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The ninth Annual Report of Family Service Units states that during 1956–7 Family Service Units worked with over 700 families, or an equivalent of about 4,500 men, women, and children. It is often through a telephone call from a housing manager, hospital almoner, or probation officer that a family needing long-term assistance is heard of by F.S.U. The help which "problem" families need varies greatly: material aid, such as clothing, bedding, or furniture, is often required, and specialized help, such as medical treatment, may well be necessary. Constant collaboration is essential with all the many agencies concerned with the different aspects of the family's welfare. The F.S.U. worker's task is to mobilize all the resources available and to enable the family to make the best of them. So that each family can be given the time and attention it needs, each worker is in touch with 12 to 15 families only at one time. Some 39,000 visits were made to families during the year.

BEMEGRIDE AS AN ACTIVATOR IN ELECTROENCEPHALOGRAPHY

BY

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Bemegride (β -ethyl- β -methylglutarimide) was introduced in 1954 as a barbiturate antagonist. Its first clinical application was in the treatment of barbiturate poisoning (Shaw *et al.*, 1954; Shaw, 1955; Shulman *et al.*, 1955). Shulman *et al.* (1955) suggested that treatment should be carried out with electroencephalographic control, and an investigation of the electroencephalographic examination of the effects of bemegride in barbiturate narcosis was made in animals (Peacock, 1956).

Delay *et al.* (1956a, 1956b, 1956c), Drossopoulou *et al.* (1956), and Courjon and Bonnet (1956) published papers on the use of bemegride as an activating agent in electroencephalography. They compared bemegride with leptazol, using roughly equivalent techniques in normal, psychiatric, and epileptic patients. The drugs were given by slow intravenous injection until a convulsion was produced. The amount of bemegride used to produce a convulsion was often of the order of 250 mg., the maximum dose being 630 mg. Normal subjects showed, at the most, "slight activation in the electroencephalogram." Subjects with temporal lobe epilepsy sometimes produced focal discharges, and other epileptics had generalized convulsive discharges. The fits produced by bemegride were slow in onset and of short duration, recovery being quick. Subjective side-effects were few, and consisted usually of muscular twitchings. These workers considered bemegride to be equal to leptazol as an activator in electroencephalography, and that it was safer because the convulsions were milder and more easily controlled.

An experimental study of the effects of bemegride in the antagonism of barbiturates and other narcoleptics was carried out by Cass (1956) in animals with electroencephalographic control. That author concluded that bemegride had a specific effect against the electroencephalographic changes produced by barbiturates, and that this change was not seen with other narcoleptics. The effect of bemegride was greater than that of other anaesthetics in antagonizing the changes brought about by barbiturates.

The present paper reports the use of bemegride as an activator in electroencephalography in 40 patients, most of whom had temporal lobe epilepsy, and also in 10 normal subjects. The bemegride activation was used with routine recordings and also in addition to a standard technique for investigation of temporal lobe epilepsy (Pampiglione and Kerridge, 1956), in which sphenoidal needle electrodes were inserted. Following the bemegride activation in the majority of patients in whom sphenoidal recordings were carried out, sleep was induced with intravenous thiopentone.

Technique

The subjects studied had been referred for electroencephalography because of the clinical suspicion that an epileptogenic lesion was present. Apart from occasional exceptions, patients were off anticonvulsants for one or two days before recordings. One or more routine recordings

were taken before proceeding to the use of activation techniques. The normal control subjects were medical students.

After the insertion of the sphenoidal electrodes a short recording was made. Bemegride was then given, usually in two separate injections. Different electrode placings were used for a recording, using photic stimulation after the administration of a further amount of bemegride. Finally, the sphenoidal electrode positions were used and a sleep record with thiopentone was done. In certain patients routine antero-posterior lines of the electrodes were used instead of sphenoidal positions, while in other patients the sleep record was not made.

From previous experience with the use of bemegride in barbiturate poisoning (Bingle and Whitwam, 1955) the maximum effect of this drug appeared to occur clinically within two minutes of an intravenous injection. It was therefore decided to give it in rapid intravenous injections at roughly two- to three-minute intervals and to observe the E.E.G. record throughout this period. As in most cases sphenoidal needle electrodes were used, it was not thought advisable to give such a dose of bemegride that a clinical fit might occur.

An initial injection of 10–25 mg. was made, followed by one or more larger doses (25–50 mg.) given rapidly at two- to three-minute intervals. In the 40 patients, between 20 and 160 mg. was given, with an average of 80 mg., over the course of 10 minutes.

In 28 out of the 40 suspected epileptic patients a thiopentone recording was also done, usually with sphenoidal electrodes in position. Thirty-one patients had sphenoidal records, while in nine the standard antero-posterior lines of the electrodes were used.

Side-effects

With the method of administration of bemegride used, minor side-effects were common in both normal and abnormal subjects. Most frequently there was a subjective twitching of the muscles around the eyes and mouth, and occasionally of the limb and trunk muscles. These twitchings were not always visible. With 25–50 mg. of bemegride the subjects occasionally felt light-headed. This was a pleasant "drifting away" sensation and was not objectionable. The impression was gained that the muscular twitchings were commoner in the normal subjects than in the epileptics. There were no coincidental changes in the E.E.G. to suggest that there was any accompanying cortical discharge. The possibility that bemegride might have a peripheral effect on nerve or muscle was considered (Coirault *et al.*, 1956).

In seven patients major or minor epileptic attacks occurred after the administration of bemegride. All these attacks were of slow onset and there was ample time to remove the sphenoidal electrodes if these were in position. The patients did not complain afterwards that there were any unpleasant prodromata to the fits. Details of the attacks are as follows.

Epileptic Attacks

Case 4.—Bemegride, 100 mg. Attack: Patient unresponsive, with twitching of the left side of the face for 10 seconds. The head then turned to the left and the patient recovered. E.E.G.: Spike-and-wave 4 c/s, of larger amplitude on the right side.

Case 30.—Bemegride, 160 mg. Attack: Patient saw lights on the left side of his field of vision. His head then turned to the left, with loss of consciousness, jerking of the left arm, and, finally, a generalized grand-mal attack. E.E.G.: Right-sided slow waves with occasional spikes. Before the fit he complained of nausea, which was due to bemegride overdosage rather than the epileptic aura.

Case 31.—Bemegride, 45 mg. Attack: Head turned to the left, with jerking of left arm and left leg, terminating in a grand-mal attack. E.E.G.: Generalized spike-and-wave discharges of larger amplitude on the left side.

Case 32.—Bemegride, 70 mg. Attack: Patient first complained of bad taste with accompanying right-sided spike and slow waves for 10 seconds. One minute later he complained of

abdominal discomfort, again with right-sided spike and wave in the E.E.G. Two minutes later his head turned to the left and he became unconscious, with jerking of the arms. E.E.G.: Irregular right-sided spike and wave followed by generalized delta activity during the recovery period.

Case 33.—Bemegride, 60 mg. Attack: Patient became confused, noisy, and incontinent of urine, with a quick recovery to normality. E.E.G.: No record during the attack because of patient's movements. After the attack there was a great increase in the amount of slow rhythms present.

Case 13.—Bemegride, 100 mg. Attack: Patient cried out and then lost consciousness for about 20 seconds. There were no localizing signs. E.E.G.: No definite change due to the amount of artifact present. This attack was considered to have an epileptic basis, as it was similar to others which the patient had had and also because the patient was known to have an underlying fronto-temporal tumour.

Case 36.—Bemegride, 20 mg. Attack: Paraesthesiae in both feet, with twitching of right face and arm lasting several minutes. E.E.G.: No change in record. Definite clinical history of temporal-lobe epilepsy with other evidence of a left-sided epileptogenic lesion.

It will be noted that fits occurred with comparatively small doses of bemegride. In several patients the nature of the fit agreed with the site of the suspected lesion, and the fit provided useful confirmatory evidence that the attacks were epileptic.

Results

Normal Controls

Ten medical students with normal histories were used as control subjects. A routine resting record with overbreathing and with photic stimulation was taken. Bemegride was then given intravenously, using the routine antero-posterior lines of the electrodes. A total of between 35 and 100 mg. of bemegride was given, usually in three injections—for example, 20 mg. followed by 40 mg., and finally 40 mg. with photic stimulation. The average total amount of bemegride given was 70 mg. In a few students there was an increase in the amount of slower rhythms present in the E.E.G. following bemegride. In one student only was any more definite abnormality seen—a high-voltage slow-wave complex after a total of 100 mg. of bemegride and photic stimulation.

Abnormal Patients

The results obtained from the 40 abnormal patients studied are summarized in the Table.

The abnormalities found in the E.E.G.s are considered under three headings: focal sharp wave-and-spike discharges; generalized spike and slow wave discharges; and increased slow activity, either generalized or focal.

The first two abnormalities are noted in the records after both bemegride and thiopentone, while the third abnormality is detailed for bemegride alone.

An attempt is then made in the table to assess the agreement between the clinical findings, resting record, bemegride, and thiopentone records. Finally, the resting, bemegride, and thiopentone records are compared, and in each patient the most useful record obtained which helps in the diagnosis is noted. If no outstanding difference in usefulness occurred between the bemegride and thiopentone recordings, this is also noted.

Certain patients showed no abnormality in any of their records, so that no comparison of usefulness could be made between them. In 12 patients bemegride only was given, and this record was compared with the routine record and not the thiopentone.

Focal Abnormalities.—A sharp wave focus was shown in 24 patients, and this focus sometimes occurred in more than one recording. Bemegride showed a focus in 17 out of 40 patients. Thiopentone showed a focus in 16 out of 28 patients. Routine record showed a focus in 11 patients and a doubtful focus in a further 2. The foci demonstrated in the resting records were usually less definite than in the thiopentone and bemegride recordings. Among the 28

patients in whom both bemegride and thiopentone were used, nine showed a focus with both bemegride and thiopentone, three a focus with bemegride only, and seven a focus with thiopentone only. The average amount of bemegride given before a focus was demonstrated was 77 mg. (range 20-120 mg.). This amount is about one-third of that used by the French workers (Delay *et al.*, 1956a, 1956b, 1956c), who induced a fit in most of their patients. On the basis of these 28 patients it would seem that thiopentone is slightly more efficient in demonstrating a temporal-lobe epileptogenic focus than is bemegride (16 compared with 12 patients).

Generalized Spike-and-Wave Discharges.—This type of discharge was sometimes useful in confirming the epileptic basis of a patient's attack. Spike-and-wave discharges were seen in 11 out of the 40 patients tested: in eight following bemegride only, in one following thiopentone only, and in two with both bemegride and thiopentone. The amount of bemegride needed to produce generalized spike-and-wave discharges varied between 45 and 100 mg., with an average of 75 mg. In five patients the generalized spike and wave occurred only when photic stimulation was given following the injection of bemegride.

Increase in Slow Activity.—This was considered only with regard to the records in which bemegride was the activator. There was an increase in the amount of slow activity without any spike discharges in 15 patients. In six the slow activity was generalized and no diagnostic significance was attached to it. In nine the slow activity was predominantly on one side of the record, and in seven of them this lateralization was on the same side as the suspected lesion.

Agreement between Records

Agreement Between Clinical Site of Lesion and Abnormalities Produced by Bemegride or Thiopentone.—Of the

40 patients investigated, 19 showed definite agreement between the clinical diagnosis and the bemegride recording. In another seven there was some support for the clinical diagnosis from the bemegride record. In 14 patients there was disagreement between the clinical diagnosis and the bemegride recording. In 11 of these the diagnosis of epilepsy was suggested, but no abnormality was found in the E.E.G. after bemegride which would support this diagnosis. The remaining three patients showed focal abnormalities in the E.E.G. where the clinical diagnosis did not lead one to expect this. Of the 28 patients to whom thiopentone was given, there was agreement between the sleep record and the clinical diagnosis in 15, in 2 the agreement was doubtful, and in 11 there was disagreement between the E.E.G. and the clinical findings.

Agreement Between Thiopentone and Bemegride Recordings.—Of the 28 patients to whom both bemegride and thiopentone were given, 18 showed agreement between the two records, two showed a focus with bemegride but not with thiopentone, six showed a focus with thiopentone but not with bemegride, one showed a focal abnormality on opposite sides with bemegride and thiopentone, and one showed generalized spike and wave with bemegride but not with thiopentone.

Relationship Between Bemegride and Resting Records.—Twenty-four patients showed agreement with both bemegride and routine recordings, seven showed a focus with bemegride and not in the routine record, five showed generalized spike and wave with bemegride and not in the routine record, one showed unilateral slow activity with bemegride but not in the routine record, and three showed abnormalities suggestive of epilepsy in the routine record but not with bemegride. Thus in 13 out of the 40 patients in whom bemegride was given as an activator this drug was of use in demonstrating an epileptogenic basis for the patient's symptoms.

Results in 40 Cases

No.	Diagnosis	Recording Position	Total Amount Given		Focal Discharges with			Generalized Spike and Wave with		Slow Activity Bem.	Normal Record	Agreement of Clinical Record		Agreement of Bem.		Assessment of Most Useful Record			
			Bem. (mg.)	Thio. (g.)	Bem.	Thio.	Routine	Bem.	Thio.			Bem.	Thio.	Thio.	Routine	Bem.	Thio.	Routine	Bem. = Thio.
1	TLE	S	45	0.4	+45	+	0	0	0	+15R		+	+	+	0	+			+
2	TLE	S	50	0.5	+10	+	0	0	0	0		+	+	+	0				+
3	TLE	S	100	0.35	+20	+	0	0	0	0		+	+	+	0				+
4	TLE	S	100	0.4	+60	+	0	+100P	0	0		+	+	+	0	+			
5	TLE	S	75	0.5	+35	+	0	0	0	0		+	+	+	0				+
6	TLE	S	100	0.5	+100P	+	±	0	0	+20L		+	+	+	+		+		
7	TLE	S	80	0.35	+20	+	±	+80P	0	0		+	+	+	+				+
8	TLE	S	40	0.4	+40	+	±	0	0	0		+	+	+	+	+			
9	EP	S	100	0.5	+60	+	0	0	0	0		+	+	+	0		+		
10	TLE	S	100	0.5	+100P	0	+	0	0	0		+	0	0	+			+	
11	Migr	S	70	0.25	+35	0	+	0	0	+		0	0	+	+				+
12	TLE	S	80	0.275	+80	0	0	0	0	0	+50L	+	0	0	+	+			
13	TLE	S	100	0.5	0	+	+	0	0	0	0	+	+	+	0	+			
14	EP	S	70	0.45	0	+	0	0	0	0	+10R	+	0	0	+	+	+		
15	EP	AP	70	0.4	0	+	0	0	0	0	0	+	+	+	0	+	+		
16	EP	S	50	0.3	0	+	0	0	0	0	+50L	0	+	+	0	+	+		
17	TLE	S	100	0.4	0	+	+	+100P	0	0	+60R	+	+	+	0	+			+
18	Sync	S	70	0.375	0	+	+	0	0	0	+35R	+	0	0	+		+		
19	TLE	S	75	0.2	0	+	0	0	0	0	0	0	+	+	0	+	+		
20	TLE	S	80	0.5	0	0	0	+45	+	0	0	+	0	+	+				+
21	TLE	S	60	0.375	0	0	0	+60	0	0	0	+	0	+	0	+			+
22	EP	S	100	0.425	0	0	0	+100	+	0		+	+	+	0	+			
23	EP	S	80	0.475	0	0	0	0	0	0	+15G	0	0	+	+				
24	TLE	S	80	0.425	0	0	0	0	0	0	N	0	0	+	+				
25	TLE	S	75	0.45	0	0	0	0	0	0	N	0	0	+	+				
26	TLE	S	100	0.45	0	0	+	0	0	0	N	0	0	+	+		+		
27	EP	S	75	0.5	0	0	0	0	0	0	N	0	0	+	+				
28	EP	AP	95	0.35	0	0	0	0	0	0	N	0	0	+	+				
29	TLE	S	120		+120		+	0	0	+10L		+	+	+	0	+			
30	TLE	S	160		+50		+	+75		+160R		+	+	+	0	+			
31	Psy	AP	45		+45		0	+45		0		0	0	+	+	+			
32	TLE	S	70		+30		0	0		0		+	+	+	0	+			
33	EP	S	60		+60		0	0		0		+	+	+	+	+			
34	EP	AP	67.5		0		+	+67.5P		+25G		+	+	+	0	+			
35	EP	AP	85		0		0	+85P		+35G		+	+	+	0	+			
36	TLE	AP	20		0		+	0		0		+	+	+	0			+	
37	TLE	AP	87.5		0		0	0		+37.5G		0	0	+	+				
38	Psy	AP	105		0		0	0		+25G		0	0	+	+				
39	Sync	S	70		0		0	0		0		+	+	+	+				
40	EP	AP	90		0		0	0		+40G		0	0	+	+				

TLE=Temporal-lobe epilepsy. EP=Epilepsy. Migr=Migraine. Psy=Psychiatric. Sync=Syncope. AP=Routine antero-posterior lines of electrodes. S=Sphenoidal electrodes. P=With photic stimulation. L=Left-sided slow activity. R=Right-sided slow activity. G=Generalized slow activity. +=Response or agreement or most useful record (according to column). ±=Doubtful response or agreement. 0=No response or no agreement. N=Normal record. Numbers in bemegride columns represent doses of drug used in mg.

Comparative Value of Bemegride and Thiopentone

An attempt was made in the 28 patients receiving both bemegride and thiopentone to evaluate which of the two had proved the more useful technique: in five bemegride was more useful, in eight thiopentone was more useful, in 8 they were deemed equally useful, in two the routine record was more useful than either of the two records, and in five patients no assessment could be made.

Discussion

This investigation has confirmed the experience of Pampiglione and Kerridge (1956) that the sphenoidal recording is both a useful and a safe procedure. It would also seem that bemegride, which has now been used in this department in over 50 patients, is a comparatively safe drug in the doses used, giving only a small incidence (14%) of fits. The onset of these fits is not alarming to the patient or to the observer. It should again be stressed that the onset of the fit is slow and gives time to take adequate precautions—for example, removal of the sphenoidal electrodes.

From the small number of controls investigated it would seem that, in the dosage used, abnormalities which might be interpreted as being due to epilepsy are uncommon in a non-epileptic patient. The sensitivity of various subjects to this drug must vary. It would not be surprising to find epileptic discharges in the E.E.G. of a normal patient if a sufficiently large dose of bemegride was given. With the present technique it is likely that at least 150 to 200 mg. of bemegride would be needed to produce abnormal discharges in any reasonable proportion of normal subjects.

Compared with thiopentone, bemegride has two advantages: firstly, that the patient is conscious throughout, provided a fit does not occur, and can walk away immediately after the record is taken; secondly, unlike thiopentone, it can be given if the patient has had a meal recently. Bemegride has the disadvantage of producing an occasional fit, and if this does occur the recording may be interrupted.

Bemegride is a useful addition to the activators used in electroencephalography, as it can demonstrate focal as well as generalized abnormalities in a reasonable proportion of patients (43% of 40 patients in this series showed an epileptogenic focus following bemegride). It may be that by using a modified technique a greater proportion of abnormalities will be demonstrated with bemegride. This series has been concerned mainly with the demonstration of temporal-lobe foci, but the use of bemegride to demonstrate foci elsewhere in the brain may be of value, and this has not been investigated.

Bemegride is not a substitute for thiopentone in sphenoidal recordings, but makes a useful addition to this technique. It can also be used after the administration of thiopentone in order to arouse the patient rapidly from his state of sleep.

Summary

The history of the use of bemegride in connexion with electroencephalography is summarized.

Bemegride was used as an activator in recording the E.E.G.s of 40 patients and 10 controls. Most of the patients had temporal-lobe epilepsy and sphenoidal electrodes were used.

Bemegride appears to be a safe drug and a useful activator in that it can demonstrate epileptogenic foci as well as produce generalized epileptic discharges.

Fits were induced in 7 out of 50 subjects to whom bemegride was given.

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BENACTYZINE IN PATIENTS WITH VIOLENT TEMPER AND PATIENTS WITH PARKINSONISM

BY

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In the early experiments with benactyzine ("suavitil," "parasan," "nūtinā"), Larsen (1955) noted in himself and his colleagues to whom the drug was given "a certain insusceptibility to unpleasant impressions"; and Jacobsen (personal communication), who worked with Larsen, informed me that the drug gives one a feeling of distance from reality, so that problems with which one is occupied do not seem to be so urgent or so demanding. Jacobsen and Skaarup (1955) showed that in cats which have been rendered "neurotic" in a conflict situation the drug tends to bring about a return to normal behaviour and a diminution in neurotic reactions. Jacobsen agreed that it would be worth testing this drug in that small group of patients, usually epileptics, who have violent outbreaks of temper. As the drug has anticholinergic properties, and as atropine and other anticholinergic drugs are useful in cases of Parkinsonism, it was also decided to test the drug on patients with this malady.

The drug was given orally in tablets, each containing 1 mg. of benactyzine. Control tablets were made up to look identical with the tablets containing the drug, and an equivalent number were given. In half the patients the first supply of tablets consisted of benactyzine, and in the other half it consisted of the control tablets; on subsequent occasions the opposite kind of tablets was given, so that those patients who had received the control tablets received the benactyzine, and vice versa. No patients ever discovered that some of the tablets they were receiving were blanks.

Patients with Tempers

Twelve patients were collected who were attending the out-patient department of this hospital and whose outbreaks of temper formed an important feature of the clinical picture and of which complaint was made. Two patients had developed these outbursts following closed head injuries; the other 10 had epilepsy. Of the epileptics, three had idiopathic epilepsy, two had temporal lobe lesions, and five had infantile hemiplegia. The drugs which the patients were receiving—phenobarbitone, primidone, hydantoin sodium—to combat their fits were given throughout the