some success, used high-fat diets or given 1 oz. (28 ml.) of olive oil before meals in the treatment of our hypoglycaemic cases. Ephedrine by its sympatheticomimetic action raises the blood sugar and has also proved useful in preventing reactive hypoglycaemia. It has been given in $\frac{1}{2}$ -gr. (32-mg.) doses half an hour before the three main meals. Fig. 3 shows its effect in a patient with moderately severe hypoglycaemia. Owing to their reduced gastric capacity these patients often feel better having six small meals a day instead of the usual three large ones.

Summary

Postprandial hypoglycaemia occurred in 17 out of 45 consecutive patients on whom a partial gastrectomy had been performed for peptic ulcer, and constituted the commonest complication of the operation in this series.

The symptoms produced were severe enough in five patients to preclude them from earning a livelihood.

It is suggested that rapid gastric evacuation is the basis of this hypoglycaemia, and that the "dumping" syndrome has identical clinical manifestations and an identical aetiology, so that the two conditions need not be distinguished.

The most effective method of treatment has proved to be a high-fat diet, six small meals a day instead of three large ones, and $1\frac{1}{2}$ gr. (32 mg.) of ephedrine before the three main meals.

REFERENCES

- Adlersberg, D., and Hammerschlag, E. (1947). *Surgery*, **21**, 720.
Beckermann, F. (1933). *Dtsch. med. Wschr.*, **59**, 683.
Evensen, O. K. (1942). *Acta med. scand.*, Supp., **126**, 148.
Kalk, H., and Meyer, P. F. (1932). *Z. klin. Med.*, **120**, 692.
Koranyi, A. (1936). *Dtsch. Arch. klin. Med.*, **178**, 353.
Lapp, F. W., and Dibold, H. (1933). *Klin. Wschr.*, **12**, 547.
Moore, F. D. (1947). *J. Amer. med. Ass.*, **133**, 749.
Wöhrle, M. (1936). *Dtsch. Arch. klin. Med.*, **179**, 411.

STATUS EPILEPTICUS COMPLICATING PREGNANCY

BY

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Status epilepticus in pregnancy is uncommon, but a few cases have been reported, most of them fatal. The effect of pregnancy on idiopathic epilepsy is variable, increasing the frequency and severity of the fits in some cases, ameliorating them in others, and in many instances producing no change whatever. Status epilepticus may occur at any time during pregnancy, labour, or the puerperium. It may even be the first intimation that an epileptic tendency exists. Often, however, the condition is preceded by more violent and more frequent fits, in spite of adequate anticonvulsant therapy.

A fatal termination is almost the rule, though very occasionally patients recover. Sachs (1910) reported two cases in sisters, both fatal. DeLee (1938), Greenhill (1934), and Sachs all state that death is inevitable unless the uterus can be emptied, a procedure which offers a very slender chance of recovery. Jardine records a case in which pregnancy was terminated by manual dilatation of the os, but to no avail. Sachs has packed the uterus before dilating the os, with a similar result. Bachmann (1930) states that, as in eclampsia, improvement is likely to occur immediately the pregnancy is terminated, but there can be

no doubt that status epilepticus, though much rarer, is far more deadly.

Burnett (1946), in an excellent survey of the literature, has summed up the relation between epilepsy and pregnancy and the prognosis in status epilepticus in the pregnant woman. He reports a case which recovered after induction of labour by low rupture of the membranes under thiopentone anaesthesia in the thirty-third week of pregnancy. Although the child was not born for a further five days, complete recovery of the mother resulted and a live child was obtained. Two months after delivery the patient was having fits at her normal frequency.

Bachmann advises sterilization for any patient who has once suffered from status epilepticus in pregnancy, on the grounds that the chances of recovery are negligible should an attack be repeated in a subsequent pregnancy. Having regard to the rarity of the condition and the high mortality rate it is not possible to forecast the chances of a recurrence, but there would appear to be good reasons for supporting his view.

The following case is of interest, since recovery took place without interruption of pregnancy.

Case History

The patient, a married woman of 23, was admitted to the Royal Infirmary under the care of Prof. E. J. Wayne on Dec. 29, 1946, in status epilepticus; she was then three months pregnant with her first child. At the age of 21 she began to have major epileptic fits, and after full investigation idiopathic epilepsy was diagnosed. There was no family history of convulsive phenomena. She continued to have occasional fits, which were controlled with phenobarbitone. After one year's treatment, however, she ceased to take the drug, with the result that she went into status epilepticus for a few hours eighteen months before the present admission. She had taken no phenobarbitone during pregnancy, which so far had been uneventful and free from fits. Three days before admission she was married to the father of her child. Continuous convulsions began at 1 p.m. on the day of admission.

On examination she was seen to be a well-developed young woman, comatose, with stertorous respiration and slight cyanosis. The pulse was rapid (120) and of good volume, the blood pressure 130/70. There were no localizing signs in the central nervous system; the reflexes were absent, the plantar responses extensor. There was no oedema. The optic fundi, heart, lungs, and abdomen were normal. Vaginal examination revealed pregnancy of approximately three months' duration. The urine contained a trace of albumin but no sugar or acetone. The temperature was 98.8° F. (37.1° C.). She was incontinent of faeces and urine; there was no urinary retention.

Further generalized epileptiform fits followed in rapid succession at intervals of ten to fifteen minutes and lasted one to three minutes. No response was obtained to intramuscular sodium phenobarbitone, and it became necessary to give intravenous thiopentone to prevent a continuous succession of fits. Oxygen was administered continuously.

Sodium phenobarbitone, 3 gr. (0.2 g.), was injected intramuscularly twice daily and 0.25 g. of thiopentone was given intravenously as required. A lumbar puncture was performed and 10 ml. of clear fluid at a pressure of 160 mm. of water was removed. This manœuvre produced little relief, but it is probable that the increased intervals between fits were due to the barbiturates. On Dec. 29 she had seventeen major fits, and remained unconscious. Next day she had only four fits, but still remained unconscious. To control dehydration fluids were administered per rectum, and into the stomach through a transnasal tube. There were no other physical signs and no evidence of rising intracranial pressure. A further lumbar puncture was normal in all respects. On the 31st her general condition was much the same, but the temperature rose suddenly to 103° F. (39.4° C.) and the pulse to 130 at 2 p.m. She was still unconscious. During the day she had

twelve fits. Her lungs were clear. The blood urea was 41 mg. per 100 ml., the blood sugar 85 mg. per 100 ml., and the blood calcium 9 mg. per 100 ml. The cerebrospinal fluid contained 30 red cells per c.mm. but was otherwise normal.

On Jan. 1, 1947, she was still comatose and had 60 fits; the temperature was 101° F. (38.3° C.), and the respirations 22. Towards evening cough with sputum developed, moist sounds appeared at the bases of the lungs, and the respirations increased to 32. Penicillin, 30,000 units three-hourly, by intramuscular injection was started, and sulphamezathine, 2 g. at once and 1 g. four-hourly, was given through the gastric tube. Paraldehyde, 4 dr. (14 ml.), four-hourly per rectum was started. Phenobarbitone and thiopentone were discontinued. The white blood cells numbered 21,000 (81% polymorphs). Blood culture was sterile. The sputum showed *Staphylococcus aureus* and pneumococci. A catheter specimen of urine was sterile, and contained red cells and pus cells, a trace of albumin and sugar, but no casts. A skiagram of the chest was normal. On the 2nd her condition was deteriorating. Rectal paraldehyde was not retained; 3 dr. (11.5 ml.) was given four-hourly through a gastric tube. The temperature was 104° F. (40° C.), pulse 130, and respirations 40. During the day she had 25 fits. She was still comatose, and rales at the lung bases had increased. Mr. Glyn Davies advised against emptying the uterus.

On Jan. 3 her condition was slightly improved: there were no further fits and the coma was not so deep; the temperature was 100° F. (37.8° C.), pulse 130, and respirations 30. Paraldehyde was continued. A blood count showed: white cells, 9,200 (polymorphs 80%); haemoglobin, 73%; urea, 54 mg. per 100 ml. Next day her condition was steadily improving. She could be roused and was no longer incontinent. The temperature was 100° F., pulse 110, and respirations 30. There were no fits. On the 5th she was conscious and co-operative, but cerebation was slow. The temperature and respirations were normal, the pulse 110. She took fluids by mouth normally. Paraldehyde was reduced to 3 dr. six-hourly. On the 6th sulphamezathine was discontinued. She had no fits or symptoms and was fully conscious and sensible. The temperature, pulse, and respirations were normal. A catheter specimen of urine was sterile, and contained red cells and pus cells, a trace of albumin and sugar, but no casts.

On Jan. 9 the paraldehyde was discontinued. Phenobarbitone, 1 gr. (65 mg.), was given by mouth, three times a day. She had no fits. Skiagrams of the chest and skull were normal. On Jan. 16 the penicillin was discontinued. The patient was asymptomatic, and there were no abnormal physical signs and no fits. Next day her physical condition was excellent, but she became tearful and uncooperative. Clonic twitchings of the legs developed in the presence of any audience. She asserted that she could not walk. The character of these phenomena strongly suggested hysteria, and this diagnosis was confirmed by Dr. A. G. Yates. On Jan. 20 she was physically normal but grossly hysterical. She was discharged from hospital, under observation, on phenobarbitone, 1 gr. thrice daily. The pregnancy had remained undisturbed throughout in spite of continuous coma for six days and a total of 128 fits in hospital and an unknown number before admission.

Subsequent Progress

On June 6 the patient was feeling perfectly well, walking normally, with no signs of hysteria. She was taking phenobarbitone as instructed, and there had been no further fits.

On July 21 she was delivered of a normal female child weighing 8 lb. 2 oz. (3.7 kg.) by spontaneous delivery at term. There were no fits during labour, and both mother and child are progressing satisfactorily.

Discussion

This case differs in several important respects from the one described by Burnett. In our patient status epilepticus had occurred previously, when the patient was not pregnant and had omitted her phenobarbitone; it occurred at the end of the first three months of pregnancy, during which period she had taken no anticonvulsant drugs whatever. Burnett's patient had never previously had status epilepticus, which developed in the last three months of

pregnancy in spite of regular anticonvulsant therapy. There does not seem to have been any question of eclampsia. Finally, termination of the pregnancy was not required in our case.

These differences suggest that the prognosis may be better when omission of specific therapy is a complicating factor than when status epilepticus intervenes in pregnancy despite previous adequate therapy. In our case it may well be that failure to take the necessary amount of phenobarbitone was alone responsible for the condition, but it would appear that the pregnancy exerted an additional malign influence, since this attack was far more severe than the previous one.

It is probable that the profound changes in hormonal balance with intracellular fluid retention which occur in pregnancy may lead to a slight degree of cerebral oedema sufficient to "fire-off" an excitable cortical focus. It is a well-known fact that some epileptics experience more fits at the menstrual periods than at other times, or may have fits only at those times.

In future cases of status epilepticus in pregnancy careful inquiry should be made concerning previous anticonvulsant treatment, as this point may prove an aid to prognosis and therapy. It is possible that onset in the early months of pregnancy may indicate a better chance of recovery than onset in the later months, when latent toxæmia of pregnancy may be an additional factor.

We wish to express our thanks to Prof. E. J. Wayne for permission to publish this case and for helpful criticism. We would also like to thank Mr. Glyn Davies and Dr. A. G. Yates for their help.

REFERENCES

- Bachmann, H. (1930). *Zbl. Gynäk.*, 54, 2636.
Burnett, C. W. F. (1946). *J. Obstet. Gynaec. Brit. Emp.*, 53, 539.
DeLee, J. B. (1938). *Principles and Practice of Obstetrics*, 7th ed. Saunders, Philadelphia.
Greenhill, J. P. (1934). *Practitioners' Library of Medicine and Surgery*. New York.
Sachs, E. (1910). *Msch. Geburtsh. Gynäk.*, 32, 649.

DISCONTINUOUS INTRAVENOUS INFUSION AND TRANSFUSION

ADVANTAGES AND TECHNIQUE

BY

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Working as I do to a large extent in small hospitals and nursing homes without a resident medical officer, I have found the following expedient a godsend. The principle is founded on Edwards's vein-seeker. The outfit (Fig. 1), improvised with materials that are not difficult to obtain, was evolved with the assistance of Sister Pauline, C.B.E. It is of cardinal importance that the tubing be latex or other really good rubber. Most rubber tubing supplied to-day, particularly that made from synthetic rubber, has been found to be useless and dangerous for this purpose. Another essential point is that the rubber tubing must be renewed each time the apparatus is sterilized by boiling, and each time it is renewed the tubing must be tied securely

FIG. 1.—Showing the relative sizes of the components.