Thesis

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by

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Puerperal Eclampsia

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The subject of puerperal eclampsia as a thesis has suggested itself to the writer, owing to the fact that several cases occurred in his practice within a comparatively short period.

These offered him an opportunity of making a close study of the disease, and of judging of the value of various forms of treatment.

On the basis of these cases a paper was read at the local branch of the British Medical Association and the discussion which followed led to further inquiry being made into the local incidence of the disease.

The excellent Library of the local branch of the British Medical Association also afforded an opportunity of consulting a fairly representative collection of modern and ancient articles on the subject, and these, together with the obstetrical works and Journals in his own library have enabled him to make a critical view of the views held on the unsolved problem of eclamptic seizures.

The Thesis is thus divided into two parts - I A Report of three cases of eclampsia, with details of the treatment carried out. and II. A Review of the literature of the subject, with special reference to incidence, theories of causation and treatment.

I. Report of three cases of eclampsia.

Case A. Case of Mrs D. Devon Street, Woodstock Cape Town. Attended on July 15th 1903. The notes from the Case Book were taken at the time of the illness.

The patient was an Englishwoman, aged 29 years. She had already had three children, the last in 1900. The husband stated that she had no trouble at any of her previous confinements.

It was also stated that she was addicted to the use of alcoholic stimulants, chiefly beer, and that even within a short time she had been seen intoxicated in the street.

Up till the day of the attack she had appeared to be in good health, except that she had complained of headaches, chiefly in the back of the head, and that her feet and legs had been swollen for about a fortnight. She had been in her usual health in the early part of the day of the attack and had dressed and gone about as usual, till suddenly, about 10 a.m., she "had a fit," from which she had not "come out" when seen by the writer at 11 a.m.

On examination she was found to be a large, stout woman, and there was a considerable degree of anasarca of the feet and

legs. She was deeply comatose. Nor could she be roused from the comatose state in which she was found. There was stertorous breathing and cyanosis present.

A sample of urine, obtained by catheterisation, was found to contain a large quantity of albumen and some blood. On vaginal examination the vagina was found to be of large size and the os uteri admitted the tip of the index finger. There was no evidence of labour having commenced. The uterus apparently corresponded in size with a full-time uterus.

Whilst under observation no fits occurred, but the comatose condition continued. The temperature was 100°, and the pulse very rapid, and of high tension.

A consultation saw the patient with the writer, and after considering the history and condition of the patient it was decided that the uterus should be emptied.

During the time that the writer was absent, to obtain his Bossi's dilator and other instruments, another "fit" was observed by the nurse and on his return the same deeply comatose condition was present.

When proceeding to give

chloroform, it was discovered that the artificial had been broken during the seizures, and the plate could not be removed.
The writer then proceeded to dilate the os with Bossi dilator, Hegars dilators, and the Ellinger-Sims instrument being used before the "unarmed" blade of Bossi instrument were introduced. These were followed by the "armed" blades, and there was no special difficulty in the use of the dilator. Plenty of time was allowed after each turn of the screw; and when dilatation was completed up to 11 c.m. the membranes were ruptured, and axis traction forceps applied to the head which was in the I st. cranial position.
After delivery the placenta was expressed, and the uterus contracted well. The haemorrage was not more than is usual at normal confinements.
It was noticed that there was a tear of the cervix on the left side, and this caused some anxiety, repeated examinations being made by the finger.
The process took one hour and ten minutes.
After recovering from the chloroform, the patient became more conscious than she had been, and would mutter a

few unintelligible words when shouted at, but she did not become fully conscious.

The bowels were acted upon by means of a large enema, and a pint of normal saline fluid was injected under each breast.

Within a few hours of delivery the seizures returned with great frequency and violence and continued till the death of the patient two days later. At first the interval between the fits was several hours, but during the last six hours they occured at intervals of about half an hour. The administration of chloroform was found to be the only means by which the fits could be kept in check. A few drops were put on the mask as each seizure took place.

Towards the end, the fits ceased, coma deepened, and death took place.

The child, who at birth was slightly asphyxiated, responded well to artificial respiration, but she also died when about thirty-six hours old.

She had no fits, and was a foetus of eight and a half months.

A partial post-mortem examination was carried out, chiefly to determine the effect of the

dilator on the cervix.
There was an extensive laceration of the cervix on the left side. There was no injury of the vessels or peritoneum. The cervix was marked by the instrument but there was no tear at any other part.
Remarks on Case A.
The question of the treatment employed will be discussed more fully later on.
It is evident that the treatment had little beneficial effect on the course of the Disease. The profoundly toxæmic condition of the patient when first seen, determined the active measures employed, and was evidently the cause of the fatal result.
As stated, labour had not commenced, and the cervix was consequently not "taken up" Consequently the case was not specially suitable for the use of Bossi's dilator.
No harm seemed to result from the laceration, and as there was no haemorrhage, and the patient had been a long time under the anæsthetic, suture of the cervix was not performed. Under favourable circumstances it is advisable to suture the cervix at once.

Case B.

Within a few months of the previous case, the writer was called to attend a Scotswoman, aged 28, at Woodstock.

She was a primipara and labour proceeded satisfactorily till the pain occurred, during which the head was driven through the vulvar orifice.

This pain, so to speak, developed into a convulsion.

The patient, who previously had been in good spirits, suddenly threw out the arms from the body, whilst the fingers were flexed on the palms, and the hands flexed on the forearms. The eyes rolled about in such a manner as to terrify the nurse, and the woman became cyanotic. There was foaming from the mouth, and complete loss of consciousness for quite five minutes. Clonic movements followed the tonic contractions, and there was difficulty in protecting the infant during these.

The child had to be extracted during the time that the mother was unconscious. It was a healthy live boy.

The patient was dazed when she recovered from the seizure, and did not know that the child was born. She complained of headache. The placenta was

expelled about twenty minutes later. The binder had been applied and the writer was about to leave when about an hour after the first attack, a similar seizure took place. Consciousness was again lost for several minutes, and tonic and clonic convulsions took place. This left the patient dazed and with a severe headache. Bromide and chloral were ordered, and the patient was kept quiet in a dark room and on fluid diet. No more seizures occurred. The urine was found to be free from albumen, and the recovery was complete.

Remarks on case B.

The question of diagnosis arises in this case. Eclampsia has been defined as a condition characterized by the presence of convulsions and albuminuria, during pregnancy or the puerperium. In this case there was no albumen in the urine. There was, however, no history of epileptic seizures, and the attacks as described above were typically eclamptic. In spite of the fact that Lusk (1) and other authorities have stated that they have never seen a case of eclampsia without albuminuria, the writer is convinced that this was such a case. In an interesting article on Epilepsy in pregnant women Neu (2) has gone

fully into the question of epilepsy and eclampsia and he emphasises the fact that the history of the case is the chief guide in differential diagnosis.

Case 6 — The third case in the series is that of C. B. a Cape coloured woman aged 21 years.

She was treated at "Vrede Oord" the Home of the Salvation Army for such cases, of which the writer is in medical charge.

She was sent in by her medical attendant who had seen her in her Mother's house where several fits had occurred.

She was a primipara and unmarried. She was admitted on August 6th 1906 and was unconscious on admission.

She had three seizures on the afternoon of admission.

Later in the afternoon she recognised her Mother, but otherwise lay in a semicomatose condition which deepened into coma after each seizure.

When seen, she was found to be a well-nourished woman in a semiconscious condition. There was marked edema of the feet and legs which extended up to the knees, and pitted on pressure. She was semiconscious. The pupils were small and fixed. The pulse was regular, rapid and of high tension. The temperature was 100°.

She had just had a seizure when seen, but none were observed by the writer. The chief feature of her condition was the extreme restlessness. She constantly tossed about from side to side, and moaned, but took no notice of questions, addressed to her in a loud voice. A quarter of a grain of morphia was injected hypodermically. This was repeated in four hours. Another fit occurred at 12.30 a.m. and she lay in the same condition during the night.

Up till the morning of the 7th no urine had been passed, but in the morning the nurse reported that she had passed a very large quantity of urine; and that the bowels had moved without the patient's knowledge.

On vaginal examination however it became evident that the fluid was in part at least liquor amnii, as the membranes had ruptured, and the head was presenting. With the aid to slight manual dilatation of the os the child was speedily delivered by the uterine contractions. The patient took no notice of the act of parturition.

Later in the day a catheter was passed but no urine could be obtained as the bladder was empty.

On the following day a small

sample was obtained which was found to be loaded with albumen. Tube casts were also present.
The child proved to be a five and a half months' foetus, born dead.
After delivery no marked improvement took place except that no fits took place.
The patient lay in the same semi-conscious restless state, taking no notice of anyone, and only occasionally opening the eyes when loudly shouted at.
By means of a funnel she could be made to swallow fluid nourishment, but the extreme restlessness made it difficult as well as dangerous to give sufficient food.
On the evening of the second day the temperature was 101.8° and the pulse rapid, and the urine was very deficient in quantity, and passed unconsciously, as were also the motions. The bowels move frequently although no purgatives were given. One and a half pints of normal saline fluid with 30 grains of acetate of potash were injected subcutaneously under the right breast.
The patient took no notice of the manipulations but as she tossed about, the process was difficult and dangerous.
For this reason the fluid was

ordered to be given per rectum, one pint of normal saline with 30 grains of acetate of potash were injected every six hours. As the diarrhoea was ceasing, this was mostly retained. On the morning of the third day large quantities of urine were passed into the bed, but no improvement in the general condition was noted. On the fourth and fifth days the patient remained in the same condition, except that the temperature reached only 100.2° on the evening of the fourth day, reached normal the following morning, and remained normal afterwards.

On the sixth day she became more conscious and opened her eyes when spoken to, otherwise there was no change.

The pulse was still of high tension and rapid. The rectal injections were continued thrice daily, and nutrient enemata were given, owing to the difficulty of giving sufficient nourishment by the mouth.

On the seventh day, quite unexpectedly, another severe fit occurred and she became comatose again. A quarter grain of morphia was injected.

On the eighth and nineth days she gradually improved, and had no

further seizures. She was however, semiconscious only, and could not speak.
On the tenth day she shewed the first signs of consciousness, and spoke a few unintelligible words. From this time onwards, progress was uninterrupted, and the patient although extremely emaciated and anaemic made a satisfactory recovery.
The urine contained albumen till the fifteenth day after which none was found.
Remarks on Case 6.
This case presents a severe attack of eclampsia. The fits were not very numerous, only five been observed during her stay in the Home, but the coma was present for an unusually long time. For five days the patient was semiconscious, and it was very difficult to feed her, because of this, and also because of the restlessness. Pulmonary complications arising after eclampsia are undoubtedly in many cases due to food or medicine administered to the unconscious patient. It has been pointed out that fluids are apt to find their way into the trachea, especially if the patient is gagged, as the act of deglutition cannot be performed unless the lips are approximated.

On the sixth day, when the patient became for a time more conscious, the task of feeding her became more difficult as she resisted efforts to give her fluid food by tightly closing her teeth.

During the ten days all the evacuations were passed unconsciously, and this involved unceasing labour on the part of the nursing staff.

The fact that no marked improvement took place after the birth of the foetus, raises the question whether "accouchement forcé", as some hold is the indication in the treatment of eclampsia.

This question, and others arising from these cases, will be discussed in the second section of the Thesis.

II. Review of views held on eclampsia.

a. Causation.

Zweifel has named eclampsia "the disease of theories" and so far, investigation seems chiefly to have added to the theories without furnishing any solid substratum on which to build.

Progress in this direction can be hoped for chiefly along the lines of careful clinical investigation of cases, post-mortem appearances, biochemical analysis, and experiments on animals.

Clinically the most striking features of eclampsia are the association

of convulsions and albuminuria
in pregnant women.
Rayner of Paris in 1840 called
attention to this. Sir J. Y. Simpson (3)
has pointed out that in 1800
Hamilton observed that anasarca
was frequently present when
puerperal convulsions occurred,
and Simpson states that previous
to 1840 he had taught that
Bright's disease was often present
along with eclampsia.
It was naturally concluded in
the first instance, that the
disordered kidneys were the cause
of eclampsia, and that the coma
and convulsions were probably caused
by uraemia. An explanation of
the condition of the kidneys was
also found by some, in the pressure
which the pregnant uterus exerts
on the ureters
The discovery however, of the widespread
nature of the lesions found
post-mortem in eclampsia, leads
to the modern theories of
eclampsia as a toxaemia.
Clinical evidence also is not
wanting to prove that many
women who have had albuminuria
and who become pregnant
shew no signs of eclampsia.
Indeed no previous renal
disease has existed in the great
majority of cases, and eclampsia
may occur without albuminuria
The fact also, that uraemic symptoms

are rare, for instance in uterine cancer which causes constriction of the ureters, and accumulation of urea and other waste products in the blood, goes to disprove a merely mechanical theory.

The liver, the blood, the intestines the brain, the thyroid gland and other organs, as well as the kidney give evidence of a blood-borne poison; and at present some authorities hold that the liver lesions are the most characteristic of the Disease.

Recently Konstantinovitsch (4) has reported on thirty cases examined post mortem, in Marchand's laboratory. His investigation shewed that the earliest changes were alteration of liver cells and endothelium of the capillaries at the periphery of the lobules. There was widening of the capillaries and congestion and escape of blood at the periphery of the lobules, caused by thrombosis of blood in the capillaries. Then the smaller, and later, the larger interlobular vessels were thrombosed. This may lead to a form of cirhosis of the liver.

Subcapsular haemorrhages and areas of necrosis surrounded by small-cell infiltration are considered characteristic.

Many authorities may be quoted as supporting the view that the

liver lesions are quite characteristic of the disease, and not the same as those found in acute yellow atrophy and phosphorus poisoning as has been stated by some.

Thus Whitridge Williams (6) supports this idea, and states that in eclampsia, the characteristic features is the commencement of the necrosis of the lobules at the periphery and not at the centre. "Hepatitis haemorrhagica" is a term that has been applied to the condition found.

The pathological conditions found in the livers have been described as they have attracted much attention of late, but similar conditions have been found in the spleen, pancreas, lungs, and brain. We must however not lose sight of the fact that kidney lesions are present in from ninety to ninety-five per cent of cases (Jellett (4)), and it is difficult to prove which lesion is primary, which secondary or indeed that all are the result of a toxaemia.

It is not possible to discuss the various conditions found in the kidney. "Pregnancy kidney" is frequently applied to the various forms of nephritis which are found during pregnancy, but no pathological condition of the kidney can be

stated to be pathognomonic of eclampsia.

In the brain various pathological conditions have been found. Sometimes it is anaemic, sometimes hyperaemic, and marked oedema and minute haemorrhages are frequently present.

Recently Carver and Fairbairn (7) have recorded a case of eclampsia in which haemorrhage into the Pons Varolii was the cause of death. Similar cases have frequently been recorded.

The presence of increased tension in the cerebro-spinal fluid has been found in some cases. Further reference will be made to this in the section on treatment.

The theories as to the causation of eclampsia have been systematised by the writer under the following headings, and these will be considered along with the views on the pathology of eclampsia.

A. Theories referring the origin of the poison to the mother.

(a). Eclampsia is a form of uraemia. This is the oldest theory, and is sometimes called Frerichs. According to this theory the diseased kidney is the chief factor, and urea or carbonate of ammonia cause the symptoms as they are not eliminated by the diseased kidneys. Stumpf has suggested that acetone may be the poison.

(b) Eclampsia is an autointoxication

due to a poison or poisons produced by the mother which are not eliminated or neutralised. It is supposed that such poisons are formed normally and that certain organs (e.g. the thyroid gland) have the property of producing antitoxines. Against this theory it may be urged that no toxine has been isolated.

B. Theories associating the disease with the foetus —

(c.) The intoxication is due to products of metabolism produced by the child in utero.

In support of this Dienst (8) has shewn that pathological changes are present in children born of eclamptic mothers similar to those described, but at a more advanced stage in the foetus. He considers that these are primary.

C. Theories associating eclampsia with the placenta and foetal membranes.

(d.) The intoxication is produced in the placenta. This includes Veit's theory of a "syncitiotoxine" which is normally produced in the placenta and enters the maternal circulation where it is neutralised by a "syncitiolysin". It was shewn that placental giant cells or masses of syncitium could be found in the pulmonary capillaries of women dead of eclampsia. Some have shewn, however that such cells may be found in the

pulmonary vessels of all women who die during or after labour, from whatever cause. Whitridge Williams (loc. cit (5)) has also shewn that chorionic villi can always be found during the puerperium in the blood vessels of the uterine wall, far removed from the placental area.

Veit employed the term "deportation of chorionic villi" to describe this process, and on Ehrlich's "side-chain" hypothesis founded his theory referred to. He explained all the disturbances of pregnancy by this theory. This theory is in accordance with the results recently obtained in haematology and is of interest on that account.

Recently Mirto (11) has investigated the question of the relationship of the placenta to eclampsia. He finds that the placenta in eclampsia is frequently taken up with infarctions sometimes to the extent of one third of its substance. Mirto had previously advanced the theory that placental insufficiency might allow passage into the maternal circulation of foetal waste products usually neutralised by the placental secretions. He now thinks that eclampsia is due to the fact that the cells of the diseased placenta pass more readily into the maternal circulation. The idea that

eclampsia is due to an increased number of syncitial cells in the maternal blood he considers not to have been proved. He considers that the poison in eclampsia is of foeto placental origin.

Recently Dr. Albeck (9) of Copenhagen has experimented with the liquor amnii of eclamptic patient. This was injected into guinea pigs and cats, and produced necrosis of liver cells, and other lesions characteristic of eclampsia. The liquor amnii of non-eclamptic patients had no such results.

D. Eclampsia is due to the action of internal agents.

(e) Bacteria have been suggested as the cause of eclampsia. There is no definite evidence to support this. A remarkable feature, however, of eclampsia is that it appears to occur epidemically at times. Thos Ballantyne (10) has recorded the fact that in the Edinburgh Maternity Hospital, during thirty six days in 1902, out of thirty seven confinements, six cases were complicated with eclampsia and five others had albuminuria although in them eclamptic symptoms were warded off with treatment. Olshausen and others have recorded similar "epidemics". It is of course well known that eclampsia is more frequent at certain seasons of the year, and

Olshausen states that in Berlin it is most frequent between September and February.

In reviewing the theories sketched above it is disappointing to find that, in spite of much investigation, we are without a solution of the problem.

Pregnancy although a physiological condition, as has been said, borders on the pathological. Vomiting and digestive disturbances in pregnancy are probably evidences of a slight degree of poisoning of the system; and albuminuria and eclampsia may be looked on as a more pronounced evidence of what always occurs in pregnancy. The origin of the poison (it seems hardly correct to call it a "toxine" as "toxines" are usually associated with microbic action) is still obscure but that the foetus plays an important part in its production is certain. This idea is favoured by the fact that improvement usually sets in on the death or delivery of the foetus. The lesions found in the mother are probably secondary, and are the result of a blood-borne poison. Predisposing factors play a part as in other diseases, thus eclampsia is notoriously frequent in primiparae especially if the offspring be illegitimate.

Turning now from theoretical

considerations, a short reference will be made to the frequency of eclampsia.

b Incidence.

The writer has made some inquiries into the incidence of eclampsia in Cape Town. It is well known to be a frequent disease amongst the coloured races in the West Indies and the East. Some of the most extensive series of cases come from India, due in part to the large number of cases dealt with. It is stated that in Great Britain dark, damp days favour the occurrence of eclamptic seizures, and it might be supposed that in the warm dry climate of South Africa, it would be a rare disease.

Owing to the courtesy of the Medical Officer of Health of Cape Town, the writer has obtained the statistics of deaths from eclampsia during as many years as such have been kept.

Table A and Table B (on the next page) have been compiled from these figures, and figures given by Herman (12) for England, and by Hardie (13) of Brisbane, have been added for the purpose of comparison. As far as deductions can be made from these figures, it would appear that eclampsia is more frequent in Cape Town, and still more frequent in Queensland than in England.

Table A

Year	Births		Deaths from puerperal convulsions	
	European	Coloured	European	Coloured
1902	925	1661	0	0
1903	919	1603	0	2
1904	1049	1676	0	1
1905	1020	1771	0	0
1906	937	1760	1	1
1907	920	1765	1	0
1908	776	1667	1	2
seven years.	6546	11903	3	6

Table B.

Place	No of deaths from Eclampsia	Death rate per 100,000 confinements	Authority
England	1 in 2543 births	39	Herman (12)
Cape Town	European 1 in 2182 births	46	writer
	Coloured 1 in 1983.3 births	50.4	writer
Queensland	1 in 1585.8 births	63	Hardie (13)
~~New York~~	1 in 700 births	142.8	Lusk (1)

On investigating the statistics of the Cape Town Free Dispensary (Maternity Department) with the working of which the writer is associated it was found that during the twentyone years in which cases have been attended 2,516 maternity cases have been undertaken, and amongst these only one slight case of eclampsia occurred. Only married women are attended, and in some cases prophylactic measures have been successfully employed. It is difficult to estimate the frequency of eclampsia. Veit and others give a general proportion of 1 in 500 confinements, and Parvin a proportion of 1 in 333, for the United States.

c. Treatment.

A review of the views held on the treatment of eclampsia will now be undertaken, and here the most remarkable difference of opinion is found amongst the authorities

A Prophylactic treatment.

All are agreed that this is of the greatest importance. A systematic examination of the urine in the later months of pregnancy in all cases, will lead to the detection of albuminuria in a certain number of cases. This is specially necessary in the case of primiparae, for eclampsia is specially frequent with them. Byers (14) states that in his experience five times as many cases occur amongst primiparae as amongst multiparae, and that Schantz's statistics give the same result.

The presence of albuminuria in a pregnant woman, whether of recent origin or not, should lead to supervision being instituted, and to a quantitative estimation of the amount of albumen and urea present. Rest in bed, purgation, and a milk and copious fluid diet should be enforced. Dickinson has stated that he never knew of a case of albuminuria in pregnancy in which such measures were instituted where eclampsia developed.

B. Curative Treatment.

When eclamptic or preeclamptic

symptoms have developed the question to be decided is whether the uterus should be emptied or not.
Here a sharp cleavage takes place in the practice of obstetricians which may be shewn by reference to the teaching of two eminent accoucheurs. Kelman (loc. cit (12). p. 826) says "I believe that much of the mortality of puerperal eclampsia comes from the pernicious maxim "Deliver as quickly as possible."
Sir Halliday Croom (5) says "The supreme principle (in eclampsia) is to deliver the woman as quickly and carefully as possible."
The different views held on the treatment of eclampsia was strikingly shewn in an investigation carried out by Comyns Berkely (38).
Between the extreme views there is, of course, a "via media" which leads to an expectant treatment followed by one or other form of "accouchement forcé" if improvement does not result.
First will be considered the means to be employed if the expectant line of treatment is to be followed. Should albuminuria be present, and premonitory symptoms appear such as severe headache (frequently occipital) amaurosis, oedema, or twitching then eliminative measures are indicated. These will consist first in free purgation. An intestinal origin of eclampsia has been suggested.

Thus in a case recorded by Chambrelent (16) eclamptic seizures in a pregnant woman followed on the eating of "high" pheasant and snipe. Barbas also recorded cases occurring after "high" game and oysters had been eaten. Constipation is a frequent prodrome of eclampsia.

A copious milk and fluid diet should be given, and diuretics may be administered by the mouth. Fluid may also be introduced into the system per rectum or subcutaneously as recommended by Jardine (17). Diuretic salts may be added to normal saline and used in this way.

It has, however been pointed out by Bovée (18) and others that owing to kidney insufficiency, the output of chlorides is diminished in eclampsia and that the system is apt to be further overloaded with chlorides if normal saline is used in large quantity.

Bleeding may be looked upon as an eliminative form of treatment. Sixteen to twenty ounces of blood may be withdrawn with advantage even in the early stages, and certainly in those cases which are marked by coma, cyanosis, high tension pulse and engorgement of the pulmonary circulation and right side of the heart.

Hot packs have been used to induce diaphoresis. It has,

however been pointed out that there is danger in too free diaphoresis, as the poison is thus apt to be concentrated.

A form of treatment that has given good results is the use of thyroid extract. Nicholson (19) has given much attention to this subject. His work is founded on the observations of Lange (20) who found that the thyroid was enlarged in 81.2% of women examined in the last twelve weeks of pregnancy. The enlargement disappeared in the puerperium, and returned in subsequent pregnancies.

When iodothyrin was given to women with enlarged thyroids under these conditions the gland diminished in size. He concluded that there is increased functional activity of the thyroid during normal pregnancies. This increased thyroid activity is supposed to be due to the action of the thyroid in neutralising the poisons normally present. In cases of eclampsia, this enlargement is often absent, or less than usual. Theoretically the use of thyroid extract is supposed to stimulate tissue metabolism and neutralise the poisons in eclampsia, practically the patients improve under the treatment, and especially free diuresis is produced. Nicholson employs morphia hypodermically along with the thyroid treatment

and this has given good results, as recorded by several observers. The use of morphia in preference to such sedatives as chloral and chloroform, has recently been much favoured. Veit is a strong advocate of the use of morphia in eclampsia, and he points out that by inhibiting metabolic processes, it lessens the amount of toxine produced and it produces diuresis. A high foetal mortality has, however, been reported after the use of morphia. It used to be taught that morphia was dangerous in kidney disease, and Sir William Gairdner used to say that "it locked up all the secretions, except sweat" Good results have, however, followed its use in eclampsia, and a quarter or a half grain may be given until, if necessary, two grains have been injected in the twenty four hours.

The morphia treatment is most suitable as a preliminary measure, in cases commencing with severe seizures. These can sometimes be controlled by its use till the course the disease is likely to take is apparent. For obvious reasons it is not suitable for cases in which coma is a marked feature.

Veratrum viride is a drug much used by American obstetricians

in eclampsia. It is supposed to reduce the temperature, slow the pulse, reduce blood pressure, and cause sweating. It may be given in doses of ten to twenty minims of a saturated tincture every half hour till its effects are produced. The value of this treatment is doubtful. The use of chloroform as a means of controlling the severity of the seizures has been advocated and it was used in case A. The action of chloroform in lowering blood pressure has been urged in its favour but probably its use is best reserved for the production of anaesthesia during obstetrical interference. The administration of chloral by the mouth in early or mild cases gives good results. Pilocarpine has been used in the treatment of eclampsia but it must be looked upon as a dangerous drug. Pulmonary complications (oedema, pneumonia etc) are not infrequent in eclampsia and the administration of pilocarpine is apt to favour these conditions.

Digitalis is probably the best heart stimulant in eclampsia and atropine and nitroglycerine may be used as indicated.

In considering the necessity for emptying the uterus, due weight must be given to the fact that, in a certain proportion of cases, the fits do not supervene till after

the child is born. It has even been contended that eclampsia may occur without a foetus being present in the uterus. Hitschmann (21) has recorded a case of molar pregnancy in which no evidence of a foetus could be found on microscopic examination and where typical eclamptic convulsions occurred after labour pains commenced. Albuminuria was present in this case.

With regard to the occurrence of eclampsia after labour, the following are some of the statistics.

Esch (22) gives the percentage at 15.7
Olshausen " " " at 14
Goedecke " " " at 18.2
Knapp " " " at 14.6
Bidder " " " at 29
Schauta " " " at 23.3

With regard to the question of the cessation of fits after delivery, there is wide divergence in the statistics given.

Dührssen (23) gives the percentage at 93
Zweifel " " " at 66
Esch (22) " " " at 49
Olshausen " " " at 45

With regard to the mortality under the various forms of treatment, Bumm has recorded a mortality of 30% in his own practice under expectant treatment. By immediate emptying of the uterus which he has latterly adopted, the mortality fell to 2.8% in 104 cases; and he has recently

recorded seventy nine cases treated by rapid delivery, with only one maternal death. These figures are striking as being the results obtained by the same obstetrician using different methods of treatment, and have caused Bumm to be a strong advocate of early delivery. Pfannenstiel on the other hand, has recorded thirty five cases treated on expectant lines without a maternal death.

In spite of such advice as that given by Goodel - "Take care of the convulsions and let the uterus take care of itself" there are cases in which the uterus should be emptied, and the different methods of doing this will now be considered. In suitable cases, instruments may, of course be applied to hasten delivery, and where labour has not commenced, or is only in the early stages, the following are the methods by which it may be rapidly terminated -

1. Dilatation of the cervix with hydrostatic bags, followed by extraction.
2. Dilatation of the cervix manually.
3. Dilatation by Bossi's dilator or other metal dilator.
4. Vaginal Caesarean section or cervical incisions
5. Caesarean section.

1. The use of hydrostatic bags (such as Barnes' or Champetier de Ribes') although of value in certain cases of

"accouchement forcé" is not specially indicated in eclampsia, because of the time they take to dilate the cervix.

2. Manual dilatation of the cervix gives good results in certain cases of eclampsia. The writer has had experience of this method in a case of placenta praevia in which the vagina was wide, and the os soft and easily dilatable. First one and then two fingers were inserted and the hand was gradually made to enter in the form of a cone. As the uterus lay low in the pelvis a method comparable to that used to dilate the sphincter ani, by means of the thumbs was employed, and only slight laceration of the os resulted. The child was easily turned and extracted. The advantage of the manual method is that the fingers can instantly detect any tendency to laceration. It is however, fatiguing to the hand.

3. The use of metal dilators (Bossi, Tarnier, Seigneurt) is still advocated by many. Bossi's instrument is as good as any, and with care, in suitable cases it may be employed with success. Unless however the cervix has been "taken up" these powerful instruments are apt to cause lacerations. This happened in Case A. Bossi's instrument has been used successfully in eclampsia by Simpson (24) and Ballantyne (25). Vandy

Pollak (26) has recently recorded a long series of cases from his own practice and that of others. He sets forth the advantages of this instrument in eclampsia as a means of rapid delivery, as compared with Caesarean section. He holds that there must be a judicious choice of cases, and that the operator must be prepared to treat lacerations as they arise. It has been claimed that Bossi's instrument can dilate the cervix without uterine contractions being brought on and this is considered an advantage in eclampsia as the fits are often worst when the uterus is acting vigorously (see Haultain (27)). Provided great care is taken, and the degree of tension to which the os is subjected is carefully judged by the finger at frequent intervals and provided also that the distal ends of the "armed" blades are inside the internal os, Bossi's dilator may be used with a degree of safety, especially if labour has commenced.

3. Vaginal Caesarean section is a term introduced by Dührssen who incises the anterior and posterior walls of the cervix mesially. Bumm has shewn that the anterior incision alone is sufficient in most cases. The operation is indicated when the cervix is very rigid, and it is

decided that the uterus must be emptied speedily. In some cases, especially in primiparae it is sometimes necesary to make incisions into the perineum and vagina in order to carry out the operation.

The following is an account of the operation given by Brewis (29).

"The anterior vaginal wall was divided transversely immediately above the external os, and, along with the bladder was pushed upwards. The anterior surface of the cervix was cleared in this manner, and then divided vertically in the middle line, with scissors for three or four inches. The membranes were ruptured and instruments applied to the child's head. After a quarter an hour's manipulations, the child was delivered. The cervical incisions were sewn together with catgut. Then the anterior wall of the vagina and the bladder were stitched in position." Brewis concludes that if it is conceded that the uterus should be emptied rapidly in grave cases of eclampsia Dührssen's operation is a "most rational and proper procedure". Munro Kerr (28) has also advocated the use of vaginal caesarean section in certain cases of eclampsia, and has employed

it with marked success.
He puts forward the following advantages of the operation
1st In some cases it is the only possible method of emptying the uterus rapidly.
2. Rapidity of delivery - only four or five minutes been taken to empty the uterus
3. The absence of shock
4. The fact that clean cuts are made, which can be dealt with much more satisfactorily than lacerations.
With regard to the after results of this operation Badeleben (30) has examined eight women on whom the operation had previously been performed. The results were satisfactory in all the cases. There was no serious displacement of the uterus or injury to the bladder and in most cases the finger could detect no irregularity of the external os.
He considers that the operation has many advantages over dilatation.
Skilled assistance, good light and the lithotomy position are of importance when this operation is done, especially in view of the difficulty of outlining the cervix vagina and bladder.
Veit has performed this operation in thirty three cases with only one death, the result of pneumonia.

4. Abdominal Cæsarean section has been employed in several cases of severe eclampsia. Halliday-Croom (31) has recorded two cases, in one of which a narrow pelvis and vagina led him to perform abdominal section in an eclamptic patient. Unless there is some indication of this nature, this operation must have a limited sphere in eclamptic cases. It may occasionally be undertaken when the mother is "in extremis" or dead, and the child alive in the hope of saving the child.

Two other surgical forms of treatment of eclampsia may be mentioned here - decapsulation of the kidney, and lumbar puncture. Edebohls has advocated the former in certain cases of nephritis and in 1903 (32), he recorded the first case in which the operation was performed for eclampsia. In 1904 (33) he recorded a second case. In the first case the kidneys were decapsulated forty-eight hours before delivery. This resulted in a diminution of the fits, and there was a good recovery. In the second case the operation was done forty-six hours after delivery, as the fits were continuing. Recovery resulted. In neither of these cases was the capsule tightly stretched over the kidney

In a case described by Lippel (34) the kidneys were found to be greatly distended, and the capsule tightly stretched, so that the condition was described as "glaucoma of the kidney". It was considered that decapsulation or even nephrotomy might have been done with advantage in this case. That this or similar conditions are frequent in eclampsia, has not been proved, and if present, they may be secondary so that the value of decapsulation or other kidney operations in eclampsia is far from being established, even if anuria is present.

Lumbar puncture was used on the hypothesis that eclampsia was due to increased intra-cranial or cerebrospinal pressure. J. A. Helme (35) was one of the first to use this treatment and he was led to employ it because of the good results obtained by McVail by it, in two cases of coma and convulsions due to acute nephritis.

In Helme's case about one and a half drachms of cerebrospinal fluid escaped as if under considerable pressure, and the patient recovered. Krönig (36) has used this method, and found an increased tension of the cerebro-spinal fluid, or

measurement during a convulsion.
Ballantyne (37) has recorded a fatal case in which spinal puncture was employed and from his article most of these facts have been obtained.
He considers that the chief indication for lumbar puncture is to gain time for the application of other therapeutic measures, when the convulsions are severe.
Some have injected drugs (morphia cocaine etc) into the subarachnoid space with the object of cutting off stimuli causing the convulsions.
Changes in the central nervous system are certainly frequent in eclampsia, and high pressure of the cerebro-spinal fluid is often present but the value of lumbar puncture is uncertain.
As in the case of decapsulation of the kidney, it is useless to relieve at great risk one feature of a widespread pathological process, in the hope of curing or even materially alleviating the disease.
Such are the chief points in the present day treatment of eclampsia, and their mere number and variety are striking proof of the unsatisfactory state of our knowledge of the subject.
There are undoubtedly cases in which to purge and to bleed is the best treatment.

Delivery with forceps, under chloroform should be employed also, if labour has commenced, and there is no contraindication.

One point is clear, prophylaxis gives excellent results and the urine should be systematically examined, in spite of the practical difficulties of obtaining specimens in many cases. Rest in bed, milk diet and thyroid treatment give good results, should albuminuria be detected.

The following seem to the writer to be the most important points in treatment of mild cases. They have been emphasised by the Rotunda School (38).

1. Lavage of the stomach by syphon tube through which castor and croton oil are passed
2. Lavage of lower bowel with enemata of normal saline
3. Infusion of fluid under the breasts, with the addition of acetate of potash
4. Injection of morphia hypodermically, ¼ grain at a time, up to two grains being used if required, in twenty four hours.
5. Patient to be kept on the side to prevent fluid entering the lungs.
6. Copious milk and fluid diet.

Should such measures not produce improvement, instrumental delivery under chloroform is best, if labour has commenced. Craniotomy

should be performed if the child is dead to favour a speedy delivery.
If improvement is delayed and labour has not commenced then one or other form of "accouchement forcé" should be resorted to.
Manual dilatation of the cervix, the use of Bossis dilator, or Vaginal Caesarean section are each valuable, according to the indications of the case.
The child should then be delivered after version or by instruments.

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Note — As far as possible the original article referred to has been consulted in each case.

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