

# OBSTETRICS

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VOL. III.

FEBRUARY, 1901.

No. 2

## Original Articles.

### FIFTY-EIGHT CASES OF PUERPERAL ECLAMPSIA WITHOUT MORTALITY.\*

By PROF. W. STROGANOFF.

IT will be remembered that at the last Congress of Obstetricians and Gynecologists at Gent success was reported in the treatment of eclampsia by various remedial agencies, including morphine, chloral, chloroform, veratrum viride, evnesection, accouchement forcé, sweating, and others. The success attained, however, was not very encouraging. Of 902 cases collected by J. Veit, 194, or 21.6 per cent., ended fatally. Of 717 primipara, 142, or 19.8 per cent., and of 185 multipara, 53, or 28.6 per cent. died—not including patients in extremis when first seen, the mortality still remains 15.3 per cent. Giessen and Heidelberg alone had no mortality rate, ten cases in each instance.

Veit, as the result of his analysis, draws the conclusions that since the pathology of eclampsia is unknown there is at present no logical treatment, but the best results are attained by the use of morphine in maximum doses. Although he advises that in cases of moderate severity delivery should be hastened by operative methods when it can be done with no great danger to the mother, he advises the accouchement forcé only in exceptional instances.<sup>1</sup>

In the last three years I have had 70 cases of eclampsia.

\* Translated for OBSTETRICS from Monatschrift für Geburtshilfe und Gynäkologie, 1900, No. xii.

In the academic year, 1896-97, the cases were of a severe type and the mortality reached 25 per cent. This induced me to give the subject special attention, and it was at the beginning of the academic year 1897-98 that a change in my views as to the pathology of the affection led me to adopt a change of treatment.

Among 37 cases observed in the Institute for Midwives since that time, 3 in April, '97-98', and 16 '98-'99, there has been no fatal issue.

In addition to these cases there have been during this time in the Alexandro-Newsky Maternity, which is under my direction, 9 cases, of which only 1 (No. 238, July 7, 1898) ended fatally. The fatal case occurred during my absence and other methods were used by the physician in charge. We believe, therefore, that we have a full right to exclude this case and to present a record of 45 cases without mortality.

The physicians of the Institute for Midwives also treated during the year 1889, 3 cases of eclampsia in their private practice, all ending in complete recovery.

In the year 1896-97 the usual measures were employed—morphia, chloroform, and oxygen taking the first rank. Delivery was hastened by rupturing the membranes, and by operative measures, when the latter were attended by no great risk to the mother. In exceptional cases we resorted to the accouchement forcé.

The use of morphia, that most important remedy, was restricted, as will be shown by the dosage. It was used hypodermically (in doses of from Gmm. .0075 (gr.  $\frac{56}{500}$ ) to Gmm. .03 (gr.  $\frac{9}{20}$ ) oftenest Gmm. .015 (gr.  $\frac{9}{40}$ ). The injections were usually given after the attacks. In individual cases bromide of sodium in large doses Gmm. 1 to iv., (gr. 15 to 40) was exhibited. The results, as already stated, were far from satisfactory, the mortality rising to 25 per cent.

In addition to these cases there were, as far as I know, 3 more cases of eclampsia treated in practice in 1899 by the physicians of the Institute for Midwives, and all ended in complete recovery. Clinical observation of these cases did not show any benefit from any of the measures, with the exception of morphia and the acceleration of delivery.

The views which I have held since the beginning of the academic year 1897-98 may be stated as follows: Puerperal eclampsia is an acute infectious disease<sup>2</sup> which usually runs its

course in a few hours, seldom exceeding twenty-four, and still more infrequently exceeding forty-eight hours in duration. In the great majority of cases the convulsions constitute the greatest danger, exerting a very unfavorable influence upon the heart, the respiratory center, the kidneys, and the general condition of the patient. They are often the cause of cerebral apoplexy in the fetus and result in the death of the latter before delivery. If the convulsions can be done away with or their intensity diminished eclampsia will lose much of its malignant character, for we must assume that under the circumstances the resisting power of the organism will suffice to nullify the effect of the offending germs. Therefore the attention of the physician should be chiefly directed to the prevention or amelioration of the convulsions.

As a result of an analysis of the literature of the subject and of observations at the bedside the following plan of treatment was adopted:

1. The prevention of convulsions by lessening the irritability of the nervous system and by removing all external sources of irritation, especially those connected with the birth canal.

2. The strengthening of the vital processes by careful supervision of the cardiac and pulmonary circulations; by strengthening the general circulation; by securing as large a quantity of oxygen as possible; and by prompt delivery if with these measures, and with a proper diet the convulsions do not cease.

For the attainment of these objects the following means were employed: Oxygen was inhaled during the convulsions; chloroform narcosis during convulsions of the ordinary type is, in my opinion, not only useless but injurious. During the convulsions the patient suffers from asphyxia, respiration is almost suppressed, and the organism needs, most of all oxygen. During a convulsion, which usually lasts from one to two minutes, so little chloroform is inspired that anesthesia cannot be induced, and if we place the mask over the patient's mouth we only hinder the entrance of oxygen, for the moment the most valuable of all remedies.

It is only in exceptional cases that anesthesia during the convulsion can be of service, e. g., in one case the attacks lasted from three to five minutes and respiration was unimpeded. With these conditions the usual effect of chloroform could, of course, be obtained.

During the administration of oxygen the patient was carefully watched in order to prevent biting the tongue or other injury, and especial care was taken to remove all weight from the thorax and cardiac region. After the first convulsion Gmm. .015 (gr.  $\frac{9}{40}$ ) morph. mur. was injected hypodermically, and when internal examination, disinfection of the birth-canal or catheterization was necessary, chloroform anesthesia was employed in order to avoid renewed irritation and consequent recurrence of convulsive attacks.

In addition to this morph. mur. and chlor. hyd. were employed to prevent further attacks. In cases of moderate severity the dose of Gmm. .015 (gr.  $\frac{9}{40}$ ) morph. mur. was repeated in one hour. If, however, the patient was unruly, tossed herself about the bed, or had muscular twitchings of the face extremities or trunk the same dose was given still earlier. In mild cases, especially post-partum, if the patient is quiet the second injection may be postponed from one-half to one hour.

After the second, or in bad cases, after the third injection of Gmm. .015 (gr.  $\frac{9}{40}$ ) morph. mur. we resort to chloral hydrate, which is given per rectum from two to four hours after the last injection of morphine. Without reference to the cessation of the convulsions a light narcosis is maintained until the first twenty-four hours have elapsed, and if the patient is unconscious or restless, during the second twenty-four hours also. For this purpose Gmm. 1.5 to 2.5 (gr.  $22\frac{1}{2}$  to  $37\frac{1}{2}$ ) chloral hydrate is given every six to ten hours, by the mouth if the patient is conscious, otherwise by the rectum. If a convulsion is threatened morphine is injected subcutaneously. If further attacks occur and there is no improvement after the exhibition of from Gmm. 6.0 to 8.0 (gr. 90 to 120) chloral hydrate, the same cycle of remedies, morphine and chloral, is repeated. I have a decided preference for the combined use of morphine and chloral. As is well-known, the French prefer chloral, the Germans morphine—both using large doses. There have been single instances of German authors who have failed to see good results from morphine (Lothar, Gürich). I myself have noted cases in which one or the other has proven insufficient. One patient of the Alexander-Newsky Maternity (No. 321 of the year 1897) afforded an excellent example. The subcutaneous injection of Gmm. 0.12 (gr.  $1\frac{4}{5}$ ) morph. mur. had no effect either upon the strength or the frequency of the

attacks. Thereupon Gmm. 2.5 (gr. 37½) chloral hydrate were given. The convulsions at once ceased, but re-commenced in twenty-four hours. Thinking that this patient was especially responsive to chloral I began to treat her with this remedy, but Gmm. 3.3 (gr. 49½) produced no result whatever. I then injected morphine subcutaneously and the attacks ceased. I may here remark that the Veit treatment, as employed by this author, was not employed in any of the 45 cases of eclampsia. Large doses of morphine Gmm. .03 (gr. 9/20) are not without great disadvantages. They weaken the respiratory center, suppress the oxidation processes in the organism, diminish the vital capacity of the cells, and are more likely to be of toxic effect, while good results may be obtained by the repeated use of moderate doses. For these reasons we may say that the doses advised by Veit find their application only in exceptional cases.

The second cardinal remedy for the eclamptic attacks is the delivery of the fetus. In from 50 to 60 per cent. of the cases in which convulsions occur during labor they cease with delivery, or only one or two more are noted. Therefore operative delivery was undertaken whenever this could be done without danger to mother or child. In other cases delivery was postponed until the conditions were more favorable, and under our method of treatment the attacks during the last two years almost always ceased, so that operative interference was unnecessary. In this we did not resort to the accouchement forcé, since all the cases ran a very favorable course. If, however, in a given case the convulsions did not cease I would consider an atypical forceps operation, version, or even perforation, to be indicated. When there is but little dilatation of the os and cervix and when distention is necessary as a preliminary to operative delivery, I prefer the method of Maurer, viz., the introduction of the colporynteur into the lower uterine segment and uninterrupted traction. When necessary this should be preceded by preliminary dilatation of the os and cervix by Hegar's tents. In the academic year 1896-97 labor was terminated in this manner in two primiparæ within two and a half to three hours. In both cases the cervix was still present and there was hardly any dilatation of the os. One of these patients had beginning pulmonary edema but recovered.

Very great importance is to be attached to the maintenance of the regular work of the heart, lungs, and general circulation, and to securing a sufficient supply of oxygen. I have already referred to the fact that the patient should be most carefully watched with reference to these points. The mucus should be removed from the mouth, the nose should be cleansed, all weight or pressure upon the thorax should be avoided; the patient, if comatose, should be turned from the back to the side occasionally, the room should be well ventilated, unnecessary visitors prohibited, all sources of irritation to the eye or ear, all mechanical and, if the patient is unconscious, all psychical influences which may irritate should be carefully removed. All details of this character are of great value in a disease which hardly lasts from twenty-four to forty-eight hours.

With reference to its direct effect upon the action of the heart and upon the general circulation, a milk diet, so widely recommended, is a very rational method of treatment. In those cases, however, in which the patients objected very strongly, weak tea, to which, in the case of weak subjects whose kidneys were not markedly affected, a teaspoonful of cognac was added, and was employed, in my opinion, with good effect. If the patient was unconscious milk was given per rectum. In the case of weak and debilitated patients with repeated convulsions, milk or physiological salt solution was given for the purpose of strengthening the general circulation (200,0 to 250,0 from one to three times). In cases of heart weakness after repeated attacks, tincture of musk and sulphuric ether are indicated.

I will now consider the sweating treatment. As is well known, this is advised by many, and it was used very much in the Institute for Midwives until two years ago. We have now abandoned it, however. Hot baths and, to a certain extent, also moist warm wrappings, do, in my opinion, more harm than good. The former increase the irritability of the nervous system and the latter depress the heart. Both of these disadvantages are so serious that they more than outweigh the increased transpiration from the skin. The wrappings are an actual obstruction to respiration and circulation. For these reasons I am opposed to such measures. With regard to warm baths 29° C. (84.2° F.) for cleansing purposes

I am of another opinion, especially in the case of patients with dirty, long unwashed, skin. These, in addition to promoting the functions of the skin have a quieting influence upon the patient and are therefore useful. Repeated baths are hardly indicated however, on account of the slight degree of their quieting effect and the unavoidable disturbance attending and following their use.

We did not use venesection in a single case. In one case, however, of beginning pulmonary edema dry cups were applied to the chest with very good effect.

Pilocarpine muriate Gmm. .01 (gr.  $\frac{3}{20}$ ) was considered necessary in only one case. This was a case of eclampsia in a patient who had previously suffered from severe nephritis. The latter constituted the indication for its use. The success was striking. The quantity of urine (previously three to six drops) rapidly increased. I may mention that the use of pilocarpine eclampsia was very common at the institute fifteen or sixteen years ago, but that no success was attained with this agent, which fell into complete disuse. In addition to the remedies already mentioned, sodium bromid was used during recent years. It seems to have a favorable effect in the mild cases and when used in connection with the two principal narcotics already mentioned.

I will cite a few statistical details: Of the 45 cases of eclampsia 34 were primiparæ and 10 multiparæ. In 24 the eclampsia developed before delivery, and in 20 afterward. In only 2 cases was there a dead fetus. One of these cases was a twin delivery, one of the twins surviving; in this case the eclampsia first appeared post-partum. Of the 44 patients 32 were treated in greater or less measure by the plan outlined above. In case of rapid improvement, especially after delivery the administration of morphine and chloral was suspended somewhat sooner. All the severe cases were treated by the plan mentioned above. Direct clinical observation furnished striking proofs of its efficacy. I will give a few examples:

Patient No. 279, Aug. 28, 1898 (Al. New. Geb.) had twelve attacks before treatment was begun. In the last hour there were eight attacks; pulse 150; respiration 40 to 45. First injection of morphine muriate Gmm. .015 (gr.  $\frac{9}{40}$ ) at 1.40 p.m., ten minutes after the last attack; thirty minutes later slight restlessness and facial tremor; fifty minutes later patient again

restless. Clysmas, chloral hydrate Gmm. 2.15 (gr.  $3\frac{1}{4}$ ). No further attacks. Recovery.

Another example: No. 1050, October 6, 1898 (Klin. Heb. Inst.). At 1.30 p.m. a patient was brought into the hospital in a comatose condition. She had had several attacks at home in the presence of a physician. Immediately upon admission Gmm. .015 (gr.  $\frac{9}{40}$ ) morph. mur. hypodermically. Quiet until 4 o'clock, when she received a second injection; in the afternoon clysmas chloral Gmm. 1.5 (gr.  $2\frac{1}{2}$ ) on the next day another injection of morphine. Delivery of a living child occurred spontaneously two days and four hours after admission. Many cases showed the same sequence of events.

With regard to the maximum doses of the narcotics used, patient No. 321, of the year 1897 (Al. New. Geb.) had sixteen attacks in one day and received Gmm. .15 (gr.  $2\frac{1}{4}$ ) morph. mur. subcutaneously and Gmm. 5.0 (gr. 75) chloral per rectum. In the following days she had thirteen attacks and received Gmm. .025 (gr.  $\frac{3}{8}$ ) morph. mur. and Gmm. 3.3 (gr.  $49\frac{1}{2}$ ) chloral. Recovery.

Patient No. 355 (Heb. Inst., 1898) received three morphine injections of Gmm. .015 (gr.  $\frac{9}{40}$ ) each and Gmm. 10.0 (gr. 150) chloral in twenty hours.

Patient No. 1422 (Heb. Inst., 1898) had fifteen attacks and received in two days four morphine injections and Gmm. 15.0 (gr. 225) chloral.

Patient No. 38 (Heb. Inst., 1899) received in three days eleven morphine injections of Gmm. .015 (gr.  $\frac{9}{40}$ ) each, Gmm. 14.0 (gr. 210) chloral, and Gmm. 6.5 (gr.  $97\frac{1}{2}$ ) sodium bromide. Recovery.

In the majority of cases, however, we found much smaller doses sufficient, e.g., in the case of patient No. 1050, already mentioned, only Gmm. .055 (gr.  $\frac{33}{40}$ ) morph. mur. subcutaneously, and Gmm. 3.5 (gr.  $52\frac{1}{2}$ ) chloral per rectum were given. These doses were amply sufficient to stop the attacks in spite of the fact that delivery proceeded but slowly.

Patient No. 1420 of the year 1890 received in twelve hours Gmm. .03 (gr.  $\frac{9}{20}$ ) morph. mur. subcutaneously and Gmm. 4.0 (gr. .60) chloral per rectum. (Gmm. 2.0 (gr. .30) given by the mouth was vomited).

A similar quantity was also amply sufficient for patient No. 279, Jan., 1898., Al. New. Geb. (see above).



It seemed to me as though the prophylactic use of narcotics in liberal quantity in the beginning generally permitted a comparatively restricted use of narcotics later. The histories, given more in detail below, show that it was necessary to resort to large doses in those cases in which narcotics were given, not before, but after the attacks. In the city Al. New. Maternity, under my direction, the prophylactic treatment was very systematically carried out. In the last six cases of eclampsia the attacks ceased immediately, the doses used being small.

As a result of these observations, which are, it is true, few in number, I believe that in eclampsia of moderate severity the administration within from eighteen to twenty-four hours of from Gmm. .03 to .06 (gr.  $\frac{9}{20}$  to  $\frac{9}{10}$ ) morph. mur. and Gmm. 4.0 to 8.0 (gr. 60 to 120) chloral per rectum is amply sufficient. These doses hardly involve serious danger to mother or child.

I will now consider the effect of this treatment upon the fetus, and must admit that the material at hand is not sufficient to decide the question. The majority of our cases were at the end of labor or after delivery. In only 16 cases did the fetus remain in utero for a greater or less period and only in 9 of these cases was the prophylactic treatment carried out. In the 7 milder cases it was not employed. In these cases all the children survived. Of the other 9 cases in one (1417, Jan., 1898), the fetus was extracted with the forceps and was so deeply asphyxiated that it could not be revived. The mother had received altogether only Gmm. .022 (gr.  $\frac{33}{100}$ ) morph. mur. subcutaneously, the interval being one hour and ten minutes. Before the operation the fetal heart sounds were very plain. The cord was wound about the neck, and this fact entitles us to believe that death was due to the operation.

Another child (No. 1050, Jan., 1898), weight 2476.0 g. died one and a half days after the delivery, with the symptoms of atelectasis pulmonum. The morphine and chloral treatment was carried out in this case very energetically and it may be admitted that it had a bad influence upon the fetus. At all events, this must be slight, since a whole series of eclamptic patients subjected to energetic prophylactic treatment with narcotics bore healthy children, some of whom, indeed, were premature (see table 2, J. 1898, 52, 355, 1053, and J. 1899, 24, 29, 178). The above mortality rate, 11 per cent. or even

22 per cent., must be regarded as very favorable since the fetal mortality in eclampsia is usually from 25 to 40 per cent.

Taken as a whole, the results as regards the children are very favorable. In 25 cases eclampsia developed before delivery and only 3 children died. Of 2, No.'s. 1417 and 1050, we have already spoken. The third, (No. 208 J., 1898) was premature. The mother suffered from a severe nephritis. The child was also extracted by the forceps deeply asphyxiated. It was revived after an hour but died one and a half days later. The fetal mortality is therefore 12 per cent. It must here be noted that of the other 22 children whose mothers suffered from eclampsia, developed post-partum, 2 also died, 1 during delivery (No. 1457, J., 1897, twins); the other child survived; 2 some time after delivery (No. 180, J., 1809; twins); the other child was discharged with the mother in good health.

I conclude therefore from the above facts and from the analysis of individual cases that the treatment herewith proposed is highly favorable for the child as well as for the mother.

In conclusion I will summarize the leading principles which, in my opinion, should guide us in the treatment of eclampsia:

1. After the first attack narcotics are to be used prophylactically for a varying period.
2. The combined use of morphine and chloral seems to have the best effect.
3. It is desirable to discontinue the narcosis in from twenty-four to forty-eight hours, according to the intensity of the attack.
4. The most careful attention should be paid to securing the following result, viz., that the lungs and heart perform their functions regularly and actively; for the latter purpose it is especially important that liquids be given per rectum, or, if the patient be unconscious, by the mouth.
5. All sources of irritation should be removed.
6. Delivery should be accomplished as rapidly as is possible without danger.

These things, of course, are mentioned in recent literature. Whether this combination of the leading principles of treatment is an advance the future will tell. It should be noted that such treatment seems rational from the standpoint of the intoxication theory, especially the breaking-off of the narcosis within from twenty-four to forty-eight hours. The treatment is also a logical corollary of the definition of eclampsia

as an infectious disease running a rapid course, an entirely different theory.

At any rate, the employment and the dissemination of this method of treatment which we have described seems very desirable.

This report was prepared five months ago but its publication was unexpectedly delayed.

Between the time when the above was prepared and January 1, 1900, I had the opportunity to observe 13 cases of eclampsia and to employ the treatment already described. In all cases the success was striking, as well for the children as for the mothers. The attacks became weaker and more infrequent, in many cases, indeed, they suddenly ceased, even in cases of marked severity. Labor continued with undiminished vigor.

Two of these cases were observed during pregnancy, 9 during labor. One of the latter was attacked at a very early period of labor, but, nevertheless, in spite of the progress of labor, the child being alive, there were no more attacks after the adoption of my treatment. Only twice had the affection been first noticed post-mortem. Of all these patients only one died. This was a case of pneumonia which had been diagnosed during life, the diagnosis being confirmed at the post-mortem by Professor Swanowsky. The complete history is given below, from which it will be found that she was brought into the hospital moribund (P. 150, resp. 40) after she had had at least twenty attacks at home. Even in this case our treatment was promptly successful. The attacks ceased at once and the patient's condition showed gradual improvement; fifteen hours after the last attacks the patient became conscious again and felt as well as ever. The temperature was 36.5°; pulse 90; and the urine contained much less albumin. The patient succumbed, however, to a lobar pneumonia, which quickly developed.

We have, then, in 58 cases 0 per cent. mortality from eclampsia and 1.7 per cent. from complications.

No less favorable is the result as regards the children. In the two cases of eclampsia during pregnancy one was discharged before delivery, the eclamptic attacks having ceased. She was in good condition when discharged, and the fetal heart sounds were very plain. In the case of the second patient premature labor was induced after a time on account of

a severe nephritis. She bore a living child. Of the 9 cases in which eclampsia developed during labor only one bore a dead (macerated) fetus. The fetal heart sounds could not be heard at the time of admission.

Another child died of a large congenital tumor (teratoma). This tumor began to become gangrenous seven or eight hours after delivery and was at once removed; weight, including tumor, 1900 g. The child died shortly after the operation.

The other 9 children (2 of whom were twins) were discharged in good health with the mother.

The method of treatment also secures good results for the children.

In closing I will cite the statistics of different authors with reference to maternal and fetal mortality:

## MORTALITY.

Mothers.		Children.	
	Per cent.		Per cent.
Hofmeier.....	39.4	V. Winckel.....	77
Späth-Schauta.....	36.5	Dührssen.....	53
C. Braun.....	21	Goldberg.....	47
Ahlfeld.....	30	Löhlein.....	44
Dohrn.....	29	Leopold.....	37
Olshausen.....	25	Zweifel.....	34
Arnand.....	25	Olshausen.....	28
Goldberg.....	24.5	Schauta.....	24.3
Dührssen.....	23	Bidder.....	23.1
Zweifel.....	22	Knapp (41 children).....	31.8
Löhlein.....	19.38		
With complications.....	23.7		
Bidder.....	17.3		
Knapp.....	10.5		
In 41 cases with complications.....	14.6		
Klin. Heb. Inst. and Alexandro-Newsky Maternity 6 per cent. mortality and 1.7 per cent. of complications.		Klin. Heb. Inst. and Alexandro-Newsky Maternity 11.3 per cent. in 62 cases; 13.4 per cent. in 38 cases of eclampsia during pregnancy and labor of which 1 child was dead on admission (see No. 53) and another had a large teratoma (see appendix No. 56).	

The details of the histories were omitted by the *Monatsschrift* for lack of space.—Translator.

## LIST OF AUTHORITIES.

1. Ruge's Festschrift. Ueber die Behandlung der Eklampsie Ruge's von J. Veit. (I will note here that Veit expresses his belief in the microbic origin of the disease).

2. Zeitschrift für klinisch. Medic. 39 Bd. H. 5, u. 6. Ueber die Pathogenese der Eklampsie. W. Stroganoff.