THE TREATMENT OF ECLAMPSIA BY TRANSFUSION OF BLOOD.

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ECLAMPSIA is a very grave condition, both to the mother and child. According to statistics, the maternal death rate varies from 20 to 30 per cent., and in regard to the child the mortality is between 35 to 50 per cent. Yet, in spite of many investigations, we seem to have discovered no specific method of treating the condition once convulsions have occurred. We are not even sure that much can be done in the way of prophylaxis, for we do not know how many of the cases of toxic albuminuria of pregnancy that are carefully treated would have terminated in the eclamptic state.

I shall not discuss the methods of treatment usually adopted. I wish to consider only the question of blood transfusion in eclampsia.

Attention has lately been directed in a leading article in the *BRITISH MEDICAL JOURNAL*¹ to certain recent immunological investigations. In 1911 Dold² showed that saline extracts of many viscera contain a toxin, lethal to animals, which is completely neutralized by normal blood serum. To this toxin he gave the name "*Organgift*." The nature of the substance has, however, not yet been determined, although many investigations have been made. Obata,³ following the work of Dold and others, has recently made an important contribution to the subject from an obstetrical point of view. This investigator has found that, when an extract of fresh human placenta is injected into mice, symptoms resembling those of eclampsia are produced, and that there is no difference between the toxicity of the extract of placenta from a normal case and that of the extract of placenta from a case of eclampsia. Further, Obata observed that fresh serum from the blood either of a normal person or of an eclamptic patient produces similar symptoms in mice, but no increase in toxicity was noted in regard to the serum of eclamptic patients. When, however, the extract of placenta was mixed with serum from a normal person—and it was found that sex and pregnancy did not affect the issue—the toxins of the placental extract and also apparently of the serum were neutralized; but, on the other hand, the serum from the blood of an eclamptic patient failed to neutralize the toxin of the placenta.

It appears, therefore, that there is some substance in normal blood that neutralizes the toxin of the placenta, and it seems curious that this is present in the blood of males as well as females, until we remember that the fetus is the product of the male no less than of the female.

On thinking over these facts when faced recently with a serious case of eclampsia, I determined to try the effect of blood transfusion, in the hope of introducing an antitoxin into the maternal blood stream. The result was so satisfactory that I have ventured to bring forward the case, although a single one, especially as the treatment of it was based on experimental findings. I would have preferred to wait, but as it may be some time before I have a further opportunity of testing it, and as no harm can result from the treatment properly carried out, I think it only right that the method should have a proper trial at the hands of others, in order that we may know whether blood transfusion may be regarded as a reliable method of treatment.

Abstract of Notes of the Case.

Mrs. E. T., aged 24, a primigravida, in the ninth month of gestation, consulted Dr. D. R. Evans on April 15th, complaining of recurring pains in the back, and pain on micturition. Dr. Evans examined her urine and, finding a large amount of albumin, sent her home to bed. He saw her the following evening, when he found that labour pains had commenced at 5 p.m., and that she had had a "fit." He then administered hypodermically morphine gr. $\frac{1}{2}$. Other "fits" followed at hourly intervals.

She was admitted to the Liverpool Royal Infirmary at 9 p.m., and was then conscious and rational. A catheter was passed, but no urine was obtained. The eyelids were slightly oedematous. Another convulsion soon occurred, and following this she remained oblivious of her surroundings. I saw her at

10.30 p.m. She was struggling during labour pains, but, otherwise, was indifferent to what was going on. Owing to her restlessness a proper abdominal examination was impossible, but *per vaginam* a fetal head could be felt lying low in the pelvis. I hoped, therefore, that the child would soon be expelled. Another severe convulsion occurred at 11.30 p.m. After this she remained semicomatose. She was then placed under light ether anaesthesia and removed to the theatre, where I delivered with forceps, and without difficulty, twins—a boy and a girl, weighing respectively 5½ and 4½ lb. The cords were pulsating feebly when the infants, in a state of "white asphyxia," were born; but it was impossible to stimulate respiration. The patient remained semicomatose and restless all night. At 5.30 a.m. another convulsion occurred, followed by a very severe one at 6 a.m. The patient remained cyanosed; 20 c.cm. of urine loaded with albumin was obtained by catheter.

The house-surgeon now opened a vein in the arm, but was unable to bleed the patient, as directed, while saline infusion was being introduced. A quantity of saline solution was, however, run into the vein. I received a message at 8 a.m. to say that the patient appeared to be dying, and that she was more deeply comatose. I saw her as soon as possible (10.30 a.m.), and found her lying quite still, almost completely comatose; her face was of a yellow colour, and her pulse was very soft and feeble. I determined then to try the effect of blood transfusion, and was fortunate enough to obtain the assistance of my colleagues Mr. R. E. Kelly and Dr. Wallace Jones, who have had much experience in this procedure. The husband, a robust-looking young man, willingly consented to be the donor. His blood was found to be in Group IV, so 500 c.cm. were withdrawn into citrate solution from his median basilic vein. Approximately the whole of this was transfused into the median cephalic vein of the patient.

At 1.30 p.m. the patient looked better—the colour had almost immediately been improved by the transfusion; 60 c.cm. of urine, withdrawn by catheter, were found to contain acetone, and albumin to the extent of 12 per cent. The following estimate of the ammonia coefficient was made by Professor Ramsden:

Ammonia nitrogen	...	...	...	...	0.05 per cent.
Urea	...	...	...	...	0.48 "
Total nitrogen	...	...	...	...	0.23 "
Ammonia N } ratio	...	...	...	...	22.0 "
Total N	...	...	...	...	

A few hours later the patient was able to talk rationally; and when the house-surgeon made the evening round she discussed her condition, and said that she had no recollection of anything that had happened previously in regard to her confinement. In the sixteen hours subsequent to the blood transfusion 50 oz. of urine were secreted. A sample was then found by Professor Ramsden to contain "a small amount of albumin." Acetone was absent. The ammonia coefficient was estimated as follows:

Ammonia nitrogen	...	...	...	...	0.017 per cent.
Urea	...	...	...	...	0.75 "
Total nitrogen	...	...	...	...	0.35 "
Ammonia N } ratio	...	...	...	...	4.8 "
Total N	...	...	...	...	

In the next twenty-four hours 71 oz. of urine were secreted. Since then convalescence has been uninterrupted.

Should another case come under my care I shall perform blood transfusion immediately. It may be possible by so doing to save not only the life of the mother, but also that of the child. In such circumstances it would probably be necessary to repeat the transfusion at the end of parturition.

With regard to the method of transfusion employed in this case, citrated venous blood was used, and I noticed that some difficulty was experienced by the house-surgeon in shaking, and at the same time collecting, the blood from the vein, in the flask containing the citrate solution. I think that the blood might best be mixed with the citrate solution by allowing oxygen to bubble through the fluid; moreover, oxygenated blood would probably be better in all cases of transfusion than venous blood.

In conclusion, I wish again to emphasize the fact that this is only one case, and that no final judgement can be formed until many cases have been treated in the same way by competent observers and by those who have had some experience in blood transfusion and who are able to carry out the necessary procedures quickly and safely. It is unlikely that any treatment will ever be introduced which will ensure the recovery of every patient; but, if the present appalling maternal and fetal mortality can be reduced, something will have been accomplished. In those circumstances the preparation of a human antitoxic serum might be worth while in order to simplify treatment.

REFERENCES.

¹ *BRITISH MEDICAL JOURNAL*, 1920, i, 479. ² Dold, H.: *Zet. f. Immunol. u. Exper. Therap.*, 1911, x, 53. ³ Obata, I.: *Journ. Immunol.*, 1919, iv, 111.