faulty—astereognosis. Tactile discrimination and weight sense are lost. Crude sense of pain touch and thermal sensitivity are retained, but the degree of recognition may become inconstant. This is the condition of cortical anaesthesia. In discussing lesions affecting the frontothalamic projection fibres the thalamus itself must be considered.

The thalamic nuclei may be divided into three main groups: the cortical relay nuclei, association nuclei, and nuclei with subcortical connexions. None of these nuclei receive ascending fibres. It seems that the area under discussion involves either the association nuclei (dorsomedial, lateral, and pulvinar) or their associated connecting fibres. These nuclei are connected to the following cortical areas: dorsomedial, areas 9, 10, and 12 (Brodmann); lateral, areas 5 and 7; pulvinar, areas 18 and 22.

In the modern technique of frontal leucotomy of the partial combined intervention type (leucopectomy) the object of the operation is the severance of three main groups of fibres passing from the frontal cortex to the thalamus. These groups are: (1) from cortical areas 9, 10, and 45 (Brodmann); (2) from cortical areas 11, 12, 13; (3) from cortical areas 24 and 32.

A recent application of leucotomy has been the relief of intractable pain, generally in terminal neoplastic conditions where normal drugs have become useless and the object of operation is to make the closing stages of life pain-free for the unfortunate patient.

Such an operation does not sever any known pain pathways, but the end-result is that the division of the frontothalamic projection fibres completely alters the patient's reaction to pain. It now appears quite certain that the sensation of pain is in no way altered or abolished, but that the patient ceases to worry about the pain and thus relief is obtained.

It will now be seen that this state closely resembles that found in congenital universal indifference to pain.

It therefore appears that the frontothalamic projection fibres involved in the interpretation of pain and the imposition of pain on consciousness derive from cortical areas 9, 10, and 12, and pass into the dorsomedial nucleus of the thalamus. It can be presumed from anatomical and embryological evidence that connexions exist between the thalami and that integration of interpretation from left and right cortical areas will occur.

In low-grade mental defectives the psychological, intellectual, and personality states in many cases can be compared to the changes found after leucotomy in mental patients. This may point to defective development either in frontal cortical areas or in the fronto-thalamic projection fibres. If this is the case, this hypothesis gives an explanation for the indifference to pain found in low-grade mental defectives accompanying acute surgical and medical conditions.

Summary

Seven cases of surgical and medical conditions occurring in low-grade mentally defective patients are reported. In the normal patient these conditions are associated with pain of severe degree. In these mentally defective patients there was a marked indifference to pain, although some discomfort was felt in a few cases.

An explanation has been advanced for this indifference to pain on the theory of frontothalamic projection fibres associated with cortical areas 9, 10, and 12 being defectively developed or in defective development of these cortical areas themselves.

A comparison has been drawn between the condition of congenital universal indifference to pain and the cases in the above series.

BIBLIOGRAPHY

- Ford, F. R., and Wilkins, L. (1938). *Bull. Johns Hopk. Hosp.*, 62, 448.
Freeman, W., and Watts, J. W. (1946). *Lancet*, 1, 953.

INTRAVENOUS ERGOMETRINE AND THE UNDIAGNOSED SECOND TWIN

BY

J. K. RUSSELL, M.B., Ch.B., M.R.C.O.G.
Lecturer in Obstetrics and Gynaecology

D. TACCHI, M.B., B.S., D.Obst.R.C.O.G.
Registrar

AND

ANNE L. M. GRAHAM, M.B., Ch.B., D.Obst.R.C.O.G.
Registrar

(From the Department of Obstetrics and Gynaecology, University of Durham, and the Princess Mary Maternity Hospital, Newcastle-upon-Tyne)

Our purpose in writing this paper is to draw attention to a complication associated with the use of intravenous ergometrine in the control of the third stage of labour. During the past two years, on four occasions in the Princess Mary Maternity Hospital, an undiagnosed second twin has been discovered after the administration of intravenous ergometrine; three of the cases occurred within the space of a fortnight, and this brought the problem to our notice.

Case Reports

Case 1.—The patient, a gravida-3 aged 39, was admitted to hospital as an emergency case of ante-partum haemorrhage four weeks before term. Three hours after admission she delivered spontaneously a live male child weighing 4 lb. 10½ oz. (2.1 kg.). Intravenous ergometrine, 0.5 mg., was given with the birth of the anterior shoulder, but as soon as the child was born it was realized that a twin pregnancy was present. The second twin was presenting as a vertex, and within a few minutes a female child weighing 3 lb. 15½ oz. (1.8 kg.) was delivered spontaneously. The placenta was expressed quite easily after the delivery of the second baby. The twins were in good condition at birth and made satisfactory progress.

Case 2.—The patient, a gravida-2 aged 24, was booked for hospital delivery, and was admitted in premature labour at 30 weeks. The uterus was noted to be slightly larger than for the gestation period, but a twin pregnancy was not suspected. Twenty-five minutes after admission an outlet forceps delivery was performed under local analgesia; the baby, a male, weighed 3 lb. 6 oz. (1.5 kg.). Intravenous ergometrine, 0.5 mg., was given with the delivery of the anterior shoulder. A twin pregnancy was diagnosed as soon as this child had been delivered. A vaginal examination showed the presentation to be a footling, and the membranes were ruptured by the operator. Strong uterine contractions began at once, but no progress was made, and after an interval of 8 to 10 minutes a general anaesthetic was started. Vaginal examination revealed a constriction ring in the lower part of the uterus. The anaesthesia was deepened, and with some difficulty a breech extraction was carried out. The child, a male, weighed 3 lb. 10 oz. (1.6 kg.) and was limp and blue at birth; respirations were never satisfactorily established, and the infant died at 55 minutes. A post-mortem examination was not obtained, but the cause of death was presumed to be anoxia and possibly traumatic cerebral damage. The first twin made satisfactory progress.

Case 3.—This patient, a gravida-3 aged 25, was booked for delivery in hospital and was admitted in labour two weeks before term. After a labour lasting three hours she delivered spontaneously a male child weighing 6 lb. 14 oz. (3.1 kg.). Ergometrine, 0.5 mg. was given intravenously with the delivery of the anterior shoulder, but only with the delivery of this child was a twin pregnancy diagnosed. Vaginal examination showed that the second twin was

presenting by the breech. The membranes were not ruptured on this occasion, and the operator, with his hand, kept the presenting part high in the pelvis until a general anaesthetic had been administered. The membranes were then ruptured and a breech extraction was easily performed 25 minutes after the delivery of the first child. The second twin, a male, weighed 6 lb. 2 oz. (2.8 kg.). The placenta had to be removed manually. Both babies made satisfactory progress.

Case 4.—The patient, a gravida-4 aged 36, was admitted to hospital as an emergency case four weeks before term. After a labour lasting two and a half hours a male child weighing 3 lb. 7 oz. (1.56 kg.) was born. Intravenous ergometrine, 0.5 mg., was given with the birth of the anterior shoulder; a twin pregnancy was diagnosed as soon as this child had been delivered. Vaginal examination showed the second twin to be presenting as a vertex, and the operator kept the presenting part high in the pelvis whilst a general anaesthetic was administered. The membranes were then ruptured and a male child weighing 3 lb. 12 oz. (1.7 kg.) was delivered by forceps; the placenta was expressed quite easily. The first child made satisfactory progress, but the second suffered from repeated cyanotic attacks for several days; the appearance of the second twin strongly suggested mongolism, but this diagnosis has yet to be established.

Discussion

There is convincing evidence that intravenous ergometrine, provided it is given with the crowning of the foetal head or birth of the anterior shoulder, will reduce the risk of post-partum haemorrhage and shorten the duration of the third stage of labour (Martin and Dumoulin, 1953). Certain drawbacks to its use have been noted. Grimes *et al.* (1948) and Priver *et al.* (1949) have reported side-effects such as nausea, headaches, and vomiting, while Martin and Dumoulin noted a significant increase in the incidence of manual removal of the placenta. For the past two years, in our hospital, intravenous ergometrine has been used widely but not routinely in the control of the third stage of labour. During this time there have been 74 cases of twin pregnancy, and nine of these have been undiagnosed. Four out of the nine patients were given intravenous ergometrine as the first baby was being delivered, and details of these cases have been given. One of the eight babies born to these women died, and, although we cannot be sure, we suspect that the death was at least in part caused by the strong uterine contractions which followed the administration of ergometrine; this drug is known to cause tonic contraction of the uterus and is therefore liable to interfere with placental circulation and so lead to foetal anoxia. As a result of the difficulty experienced in the delivery of the second twin in Case 2, we made a point, in the later cases, of not rupturing the second sac of membranes until we were in a position to carry out immediate delivery of the second twin. By conserving the sac of membranes there is less likelihood of the uterus contracting firmly down on the second twin.

So far we have been fortunate in that none of the undiagnosed second twins has been lying transversely. Were this to happen, then the operator might well be faced with a difficult intrauterine manipulation where the uterus had contracted down firmly on the foetus. There might then be a risk to mother as well as to child.

A number of authors have now reported the use of intravenous ergometrine in large series of cases, but, so far as we are aware, no one has acknowledged the complication to which we draw attention in this paper. In our experience the hazard is a real one and must be taken into account when an assessment is made of the advantages and disadvantages of the use of intravenous ergometrine in the control of the third stage of labour.

Summary

Attention is drawn to the complication of the undiagnosed second twin when intravenous ergometrine has

been given in the control of the third stage of labour. This complication occurred four times in two years at the Princess Mary Maternity Hospital, and one baby died. Details of the four cases are given.

It is suggested that when this complication occurs every effort should be made to avoid rupture of the second sac of membranes until the patient is under an anaesthetic and immediate delivery of the second twin can be undertaken. With an intact sac of membranes there is less likelihood of the uterus contracting down on the second twin and interfering with placental circulation.

We are indebted to Professor Harvey Evers for permission to publish details of cases which were under his care.

REFERENCES

- Grimes, W. H., Bartholomew, R. A., Colvin, E. D., and Fish, J. S. (1948). *Sth. med. J.*, **41**, 980.
Martin, J. D., and Dumoulin, J. G. (1953). *British Medical Journal*, **1**, 643.
Priver, M. S., Harris, J. M., Krohn, L., and Boros, H. H. (1949). *West. J. Surg.*, **57**, 586.

RENAL CLEARANCE OF CREATININE AND UREA IN THE WEST AFRICAN

BY

R. A. KENNEY, Ph.D., B.Sc.

*Colonial Medical Research Committee's Laboratory for
Hot Climate Physiological Research,
Oshodi, Lagos, Nigeria*

We have previously reported from this laboratory the low levels of plasma urea (Phillips and Kenney, 1952) and the low output of urea following the ingestion of 30 g. of this substance (Kenney, 1953) encountered in the West African subject. The clearance data reported in this paper were obtained in order to provide a further standard of comparison with the European subject. Precise investigation of the renal partial functions, glomerular filtration rate, and the rate of renal plasma flow (Kenney, 1954) had demonstrated the identity of these values in the African and European subjects.

Methods

Ten African subjects were used. All were familiar with the procedure of venepuncture and were trained to empty their bladders completely and spontaneously at frequent fixed intervals. The subjects were typical members of the local labour force, in regular employment and enjoying a good standard of nutrition by African reckoning—that is, a diet containing about 70 g. of protein a day, about one-third of which was meat.

The subjects reported to the laboratory at 8 a.m., after their normal morning meal, and rested in bed for a period of two hours. During this time their water intake was adjusted so as to provide a low urine flow of less than 1 ml. a minute at the start of the experimental period. At the end of this time the bladder was emptied and urine collection started. Urine samples were obtained every 15 minutes for a period of 90 minutes. During this time two or three blood samples were taken by venepuncture with the minimum of stasis. The blood was stored in a heparinized vessel and the plasma separated off by centrifugation for subsequent analysis. During the period of urine collection water was given by mouth in volumes sufficient to raise the urine flow from its original low level to about 5 to 6 ml. a minute. In this way a series of urine samples were obtained over the wide range of urine flows.

Urine and plasma samples were analysed for creatinine and urea by the following methods.