INTRAMUSCULAR ERGOMETRINE AND HYALURONIDASE IN PREVENTION OF POST-PARTUM HAEMORRHAGE

USE BY MIDWIVES IN 2,002 CASES

BY

NORMAN KIMBELL, M.B., Ch.B., M.R.C.O.G.

Consultant Obstetrician and Gynaecologist, Peterborough
Memorial Hospital

Intravenous ergometrine at the crowning of the foetal head, as given at University College Hospital, has been shown by Martin and Dumoulin (1953) to have a striking effect in reducing the rate of post-partum haemorrhage, and in their series of 1,000 cases the figure dropped from 13.1% to 1.2%. The intravenous route can be used by medical staff, but this enables only a small proportion of deliveries to be controlled in the conduct of the third stage of labour. In non-teaching hospitals and in domiciliary practice the great majority of deliveries are done by midwives, who are not allowed to give intravenous injections.

In order to attempt an acceleration of the absorption of ergometrine by intramuscular injection, I decided, in December, 1950, to use hyaluronidase ("hyalase") combined with ergometrine. The paediatric department of this hospital had demonstrated unequivocally that hyaluronidase had speeded up infusion therapy, and their experience so impressed me that I felt its use in obstetrics was worthy of trial.

All vaginal deliveries are carried out by the midwives in the obstetric unit unless the case becomes complicated, as, for example, a breech presentation or other indications for a house-surgeon or registrar to be called, when the intravenous route for giving ergometrine is the method adopted.

In 1950 it was the practice for the midwife to give 0.5 mg. of ergometrine, intramuscularly, as a routine on completion of the delivery, unless there was blood loss in excess before stage III of labour was completed, when the injection was given prior to the delivery of the placenta. It is thus possible to use the 1950 figures as a control, while in succeeding years (1951, 1952, 1953) the routine practice has been for ergometrine and hyaluronidase to be given at the crowning or delivery of the foetal head.

Present Investigation

The obstetric unit is split into approximately two halves, each in a separate building and each with a resident house-surgeon. It was a simple matter, therefore, to adopt different techniques while trying to discover which dosage of ergometrine was the best. One unit used 0.25 mg. of ergometrine combined with hyaluronidase (1 mg.) in the same syringe, the injection being given at the crowning or delivery of the head, while the other unit used 0.5 mg. plus hyaluronidase at the same moment of timing.

The patients were delivered in the left lateral position, the injection having already been made up by the midwife, and at the moment of crowning or delivery of the foetal head she injected intramuscularly into the thigh. The patient was turned on to her back after delivery of the baby. The midwife usually found once the baby had been attended to that there were signs of placental separation (not uncommonly the placenta was lying in the vagina), and stage III was completed by fundal pressure. If she found

herself unable to give the injection at the correct time, she had to wait until stage III was completed, unless excessive haemorrhage occurred, when she was allowed to give it intramuscularly before the placenta was delivered.

Ergometrine, 0.25 mg., plus hyaluronidase was used intramuscularly in 254 deliveries, with eight cases of post-partum haemorrhage, two manual removals of placenta, and one maternal death. The death occurred, after a normal delivery, from post-partum haemorrhage and its treatment. In spite of oxytocic drugs, blood transfusion, and bimanual compression this patient continued to lose and the uterus was therefore packed. She died soon afterwards, and at necropsy the cause of death was found to be air embolism. This dosage was therefore discontinued.

As a further control, 0.5 mg. of ergometrine alone was given intramuscularly at the moment of crowning or delivery of the foetal head, and in this series there were 198 deliveries with seven cases of post-partum haemorrhage and one manual removal of the placenta. This method was also discontinued, as the rate of post-partum haemorrhage was again too high.

Finally, 0.5 mg. of ergometrine plus 1 mg. of hyaluronidase was given intramuscularly throughout the unit, and this practice has remained the routine. Up till the end of 1953, 1,748 deliveries had been done by midwives, with 17 cases of post-partum haemorrhage and 23 manual removals of the placenta. In 1953 the midwives had been able to give the injection in 92.4% out of 789 cases at the correct moment of timing. The results are shown in Table I.

TABLE I

	Control Series	At Crowning or Delivery of Head		
		0.5 mg. Ergometrine Alone	0.25 mg. Ergometrine + Hyaluronidase	0.5 mg. Ergometrine + Hyaluronidase
No. of deliveries	747	198	254	1,748
Post-partum haemorrhage	48 (6.4%)	7 (3.5%)	8 (3.1%)	17 (0.9%)
Manual removal	12 (1.6%)	1 (0.5%)	2 (0.7%)	23 (1.1%)

Post-partum Haemorrhage.—The haemorrhage rate includes all losses of 20 oz. (568 ml.) or more. Only normal vaginal deliveries done by midwives are reviewed. Pethidine is given almost invariably to women in labour, and its administration has not been a factor in the haemorrhage rate. Delayed haemorrhage some hours after delivery has not been a feature of the treated cases.

Manual Removal.—This has neither been more frequent nor more difficult in the treated series.

The injection has not produced any ill-effects. It has been noticed that when the injection is given too late—that is, when the uterus does not contain the foetal body—placental retention may develop.

TABLE II

Amount of Blood Loss	% in Control Series	% in 0.5 mg. Ergometrine + Hyaluronidase	% in 0.25 mg. Ergometrine + Hyaluronidase
0-9 oz. (0-256 ml.)	60	85.4	89.9
10-19 oz. (284-540 ml.)	33.6	13.7	9.4
20 oz. (568 ml.) +	6.4	0.9	0.7

TABLE III

Length of Third Stage	% in Control Group	% in 0.5 mg. Ergometrine + Hyaluronidase Group
0-4 minutes	0.6	4.2
5-9 "	21.6	46.8
10-19 "	66.4	46.1
20-29 "	6.1	1.3
30-39 "	3.5	0.3
40+ "	4.8	1.3

A comparison of the blood loss in the various groups is seen in Table II. Martin and Dumoulin found that 89.2% of their intravenous ergometrine series had losses of from 0 to 9 oz. (256 ml.). With the use of 0.5 mg. of ergometrine plus hyaluronidase intramuscularly in 1,748 cases, 85.4% had losses of from 0 to 9 oz. (256 ml.).

Length of Third Stage of Labour.—Use of intramuscular ergometrine and hyaluronidase shortens the length of the third stage as shown in Table III. In the control series 22.2% were delivered of the placenta in less than 10 minutes, while in the ergometrine and hyaluronidase series 51% completed stage III in less than 10 minutes.

Discussion

Timing is most important. Placental expression should be carried out as soon as possible. The midwife—frequently acting alone in the delivery—is unable to express the placenta quickly because she has the baby to look after immediately it is born. Nevertheless, stage III is still shorter than before intramuscular ergometrine and hyaluronidase came into use at the moment of crowning or delivery of the foetal head.

The death rate from delivery complicated by retained placenta and other post-partum haemorrhage has been supplied by the Registrar-General (Table IV), based on the 1948 International List.

TABLE IV

	No. of Deaths	Rate per 1,000 Live Births
1949	90	0.12
1950	38	0.05
1951	54	0.08
1952	39	0.06

Any technique, therefore, which will help in reducing the incidence of post-partum haemorrhage rate must inevitably reduce the risk of maternal death.

The experience of Martin and Dumoulin, confirmed by Vartan (1953), has been reaffirmed by Professor Wright, of the University of Otago, New Zealand (personal communication), who halved his post-partum haemorrhage rate in one year and did not increase his manual removal rate. Wright gives intravenous ergometrine with the delivery of the anterior shoulder.

Summary

Intramuscular ergometrine, 0.5 mg., plus hyaluronidase was given in 1,748 cases by midwives, acting alone at the delivery, as soon as the foetal head was crowned or delivered. In addition 0.25 mg., plus hyaluronidase, was given at the same point of timing in a further 254 cases, making 2,002 cases in all.

The results are compared with 747 control cases. The use of ergometrine by midwives in this way has shown that (1) the post-partum haemorrhage rate is reduced from 6.4% to 0.9%; (2) the manual removal rate is not appreciably influenced—1.6% for control cases and 1.1% for the ergometrine and hyaluronidase series; (3) blood loss is lessened; and (4) stage III is shortened.

A plea is made for the adoption by midwives of the technique outlined.

The hyaluronidase used was "hyalase" in ampoules as a sterile freeze-dried powder of 1,000 Benger units.

My thanks are due to the matron, Miss O. M. Hutson, and her sisters and staff midwives, who were entirely responsible for all the deliveries reviewed.

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DISSECTING ANEURYSM OF THE AORTA

BY

W. M. JORDAN, B.M., B.Ch.

Lately, House-Physician, Poplar Hospital

King George II one day "was found fallen on the ground, speechless and motionless." He had died of a dissecting aneurysm of the aorta, and his post-mortem examination provides us with the first description of this condition (Nicholls, 1761). Shennan (1934) reviewed all the published cases in a comprehensive monograph, and analysed 300 proved at necropsy: of these, only six were diagnosed during life. As dissecting aneurysms are still but rarely diagnosed clinically, the following contrasting cases are of interest.

Case 1

A dock labourer aged 36, strong and active, was suddenly seized by an excruciating tearing pain while walking down the companion ladder of a ship. The pain was mainly in the back of the chest, and traversed through to the front, and thence up the neck into the head. He collapsed at the foot of the ladder and could scarcely breathe. He was carried into hospital, where he found that the pain was aggravated by lying flat and partially relieved by sitting up.

Examination showed a very pale and collapsed man, with a cold and clammy skin. His pulse was regular, rate 50 a minute, and the radial pulses were of equal volume. The blood pressure was 95/75 in both arms. The heart sounds were heard faintly in all areas, with no added sounds or murmurs. There were no other abnormal physical signs.

The patient continued to suffer very severe pain, which was now primarily retrosternal, and radiated into his back and down into the epigastrium and abdomen. He remained pale and collapsed, but was talkative and seemed to improve with rest in bed. Four hours later he had a regular pulse of 36. The radial pulses were distinctly unequal, the right being smaller in volume and more anacrotic. The blood pressure in the right arm was 120/60; in the left arm it was 135/70. The temporal, carotid, and femoral pulses were all equal. The cardiac impulse became more forcible and the heart sounds quite loud and clear. There was no increased area of cardiac dullness to percussion or tracheal tug. There was some epigastric tenderness but no rigidity.

The urine contained a moderate amount of albumin but no blood. Radiography of the chest showed normal lung fields. The postero-anterior view showed widening of the supracardiac shadow and some widening of the arch of the aorta. The left lateral view showed obvious dilatation of the descending arch of the aorta. The electrocardiogram (E.C.G.) showed a slow regular sinus rhythm, with normal conduction time. There was a deep Q wave in the chest lead CR₇, and notching of the QRS complex in lead CR₄. The T wave was inverted in CR₁, but full and erect in all other limb and chest leads. There was no Pardee sign.

Twelve hours later the patient again collapsed suddenly, and neither radial pulse was palpable. The apical rate was 148 a minute. A fresh E.C.G. showed sinus tachycardia, with no evidence of cardiac infarction. The patient improved slightly after the subcutaneous injection of morphine $\frac{1}{4}$ gr. (15 mg.), but later collapsed again, and died.

At post-mortem examination (Dr. D. Teare) the body was well nourished, with a long recent dissecting aneurysm of the thoracic aorta. There was a horizontal break in the intima, about 1 in. (2.5 cm.) long and 1 in. (2.5 cm.) above the aortic cusps. The dissection had travelled distally as far as the bifurcation of the abdominal aorta, and had ruptured proximally into the pericardium, which contained about 16 oz. (455 ml.) of blood. There was partial occlusion by the dissection of the root of the superior mesenteric artery, with recent infarction of the small intes-