A METHOD OF MANAGEMENT OF THE THIRD STAGE USING THE MITCHELL'S NEEDLE

By S. S. Ratnam, M.B., B.S., M.R.C.O.G., F.R.C.S. (Eng.), F.R.C.S. (Edin.), F.R.C.S. (Glas.),
(Lecturer in Obstetrics & Gynaecology, University of Singapore)

and

W. S. H. Tow, A.M., M.D., F.A.C.S., F.R.C.O.G.,
(Professor of Obstetrics & Gynaecology, University of Singapore)

Despite advances in modern medicine and obstetric practice, haemorrhage retains its time-honoured place as a major cause of maternal deaths. In a recent survey of maternal deaths at the Kandang Kerbau Hospital, Singapore (Lean, 1965) approximately 40 per cent of the deaths were accountable by blood loss. Postpartum haemorrhage was to be blamed in no less than 25 per cent.

While antepartum haemorrhage is largely non-preventable, the opposite is true of post-partum haemorrhage. It may appear superfluous to enumerate the reasons for wanting to prevent postpartum haemorrhage. Nevertheless, it is important to appreciate that the reported occurrence of "P.P.H." refers only to cases whose measured loss exceeds an arbitrary figure (15 ounces in Singapore) while a far larger number of lesser haemorrhages—but nonetheless important—altogether escape mention. The significance of this statement can only be fully appreciated by those who have worked among communities of mal-nourished and chronically anaemic women. A moderate blood loss, not amounting to classifiable P.P.H., in these women may well give rise to an acute obstetric emergency or result in puerperal morbidity, and chronic ill health—sequelae which are again conveniently forgotten. The case for blood conservation in every possible situation is, therefore, abundantly clear.

The methods available for the prevention of third stage and postpartum blood loss have been subjected to scientific testing and trial, discussion, debate and publication. The battles have been fought and won over the last three decades. None today will dispute the value of ergometrine in the prevention and control of blood loss after delivery. The remaining bone of contention is the route of administration, and its timing.

The advantage of intravenous ergometrine administered at the end of the second stage has been amply demonstrated by Davis (1940), Lister (1950) and Martin and Dumoulin (1953). The superiority of this method over any other is known only to those who practise it. It shortens the third stage and effectively reduces blood loss.

Those who oppose this method are not without their reasons. Firstly, the technique demands the assistance of a qualified person, usually a doctor. This may not be always available. Secondly, the timing of the injection during a moment of stress and excitation renders the intravenous technique most elusive and frustrating, even to the highly qualified and experienced. Thirdly, the possibility of an undiagnosed second twin poses a real hazard not to be lightly dismissed. Fourthly, rapid absorption of ergometrine into the circulation is not without its undesirable effects on the mother, who may suffer from transient hypertension, headache, nausea and vomiting.

The above objections, it seemed to the authors, were not insurmountable. A doctor may not be readily available at the crucial time, but his services could be made available at a more convenient moment when the patient is in an advanced stage of labour but has not arrived at the crisis of crowning and vigorous pushing. Under these circumstances, the insertion of a Mitchell's intravenous self-retaining needle should present no particular problem or hardship. With due care and observance on the part of the doctor, multiple pregnancy should not escape detection. The occasional side effects and symptoms felt by the mother are harmless and transient, and need not be a serious objection to the method of administration.

THE PHYSIOLOGICAL CONSIDERATION FAVOURING INTRAVENOUS ERGOMETRINE

The placenta at term covers a surface on the uterine implantation site of 600-700 sq. cm. with the intervillous space intervening. Through this space 500 millilitres of blood circulates each

minute, forming the utero-placental circulation. With the birth of the baby, the uterus undergoes an abrupt shrinkage in size, shearing off the placenta from its uterine attachment. With good myometrial constriction, haemostasis is secured. On the other hand, inefficient uterine activity would allow blood flow from the raw placental bed, which a moment earlier had been the site of the utero-placental circulation. This blood loss is characterised by its complete unpredictability and voluminous capacity. Hence the need for an effective and timely routine designed to minimise blood loss. The routine suggested is the administration of ergometrine by the intravenous route, timed to reach the uterine musculature before placental separation, and so ensure effective myometrial retraction and contraction, synchronous with the separation of the placenta. Such close timing would give maximum assurance of protection against haemorrhage.

It is the authors' belief that such routine prophylactic administration of intravenous ergometrine can become a practical procedure by the use of the Mitchell's needle. The trial which will now be presented, supports our belief and demonstrates the practical value of the method.

THE METHOD OF STUDY

The study was conducted with the help of final year Medical Students attached to the University Unit at the Kandang Kerbau Hospital, Singapore. During a 6-week period, from 9th March to 19th April 1965, between the hours of 9.00 a.m. - 4.00 p.m. from Monday to Friday and 9.00 a.m. - 1.00 p.m. on Saturday, all patients delivering in the Normal Labour Ward were included in the Study.

The patients were examined with these specific objectives:—

1. To confirm that labour was well advanced.
2. To exclude multiple pregnancy. Any such case was transferred to the Abnormal Labour Ward.
3. A Mitchell's intravenous needle was then inserted into a vein on the dorsum of the hand and secured with a piece of adhesive tape. An injection of 2 millilitres normal saline was given to prevent clotting in the needle.

The deliveries were conducted by Midwives in the usual manner. When delivery was impending, a Medical Student was called to stand by for the administration of ergometrine. The injections were given (a) at crowning, (b) after crowning and (c) with the birth of the anterior shoulder, the choice of timing being in that order. Wherever possible the injection was to be given at the moment of crowning. The dose was 0·25 mg.

The delivery of the body was, as far as possible, a delayed and deliberate procedure in order to allow time for the ergometrine to act on the uterus. It was thought that this timing would also allow the placenta to separate and descend "on the heels" of the baby, and thus obviate the complication of a trapped placenta.

The delivery of the placenta was commenced when the baby had been separated from its cord attachment and taken away. The Medical Student would make an attempt to delivery by the Brandt-Andrew's technique. If this was unsuccessful, further time was allowed for the placenta to descend before delivery was undertaken. Where the placenta was retained for 30 minutes, preparations were made for manual removal.

Blood loss before and after delivery of the placenta was measured and recorded in the usual way by the Midwives. The timing of the various stages was also recorded by Midwives.

CONTROL

For control, all patients delivered during the same hours in the 6 weeks immediately preceding the study period were taken. These patients were managed essentially by Midwives. No intravenous ergometrine was given. All cases received 0·5 mg. ergometrine at the completion of the third stage. Cases of retained placenta were managed by Doctors when the third stage exceeded 30 minutes. Data were obtained from the Labour Ward records. The general procedures adopted in the management of the control and study cases were identical. No attempt was made to modify or alter any of the usual routines during the period of study. This was to ensure, as far as possible, comparable conditions and observations in the two groups.

RESULTS

a) There were 370 cases in the Study Group and 325 Controls. Table I shows the parity distribution.

TABLE I

	Study Group	Control
Total number of cases	370	325
Total number of Primip	103	63
Para 2 — Para 4	158	128
Para 5+ above	109	134

b) *Blood Loss:* The average blood loss was 2·5 ounces in the Study Group and 4·8 ounces in the Control Group. This represents a reduction of 40 per cent or in absolute terms a saving of 2·3 ounces per delivery. The average blood loss related to parity is shown in Table II.

TABLE II

AVERAGE BLOOD LOSS

	Study Group	Control
All cases - -	2·5 ozs	4·8 ozs
Primip - -	3·3 ozs	4·4 ozs
Para 2 — Para 4	2·4 ozs	5·1 ozs
Para 5+ above	2·1 ozs	4·8 ozs

c) *Incidence of Postpartum Haemorrhage:* Adopting the Hospital criterion of 15 ounces, the postpartum haemorrhage rate was 0·27 per cent in the Study Group and 2·07 per cent in the Control Group, as shown in Table III. From the same Table it may be seen that in the Study Group there is a high proportion of cases in the "less than 5 ounces" category, 89 per cent as against 72 per cent in the Controls.

TABLE III

	No. of Cases in Study Group	No. of Cases in Control Group
Total number of cases	370	325
Loss of 15 ounces and more	1 (0·27%)	9 (2·07%)
Loss of 10-14 ounces	5 (1·35%)	22 (6·77%)
Loss of 5-9 ounces	34 (9·19%)	62 (19·08%)
Loss of less than 5 ounces	333 (89·2%)	232 (72·19%)
Number of M.R.P.	2	2

d) *Duration of the Third Stage:* The average duration of the third stage was 4·3 in the Study Group and 7·1 in the Control Group. This represents a shortening of the third stage by 2·9 minutes per patient or 40 per cent. The average duration related to parity is shown in Table IV.

TABLE IV

AVERAGE DURATION OF 3RD STAGE OF LABOUR

	Study Group	Control
Overall -	4·3	7·1 mins
Primip -	4·13	8·1 mins
Para 2 — Para 4	4·4	7·5 mins
Para 5+ above	4·3	5·8 mins

e) *Retained Placentae:* There were 2 cases each in the Study and Control Groups. In the Study Group the total blood loss from the 2 cases was 19 ounces. In the Control Group it was 62 ounces.

f) *Influence of the Timing of Injection:* As described in the Method, the injection of ergometrine was given at 3 points: with crowning, after crowning and with the birth of the anterior shoulder. From the analysis in Table V it is evident that the average blood loss and duration of the third stage were not influenced by the timing of the injection.

TABLE V

COMPARISON OF THE VARIOUS STAGES AT WHICH INTRAVENOUS ERGOMETRINE WAS GIVEN

	With Crowning	After Crowning	Anterior Shoulder
Study Group	3·0 ozs.	2·7 ozs.	3·5 ozs.
Control Group	5·0 ozs.	3·6 ozs.	4·2 ozs.

g) *Maternal Complications:* There was no instance of retained second twin. No serious symptoms *e.g.* severe headache or eclamptic fit were encountered. Mild degrees of nausea, transient sickness or headache were not recorded.

DISCUSSION

There are three popularly accepted methods of prophylactic administration of an oxytocic for the prevention of postpartum haemorrhage, namely, intramuscular injection at the completion of the third stage, intramuscular injection of syntometrine or intravenous injection of ergometrine with crowning of the head. For practical reasons, the first method is the most widely used. Although it is a valuable step in the prevention of bleeding, yet it suffers from the slow rate of absorption and takes seven minutes from the moment of injection to the onset of oxytocic effect.

This disadvantage is partly overcome by the combination of synthetic oxytocin with ergometrine in one ampoule containing "Syntocinon" 5 units and ergometrine maleate 0·5 mg. The injection takes 2½ minutes to act due to the rapid onset of action of the oxytocin, while the slower acting ergometrine ensures sustained haemostatic effect. Nevertheless, there is still a lag period of 2½ minutes and this is undesirable.

In the case of intravenous ergometrine, uterine activity follows within 40 seconds of administration, and theoretically is handicapped by the technical demand for a doctor at the critical moment of delivery. The method presented demonstrates the practicability of overcoming this disadvantage by the use of a Mitchell's needle. Admittedly, its insertion still requires a doctor but the timing is made more flexible and less demanding, while the actual injection of the drug into the needle may be carried out by a Midwife working under supervision.

The results of this study have merely confirmed what has been adequately demonstrated before. The blood loss has been reduced by 40 per cent and the postpartum haemorrhage rate from 2·07 to 0·27 per cent. The average duration of the third stage was reduced from 7·1 minutes to 4·3 minutes. There was no increased occurrence of retained placenta. These good results were obtained equally well with the injection given at crowning, after crowning or with the birth of the anterior shoulder. They were obtained without serious side effects to the mother.

It is therefore the opinion of the authors that, for maximum protection from postpartum haemorrhage, the adoption of the method described would have a real practical advantage over other methods. Its routine use in all deliveries is a practical procedure to be aimed for.

SUMMARY AND CONCLUSION

A method of ensuring the delivery of an oxytocic agent (ergometrine) into the vein at the moment of delivery is described. The results of a trial involving 370 women and 325 controls are presented. There was a substantial reduction of blood loss and the duration of the third stage without any increase in placental retention or maternal complications.

The routine employment of this method would offer the best protection against postpartum haemorrhage.

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REFERENCES

1. Brant, M.L. (1933): "The Mechanism and Management of the Third Stage of Labor," Amer. J. Obstet. Gynec., 25, 662.
2. Davis, M.E., & Boynton, M.W. (1942): "The Use of Ergonovine in the Placental Stage of Labor," Amer. J. Obstet. Gynec., 43, 775.
3. Davis, M.E. (1946): "Postpartum Hemorrhage," Amer. J. Surg., 48, 154.
4. Embrey, M.P. & Garret, W.J. (1958): "Ergometrine with Hyaluronidase: Speed of Action," Brit. Med. J., ii, 138.
5. Lean, T.H. (1965): "Maternal Mortality in Singapore Recent Survey 1960-1962," Singapore Med. J., 6: No. 3, 133.
6. Lister, U.M. (1950): "The Use of Intravenous Oxytocics in Second Stage of Labour," J. Obstet. Gynaec. Brit. Emp., 57, 210.
7. Martin, J.D., & Dumoulin, J.C. (1953) "Use of Intravenous Ergometrine to Prevent Postpartum Haemorrhage," Brit. Med. J., i, 643.