PRIMARY POST-PARTUM HAEMORRHAGE

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" All women, when the placenta separates, and after it is delivered, lose more or less red blood from the quantity of half a pound to that of one pound or even two ; but should it exceed this proportion and continue to flow without diminution, the patient is in great danger of her life."

This description of post-partum haemorrhage was given by William Smellie about 200 years ago (circa 1751). Its truth is still plain to-day, although we now customarily define abnormal haemorrhage as a blood loss that exceeds 20 oz. (568 ml.). Haemorrhage ranks next to " toxaemia " and " accidents of childbirth " in maternal mortality statistics ; it is a more important cause of death in childbirth than sepsis.

Present Investigation

During the period 1938–47, 156 cases of post-partum haemorrhage and 56 cases of manual removal of the placenta occurred in patients under charge of the Nuffield Department of Obstetrics ; in addition, a considerable number of cases were dealt with by the " Emergency Obstetric Service " in answer to urgent summons by outside practitioners. An analysis of the results is now presented ; but in regard to methods of treatment it should be noted that during the course of these years a progressive improvement took place in blood-transfusion technique, in the use of sulphonamides, and particularly in the increasing availability of penicillin.

In the second part of this paper an attempt is made to draw up a list of short and clear recommendations regarding the conduct of the third stage of labour in domiciliary practice.

PART I

Analysis of 156 Cases of Post-partum Haemorrhage

Parity.—Primiparae numbered 94, multiparae 62.

Type of Pregnancy.—Normal pregnancies numbered 100. Of the remainder, 22 showed some form of pre-eclamptic toxaemia, mostly mild. There were 4 cases of proved anaemia. Only one case of hydramnios was noted.

Type of Labour.—Normal labour occurred in 113 cases ; forceps deliveries numbered 27 ; other obstetric manœuvres, such as version, insertion of bag, etc., were performed in 16 ; medical or surgical induction was undertaken in 24. Multiple pregnancies numbered 3 and breech deliveries 4. Two patients with placenta praevia had post-partum haemorrhage after vaginal delivery.

From these figures it will be noted that neither hydramnios nor multiple pregnancy figured prominently in the aetiology of post-partum haemorrhage. This is contrary to current teaching. Placenta praevia, another traditional cause of post-partum haemorrhage, contributed only two cases to the list, probably because patients with major degrees of placenta praevia were treated by caesarean section, the placenta was removed immediately, and the bleeding site was directly controlled.

Length of Labour.—The average length of all the labours was 21½ hours, with extremes of 2¾ hours and 66 hours. In only 25 cases did labour last more than 30 hours.

Amount of Blood Lost.—The blood loss before and after delivery of the placenta, estimated by the obstetrician or midwife, averaged 35 oz. (990 ml.). As many patients suffered from blood loss before as after delivery of the placenta.

Methods of Delivery of the Placenta

	No.	Average Duration of Third Stage
Expulsion by fundal pressure	105	30 minutes
Spontaneous delivery	27	15 „
Credé's expression	23	70 „
Retained placenta (found post mortem)	1	
Total	156	

Credé's Expression.—Although Credé's method of expression was used in a relatively small proportion of all cases developing post-partum haemorrhage, the reverse of the picture—i.e., cases in which Credé's method was used without associated post-partum haemorrhage—is not recorded. No fair conclusion can therefore be drawn regarding the part played by this manœuvre in causing or preventing haemorrhage or shock.

Blood Transfusions.—The total number of transfusions was 38. The average amount transfused was 2 pints (1.4 litres).

Time of Administration of Oxytocic Drugs.—In 113 cases an oxytocic drug was given after delivery of the placenta. In a small minority of cases (11) an oxytocic drug was given before the delivery of the placenta (ergometrine 8, " pituitrin " 2, " pitocin " 1). In the remainder the time of administration of the drug was unstated, but was presumably subsequent to the delivery of the placenta.

Uterine Packs.—In no case was a pack inserted to control haemorrhage in this series.

Puerperal Morbidity.—" Notifiable " pyrexia occurred in 17 cases. In the majority of cases this was attributed to urinary infection ; birth-canal infection with known pathogenic organisms occurred in less than one-third of the whole.

Mortality.—There were two maternal deaths, giving a mortality rate of 1.3%. One of the patients who died was admitted as an emergency case with a retained placenta. She died before it could be removed. The other died from severe pregnancy toxaemia.

Analysis of 56 Cases of Manual Removal of the Placenta

The following table gives details of these cases :

Primigravidae	38
Multiparae	18
Spontaneous delivery of foetus	40
Emergency admissions	25
" Notifiable " pyrexia	19
Mortality	0

Regarding the incidence of " notifiable " pyrexia, there was a marked fall subsequent to 1942—only 5 cases out of 30. None of the patients received penicillin therapy, so the improvement may be shared by improved blood-transfusion technique and improved sulphonamide therapy. Prophylactic penicillin therapy may further reduce the incidence of morbidity, but was not used in the cases now under review. A similar low morbidity rate recorded by Sewall and Coulton (1946) is attributed by them to the performing of manual removal before the patient had become grossly anaemic and shocked.

Emergency Obstetric Service

The above 56 cases do not include any " flying squad " cases. These are analysed in the following table:

Cases of Primary Post-partum Haemorrhage; Emergency Obstetric Service, 1946–7

Traumatic post-partum haemorrhage		1
Haemorrhage after removal of placenta	..	21
Retention of placenta	..	29
Manual removal	21	
Manual expression	8	
Incomplete abortion	..	9
Total	..	60
Transfusions	..	49
Blood	45	
Saline	4	

It will be noted that out of 60 summonses for primary post-partum haemorrhage 38 were directly connected with retention of the placenta.

Conclusions

In the hospital deliveries analysed post-partum haemorrhage occurred as often in primigravidae as in multiparae. It occurred as often after normal as after abnormal labours. Contrary to the usual teaching, there was no evidence that multiparity and hydramnios were prominently associated with post-partum haemorrhage. The puerperal pyrexia rate was high after post-partum haemorrhage. Urinary infections were the commonest cause of this morbidity.

In collecting and analysing these case records the opinion was formed that (*a*) manual removal of the placenta is a less dangerous procedure now from the point of view of sepsis than is generally supposed ; (*b*) greater use might be made of ergometrine in the control of haemorrhage ; (*c*) larger transfusions of blood might reduce morbidity and shorten convalescence.

PART II

From the point of view of midwife and general practitioner we believe there is present need for clear recommendations regarding the treatment of post-partum haemorrhage. The following intentionally dogmatic statement is an attempt to remedy these shortcomings, and is based on the evidence presented in Part I.

Treatment of Primary Post-partum Haemorrhage

Before considering methods directed to the control of uterine haemorrhage we would emphasize that the bleeding may on occasion come from perineal, vaginal, or cervical lacerations. These may require suture.

Since so many cases of primary post-partum haemorrhage occur after normal delivery it must be supposed that the management of the third stage of labour is often mishandled. The chief requirement is the exercise of patience, but an alert eye must be kept for deviations from normality in uterine function so that prompt and ordered action may be employed when necessary.

Management of the Third Stage of Labour

As long ago as 1767 John Harvie (Smellie's successor) stated, when discussing this subject, " Nature is to be assisted, to be followed and supported, but seldom or never forced."

To wait for 20 to 30 minutes in the expectation that natural separation and expulsion of the placenta will take place is still the best policy, and is the method favoured by the majority of obstetricians. The hand supports the fundus of the uterus throughout. It is not enough to keep a record of the patient's pulse and to ignore the abdomen, for the uterus may be actively bleeding and the fundus rising because of the retained haemorrhage despite the continuance of a relatively steady pulse rate. Sometimes the condition is overlooked because a lower uterine segment alone distends and a contracted uterine body and fundus are felt at a high level in the abdomen.

The signs of placental separation and descent must be appreciated and not confused with the onset of post-partum haemorrhage. They are the rising of the fundus, the expulsion of a small quantity of blood, and the permanent lengthening of the cord. When, after these have occurred, the uterus contracts and the abdominal muscles are used, the placenta is expelled—aided, if necessary, by downward and backward pressure of the attendant's hand on the uterine fundus (Harvie, 1767).

Treatment by the Midwife

Before Delivery of the Placenta.—(1) Provided that the patient's bladder is empty, the midwife should massage the fundus of the uterus to stimulate a contraction ; separation and descent of the placenta should then occur. (2) If these do not occur and the haemorrhage continues she should give 0.5 mg. ergometrine intramuscularly. She should not wait until the condition of the woman is grave before giving the injection. The time to have prepared this injection is just before the birth of the baby—intelligent anticipation. After the injection the midwife should again support the fundus of the uterus and expel any clots that have collected meanwhile. (3) The midwife will have sent for medical aid at the outset. This action is, of course, required of her, but it will obviously not arrest haemorrhage, and much time may elapse before the doctor's arrival.

After Delivery of the Placenta.—(1) Massage of the fundus of the uterus (avoiding the region of the ovaries) should stimulate uterine contraction and so control bleeding. In addition, ergometrine 0.5 mg. (if not recently administered) should be given by deep intramuscular injection. (2) If the haemorrhage is not controlled the uterus should be stimulated by bimanual compression. This can be made through the abdominal wall if the woman is thin, or by a closed fist in the vagina and an open hand on the abdominal wall pressing down the posterior wall of the uterus if the external method is unsatisfactory. This compression is difficult to maintain, but may tide over an urgent few minutes till medical aid arrives.

Treatment by the Doctor

Before Delivery of the Placenta.—The initial treatment is the same as that recommended for the midwife. If the midwife has not already given ergometrine, the doctor should give 0.25 mg. intravenously (Moir, 1947). He should be ready to " squeeze the fundus of the uterus like a sponge " (Stabler, 1947) in an effort to deliver the placenta with the strong contraction that almost invariably takes place 45 to 50 seconds after injection of the drug. His grip should be firm but not powerful enough to bruise the uterus. If he fails to expel the placenta there is no more to be done, as there will be a well-contracted uterus and also, incidentally, a contraction ring. It will be necessary to wait for more than half an hour to let the contraction ring relax before removing the placenta manually. It is improbable there will meanwhile be any further bleeding, and this time can be well spent in resuscitation of the patient and transferring her to hospital or making arrangements for the manual removal under anaesthesia in her home.

Instead of giving ergometrine the doctor may elect to remove the placenta manually, but, as this will require administration of an anaesthetic for most cases, he will find ergometrine more immediately available.

After Delivery of the Placenta.—The treatment should be that recommended for the midwife except that the doctor will give the ergometrine part intravenously and part

intramuscularly. Few cases will fail to respond to bimanual compression of the uterus, maintained if necessary for several minutes.

Retained Placenta—No Haemorrhage

We believe that a retained placenta should be removed not later than two hours after delivery of the baby (Sheehan, 1948). In some cases the maternal pulse rate rises although there is no haemorrhage. If the third stage is being properly managed and the placenta is still retained after one hour, arrangements should be made for removing it as soon as possible. Under general anaesthesia a gentle attempt is first made to express the placenta ; if this does not succeed, manual removal should be done without further delay.

Technique of Manual Removal of the Placenta

After cleansing the vulva the bladder is catheterized. The whole hand is introduced into the vagina. (Stitches in the perineum ought not to have been tied.) The tautened cord is palpated and traced upwards. It is a guide to (1) the contraction ring of the uterus, if present ; (2) the placenta, its site and extent (Fig. 1). The contraction ring may require stretching by gentle insinuation of the cone-shaped hand. The placenta may already be separated and all that is required is its removal. If the placenta has not separated, however, the hand is withdrawn to the lower uterine segment (Fig. 1) and an attempt is made to get between membranes and uterine wall. The placenta cannot be separated adequately unless the hand is external to the amnion and chorion. Then we bel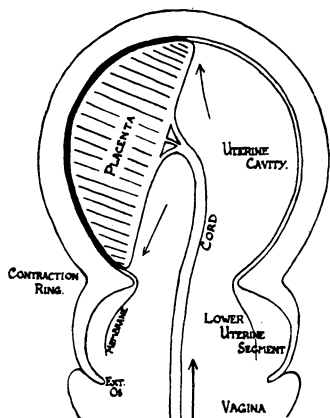ieve it is better to go to the highest point of the placenta and start separation from above downwards. This allows the uterus to retract immediately on the sinuses opened by the manipulation. Separation is best accomplished by scratching movements of the tips of the fingers directed always towards the placenta and never towards the uterine wall. The other hand, placed on the abdomen, is of great help in pushing the fundus towards the hand inside the uterus. After the placenta is completely separated it is removed in the palm of the hand, very slowly, to allow separation of the remainder of the membranes.

FIG. 1

Immediately on removal the maternal surface of the placenta is examined, and if a piece is thought to be missing the hand must re-explore. But the best chance of removing the placenta completely is at the first attempt. The ragged placental site may make re-exploration most confusing with regard to the recognition of retained fragments. Ergometrine, 0.25 mg. intravenously and 0.25 mg. intramuscularly, is given on completion of the operation.

Difficulties.—(1) On introducing the hand the cervix may be mistaken for the contraction ring, and vice versa (Fig. 1). (2) It appears that on rare occasions the contraction ring has been mistaken for the placental edge. Here the thicker upper uterine segment joins the thinner lower segment, and separation has, in error, been attempted between the two, so that the hand is soon in the peritoneal cavity. This would explain those cases in which manual removal of the uterus has been performed instead of manual removal of the placenta (Wassenaar, 1947). (3) A contraction ring may be situated in the cornual portion of the uterus, pre-

venting the escape of part of the placenta (Fig. 2). If separation of the placenta is accomplished from below upwards (Fig. 2) a fairly large bleeding area is exposed before the contraction ring is felt, and as this constriction is a very much more difficult one to overcome, and is less accessible than the other type (Fig. 1), there is unnecessary blood loss. It is better first to reach the fundus of the uterus and diagnose this cornual contraction and deal with it. It is in this type of case that the hand on the abdomen pushing the fundus downwards is of most value. The whole placenta may be within this cornual contracti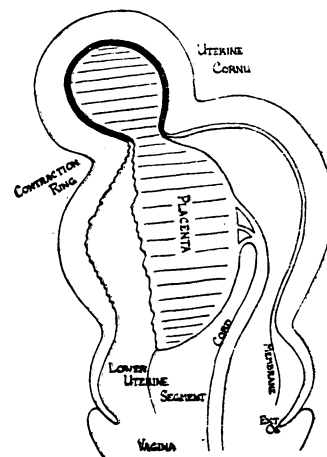on ring. (4) There may be no line of cleavage between placenta and uterine wall. This is the very rare condition of placenta accreta. One of us has seen this in a case at caesarean section (Lennon, 1947). Possibly the best treatment is to leave the placenta and to cut the cord off short in the hope that a fragmentary discharge of the placenta will take place in the ensuing few weeks (Gemmell, 1947).

FIG. 2

Comment on Certain Alternative Treatments

Treatment of post-partum haemorrhage by use of a hot intrauterine douche has not been recommended because of the difficulty in adjusting the fluid to the correct temperature—a time-consuming task. There is little margin between a douche hot enough to stimulate uterine contraction and one that will burn the skin. The oxytocic drugs now available are far easier to use and are at least as efficient.

Packing the uterus is difficult and requires special instruments if the pack is to reach the upper as well as the lower uterine segments. Packing the vagina is simpler, but is still awkward to carry out in domestic practice and tends to cause shock ; it may, however, be necessary if bleeding is due to a high vaginal or cervical tear.

Hysterectomy is obviously not a possibility in domestic practice, and in all events should not be required in any but the most intractable cases of haemorrhage.

Posterior pituitary extract has not been advocated for two reasons: (1) it may cause shock on its own account, resulting in death (Adelman and Lennon, 1941) ; and (2) it is better for midwife or practitioner to know one drug (ergometrine) and its uses than to be confused in the use of two different oxytocics.

It will have been noted that the name Credé has not been used throughout Part II. This has been a deliberate omission. We have had Credé's own description of his manœuvre (1853, 1861) translated, and we consider that Harvie, ninety-odd years before, gave a much better account of external manual expression of the placenta. It is obvious that Credé did not wait for natural expulsion of the placenta, but *in all cases, immediately after delivery*, stimulated uterine contraction by manipulations through the lower abdominal wall, gripping the total uterus from outside with the hand so that his five fingers exerted a gentle pressure on all sides of its body and thus expelled the placenta.

Summary

A review of 156 cases of post-partum haemorrhage and of 56 cases of manual removal of the placenta is made.

This analysis includes consideration of type of pregnancy, type and length of labour, blood loss, morbidity, and mortality. The main findings are listed at the end of Part I of this paper.

A routine for the conduct of the third stage of labour under normal conditions, and when haemorrhage occurs, is outlined.

The technique of manual removal of the placenta is described and illustrated.

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A REVIEW OF FEMORAL HERNIAE

WITH SPECIAL REFERENCE TO THE RECURRENCE RATE OF THE LOW OPERATION

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A great deal of attention has recently been centred on the various methods available for the repair of inguinal herniae and the advantages and disadvantages of the Bassini method ; figures have been produced to indicate the appropriate recurrence rates of the various operative procedures at present in favour. Comparatively little, however, has been said of femoral herniae, and it was thought to be well worth while reviewing a series of consecutive cases with a view to ascertaining the recurrence rate of the so-called low operation.

In the years 1942 to 1946 inclusive 178 cases of femoral hernia were operated upon in one of the surgical units of the Royal Hospital, Sheffield: 72 were in men and 106 in women, thus giving a ratio of 1 to 1.5—a far higher incidence in men than is usually accepted. There were 45 strangulations, or 25% of the total.

During the same period there were 807 inguinal herniae, 751 occurring in men and 56 in women, with a total of 21 strangulations, or 2.7% ; it will thus be seen that in this series inguinal herniae were 4.5 times more common than femoral, and men were affected 13.4 times more often than women. The statement that inguinal herniae are more common in women than femoral is not in accordance with these figures, for there were only 56 inguinal as compared with 106 femoral, making the latter almost twice as common. (It should be noted that no children under 6 years of age are included in this survey, as they are admitted to the Children's Hospital.)

Of the 178 femoral cases, 109 were on the right side and 69 on the left ; thus there would appear to be a greater tendency to herniation on the right side. (This was also found to be the case with inguinal herniae, the right side being affected more often than the left—438 and 369 respectively.) There were only four bilateral cases, in contradistinction to inguinal herniae, where it is undoubtedly much more frequent. The average age was 50 for men and 53 for women, and in the whole series the youngest was 8 and the oldest 79. As already mentioned, there were 45 strangulations (25%)—13 in men and 32 in women. Thus there is a marked difference between the two sexes,

the tendency to strangulation in women being almost three times as great. The frequency of strangulated femoral herniae to inguinal is also striking (25% and 2.6% respectively), and in the case of inguinal strangulation 76% occurred in men. Of the total number of femoral strangulations 7 were of the Richter type. The average age of strangulation was 64 for women and 63 for men ; the overall mortality rate was 6 deaths in 45 cases, or 13.3%.

Incidence of Recurrence

Of the total number of cases admitted in the period 1942–6, 120 were personally examined and closely questioned about any disabilities following operation. The technique used was the low method of herniorrhaphy, and a careful follow-up revealed no recurrence in the 54 male patients, though there were four such recurrences in the 66 females, thus making an over-all recurrence rate of 3.3%. The cases were not selected in any way, and included strangulated as well as list cases ; as previously stated, the ages ranged from 8 to 79. One of the recurrences was first operated upon in 1920, and at the time of the second operation the tissues were in a generally weak condition ; but this has been counted in the present series, as it is a definite recurrence. Five other recurrent cases were successfully operated upon, and routine examination has shown no recurrence after periods varying from 2 to 5 years. In each of these cases a very definite sac was presented, and in four out of the six it did not seem to have been adequately removed at the time of the first herniotomy—a finding borne out by the fact that recurrence had taken place a few months after operation. It is certainly true that the most fruitful source of recurrence lies in failure to remove the sac adequately, the commonest mistake being to transfix the sac too low down and to omit to clean the neck thoroughly (a most important step, if indeed not *the* most important step of the whole operation), so that after excision of the sac retraction through the femoral canal cannot adequately take place, thus leaving the stump of the sac in the crural ring, which invites a further pouch of peritoneum to form, with ultimately the development of another hernia.

There appeared to be no increased likelihood of recurrence taking place in the aged as compared with the young, nor in relation to heavy work, and strangulated cases were no more likely to recur than the non-strangulated. Chronic chest conditions, too, seemed to have no ill effects, and one patient who suffered much from a severe and persistent cough (as he put it, his cough was so bad it knocked him out of bed) was found to be completely sound, so far as his hernia was concerned, when examined 2½ years after operation, at the age of 72. This is in contrast to inguinal herniae, where there seems little doubt that recurrence is favoured by heavy work, chronic cough, and similar undue strain placed upon the abdominal wall and inguinal canal.

It is of interest to note that 9 inguinal herniae (all in men) were discovered on routine follow-up examination on the side of the femoral herniotomy, and in every case no history could be obtained of an inguinal hernia having been present before operation. This is of considerable importance, first because patients often, and very naturally, assume that the femoral hernia has recurred—an assumption sometimes shared by their doctor ; and secondly because it casts some doubt on the statement that Lotheissen's operation, by interfering with the posterior wall of the inguinal canal, predisposes to the subsequent development of a direct inguinal hernia. In the present series of cases no such interference took place, yet 7.5% when examined exhibited an inguinal hernia. Presumably a certain number must have been present initially and been