THE TREATMENT OF ACCIDENTAL HÆMORRHAGE.

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From the time when the original distinction in England was made in 1775 by Rigby between placenta prævia and accidental hæmorrhage to the present day, the question of the correct treatment of accidental hæmorrhage has been much debated. Plugging the vagina was advocated in 1776. Rigby, in his 'Essay on Uterine Hæmorrhage,' the fourth edition of which was published in 1789, very carefully describes how he waits for slight pains and some dilatation of the os before rupturing the membranes. John Burns in 1807, in 'Practical Observations on Uterine Hæmorrhage,' writes at considerable length on the value of the vaginal tampon.

Ingelby, in a book on 'Uterine Hæmorrhage,' published in 1832, refers to the disputed lines of treatment, namely:

1. Propriety of rupturing the membranes in preference to immediate delivery by turning the child.

2. The employment of the tampon until the os uteri has undergone a certain degree of relaxation.

In 1842 Churchill, in his 'Midwifery,' discusses various lines of treatment. Robert Lee in 1844 published 'Lectures on Midwifery,' and related the history of the treatment very fully. In 1860 Braxton Hicks advocated rupture of the membranes and rapid delivery for cases of concealed accidental hæmorrhage. From that time until Smyly reintroduced the method of plugging the vagina, in 1894, there seems to have been no other mode of treatment. Most of the text-books of the present day advise that in severe cases the uterus should be emptied of its contents as soon as possible, and in addition to that line of treatment they warn the practitioner against plugging the vagina.

Classification of Accidental Hæmorrhage.

The classification of accidental hæmorrhage adopted is borrowed from the Germans—namely, external, concealed, and mixed. It is a clinical classification. The text-books make use of two varieties—external and concealed. However, the causes of accidental hæmor-

rhage, let them be what they may, are the same in all. It is an accidental cause—namely, the amount of separation of the membranes—which determines whether the blood, poured out into the uterine cavity, finds its way to the vagina or not. Probably the position of the original spot where the hæmorrhage takes place is the most important factor. In not a few cases where the symptoms are principally those of the concealed variety more or less external hæmorrhage is found; and, on the other hand, in cases of external hæmorrhage not only may there be symptoms of concealed accidental hæmorrhage, but retro-placental clots may be discovered. As an example, Goodell's so-called cases of concealed accidental hæmorrhage might be classified as 68 concealed, 30 mixed, and 1 external.*

Since my attention has been attracted to this subject, I have noticed many placentæ, from apparently normal confinements, showing obvious evidence of slight separation and hæmorrhage. The old adherent blood-clots vary in size, and the placenta is more or less affected at these points. The symptoms caused by these hæmorrhages have been so slight that they have been neglected. On this question Dr. Bligh, of Caterham Valley, gives some details in his case of accidental hæmorrhage recorded in the *Lancet* for July 31, 1895. He describes the placenta, and mentions 'a roughly oval depression 4 inches × $3\frac{3}{4}$ inches; this depression was $\frac{1}{2}$ inch below the general surface, and over it the normal placental structure was atrophied, producing a fibroid, nearly smooth base. On examining the clots a portion of the smaller was found to be obviously old, being firm and partially decolourized, and this portion fitted with curved exactness into the placental depression. The larger clot, which measured 9 inches × 6 inches × 2 inches, was recent.' Dr. Bligh stated that the patient had been seized with sudden faintness six weeks previous to her confinement; this passed off after a day in bed. She was in good health up to the day before the acute symptoms began. From the extremely slight cases one can go by easy steps to the most severe, when death may occur rapidly. Of the three forms, it cannot be doubted that the concealed variety is by far the most dangerous. Besides the severity of the symptoms, there is often delay in treatment. With the external variety, on the contrary, there is seldom any delay in sending for medical assistance, as every woman fears what she calls flooding or hæmorrhage.

It may be advisable to briefly describe a typical case of concealed accidental hæmorrhage. The symptoms which attracted my attention in the first case of the kind that I was called to were the anxious,

* *Amer. Journ. of Obstet.*, vol. ii., p. 281 *et seq.*

drawn face, and the restless condition of the patient; she was tossing about from one side of the bed to the other, moaning but not complaining of pain. The skin was cold and clammy, the pulse rapid, and just perceptible. On putting my hand on the abdomen, the fundus of the uterus was felt a little below the ensiform cartilage; it was of stony hardness, round in shape, and no fœtal parts could be felt. On listening with a stethoscope no uterine souffle, no fœtal heart, no sounds of any kind were to be heard. The patient was having no labour pains, and there was no external hæmorrhage. On vaginal examination the cervix was found undilated and hard; it just admitted a finger-tip; the head covered by the membranes was felt with difficulty.

In a case of mixed accidental hæmorrhage, in addition to the external hæmorrhage, more clinical evidence of collapse is found than would be accounted for by the blood lost; in other words, there is shock as well as collapse. There are signs of internal hæmorrhage, but they are not so definite as those met with in the concealed variety; the uterus is hard, but has some elasticity; it may be slightly overdistended as well; the fœtal parts can probably be made out at the lower portion, and by the stethoscope one can hear some sounds. Later on retro-placental clots will prove the internal hæmorrhage. The external variety presents nothing out of the common. In the concealed variety, as a rule, there are no pains, and the os is hard and undilated. Attention must be drawn to the fact that in the typical cases of concealed and mixed accidental hæmorrhage the uterus is always more or less distended and *paralyzed*. It is therefore impossible, until it has rallied, to expect proper uterine contractions sufficient to expel the contents and to insure the absence of post-partum hæmorrhage. Sufficient stress is not laid upon this point in all the writings which have been consulted.

Description of the Rotunda Method of Treatment.

1. *Plugging the Vagina.*—Hastings Tweedy described the process in a paper, 'The Vaginal Plug in Accidental Hæmorrhage.'* The method in use at the present time differs a little from that employed when Tweedy was assistant-master. The plugs used are small tampons of sterilized cotton-wool, about the size of a large walnut. Lysol, creolin, and perchloride of mercury are the antiseptics used. After all the necessary antiseptic precautions usual for any obstetric

* *Transactions of Royal Academy of Medicine in Ireland*, vol. xvi., 1898.

operation have been taken, a catheter is passed, and the operator proceeds to plug. The patient is placed in the lithotomy position, and the fingers of the hand which was not used for cleansing the vulva, etc., may be used for plugging, and the other hand acts as a speculum. The plugs are taken out of the solution separately, wrung almost dry; the first one is placed in the posterior fornix, and the fornices are systematically packed with a fair amount of pressure. Each plug is put in with a purpose to form a ring round the cervix, and packing is continued systematically downwards until no more can be introduced into the vagina. The operator then takes a large strip of iodoform gauze and places it over the plugs, which will be projecting from the vagina, instructing an assistant with clean hands to hold the gauze in position while the binder and T bandage are put on. The iodoform gauze is not always used, but the author has found it of great practical value.

Chloroform or an anæsthetic need not be given; it will only be required if the patient is very restless, and it is a remarkable fact how little is necessary to render the patient quiet—merely a few whiffs.

2. *Application of the Binder and Perineal Bandage.*—The binder should have been placed under the patient before the plugging, etc., was commenced. It is now brought down into position, while the patient is swung round into the bed. Strong pins and a stout binder are needed. The first pin must be placed above the fundus, as near to the ensiform cartilage as possible, and the binder secured extremely tightly downwards as far as the symphysis. Lastly, the perineal bandage is put on, pinned well up the binder in front, three couples of pins being required. The patient is then rolled over on to her side, and the bandage secured at the back in the same way, the assistant keeping up steady pressure with his hand on the iodoform gauze. The plugs are thus kept in place until thoroughly secured by the tight perineal bandage. In this manner pressure is made on the front of the uterus and abdomen by the tight binder, and the uterus is forced downwards as well as on to the firm mass of plugs. The abdomen and the abdominal veins will also be compressed.

The Action of the Plug and Binder.

Smyly, in his paper read before the British Medical Association at Bristol in 1895, stated that a properly-applied tampon (1) prevented external bleeding; (2) excited labour pains; (3) induced

rapid dilatation of the os; (4) caused increased intra-uterine tension if hæmorrhage continued; and he only advocated the plug so long as the membranes were intact.

Tweedy, in his paper already referred to, states that the tampon—

1. Acts as a tourniquet to the uterine arteries, the arteries becoming acutely bent, and their blood-flow impeded. This action is probably brought about by the drag on them through their cervical branches. (In one case he experimented on its action.)

2. That there is clinical evidence that the hæmorrhage does not occur above a properly-fitted tampon.

3. That labour pains are induced quickly, probably by accumulation of CO_2 in the uterine muscle, the result of the compression of its vessels.

4. That it dilates the cervix by (*a*) causing a peripheral force to act upon it, (*b*) exciting uterine contractions.

His method differs from that in vogue at the Rotunda in the following particulars. He advocates:

1. Cotton-wool plugs, the size of a small fist. Further experience has shown that smaller plugs, say the size of a large walnut, are more easily manipulated, and form a better plug when massed together.

2. The left lateral position. The lithotomy position is now generally employed. He mentions only 'a diaper placed between the thighs.' As described, the fixing of the tight perineal band on to the tight binder is not the least important part of the Rotunda method.

Tweedy refers to a tight abdominal binder. At the Rotunda at the present time the binder is put on extremely carefully, and with the modification described in detail. Some medical men have attempted the procedure in such a crude fashion that naturally the results have not been successful. A local practitioner sent a case to the Rotunda, stating in a note that he had plugged the vagina. On the patient being admitted, the plug was found to be her husband's handkerchief. Mr. Targett relates a similar incident, which occurred at Guy's Hospital, the plug being in this case a handful of tow.

The statements made by Smyly and Tweedy, that the plug and binder (1) excite labour pains, (2) induce rapid dilatation of the os, may be doubted.

For this paper all the cases of severe accidental hæmorrhage occurring at the Rotunda Hospital from November 1, 1896, when Dr. Purefoy took on the mastership, to November 30, 1901, have been

collected. The total is 83 out of about 17,200 deliveries. Twenty-four occurred during the eleven months the author was at the hospital as student and extern maternity assistant. An analysis of the 40 external and mixed cases in which the plug and binder were used has been made. The three cases of concealed hæmorrhage have been purposely left out, as Smyly and Tweedy do not propose to plug the vagina for this variety.

In three of the 40 cases the times of delivery are not stated, and one died undelivered; hence there are 36 cases as tests.

Times of Delivery after Plugging.

Under 4 hours	4 cases.
From 4 to 7 hours	9 ,,
,, 7 to 12 hours	12 ,,
,, 12 to 24 hours	8 ,,
Over 24 hours	3 ,,
	36 cases.

Of the four cases three patients had been in labour six hours, nine hours, and fifteen hours respectively before plugging; the fourth patient was in her fifteenth pregnancy, and the os was the size of 2 inches when the vagina was plugged. Of the cases over twenty-four hours, the times were twenty-six hours, three days, nine days. These facts do not suggest that the plug and binder accelerate labour.

Of the three cases of concealed hæmorrhage the times were respectively ten hours, twenty hours, two and a half days.

Clinically, there can be no doubt that the plug and binder control the hæmorrhage. Forty-three of the Rotunda cases were plugged; of this number there were two deaths. One (death undelivered), judging by the description, must have lost a fatal quantity before the vagina was plugged; it was diagnosed as a case of external accidental hæmorrhage. The other died from a ruptured uterus, but she delivered herself naturally before death. It may be fairly claimed that the hæmorrhage was successfully controlled in 42 out of 43 cases.

It is difficult to say how the plug and binder control the hæmorrhage. Without more proof, Tweedy's statement, that the uterine arteries are bent by the plug, can hardly be accepted. The only explanation possible is that the effect is purely mechanical, and consists in a general pressure on the whole of the uterus.

It has been shown in describing the method in use that the plug forms a solid mass, which is kept in place by the perineal bandage. The uterus is not only forced down on to this, but a very tight pressure is put on the whole of the front of the uterus, as well as on some portion of the fundus. There is therefore a general compression. The uterus may be regarded as a distensible sphere filled with fluid. The pressure exerted outside will be transmitted to the fluid inside; at the same time the walls are supported to prevent further distension. As soon as the fluid pressure within the uterus is equal to the blood pressure in the uterine arteries, further escape of blood is stopped.

Smyly objects to the plug being used after rupture of the membranes. His reason is the risk that fresh blood may escape into the space which was occupied by the liquor amnii. If the plug and binder act in the way that has been suggested this space would be obliterated. More pressure would be required because of the loss of the fluid inside, to which the outside pressure is communicated.

Among the cases collected, the vagina was successfully plugged in one, after rupture of the membranes.

The older writers, when they advocated the use of the vaginal plug, did not perform that operation as thoroughly as it is now done at the Rotunda Hospital; therefore, they did not understand the full use which might be made of it. On this point both Smyly and Jellett seem doubtful, when they advocate *accouchement forcé* or Porro's operation for bad cases of concealed hæmorrhage.

The Causes of Death in Cases of Accidental Hæmorrhage.

It will be obvious that there can be:

1. *A Fatal Hæmorrhage.*—Physiologists state that 3 per cent. of the body-weight is a fatal loss. The average weight of a woman may be taken as 9 stone, or 126 pounds; 3 per cent. of this is $3\frac{3}{4}$ pounds. In the Rotunda Hospital cases in four instances the clots were weighed—(*a*) the blood-clot was 2 pounds, with some fluid blood; (*b*) 2 pounds; (*c*) $1\frac{7}{8}$ pounds; (*d*) $1\frac{3}{4}$ pounds. From an analysis of Goodell's cases, and many others which have been published in various medical journals, one seems to get a suggestion that the maximum loss with recovery is 2 pounds. On the other hand, death has occurred with loss of almost an infinitesimal amount of blood.

2. *Non-fatal Hæmorrhage and Shock.*—It will not be denied that distension of the uterus causes shock.

There are two other causes of shock which are material in bringing about death. These are:

(1) The shock from dilatation of the cervix in the procedures recommended by so many authors.

(2) The shock from the operative measures adopted—version, perforation, and forceps. I have seen two bad cases of shock from dilatation of the cervix for the purposes of curetting; in both the operation was commenced before the patients were fully under chloroform.

The question of chloroform has to be considered. If any operation be performed, additional shock will be caused unless the chloroform be pushed to the surgical degree. To deeply anæsthetize a patient suffering from collapse is dangerous. To perform the operation (*a*) without chloroform, (*b*) at a point less than surgical anæsthesia is also dangerous, therefore any operation is contra-indicated.

3. *Post-partum Hæmorrhage.*—This must have caused death in many instances if the descriptions of the cases are true. The extra amount of blood lost is sometimes little because of the collapsed condition of the patient, yet it is sufficient to settle the question of life or death. In others there can be no doubt as to its effect, the hæmorrhage being so severe.

Clinically the cases can be divided into three classes:

(1) Cases where the hæmorrhage or shock, or both, have been so severe that the patient cannot recover, no matter what treatment be adopted.

(2) Cases where the symptoms are severe, and there is a medical man's margin, proper treatment will result in recovery, but injudicious treatment will probably cause a different ending.

(3) Cases so slight that, under any treatment within certain limits, the patient will recover.

The uterus, very soon after the plug and binder have been applied, becomes markedly softer to the touch and the patient rallies. After an interval—sometimes hours, sometimes days—pains come on. In a remarkably short time (in some cases with two or three pains) the plugs, fœtus, placenta, and clots behind it 'tumble out,' to use the expression of a midwife about seventy years old, with an experience of forty years in the Dublin slums. There is seldom, if ever, any post-partum hæmorrhage, providing a sufficient interval has elapsed between the plugging and the delivery.

Now, with regard to the question of after-treatment. In most

instances, as soon as the patient is seen (and before the plugging), a hypodermic injection of strychnine is given. When she is comfortably in bed with hot bottles, if there is no vomiting, she is induced to take some hot nourishment, and a hypodermic injection of morphia; ½ grain may be given with benefit, but this dose is usually considered too much. Instructions are given to the attendant that an urgent message should be sent in the event of:

(*a*) Pains coming on.

(*b*) Plugs commencing to bulge.

(*c*) Any hæmorrhage coming through the plugs. (This is usually regarded as a proof that the plugging has not been efficiently done.)

(*d*) Any attack of faintness, etc.

The patient while awake should be given nourishment every hour, and the binder and plugs should not be touched for any purpose. A catheter is passed about six hours after plugging, the perineal band is reapplied, and the binder tightened. The plugs are left in for twenty-four hours (if there should be no need to take them out); they are then removed, the vagina is douched, and, if necessary, the plugs are reinserted. Should the conditions be satisfactory, nothing further is done.

Criticisms on the Results of Rupturing the Membranes.

Those who have advocated the rupture of the membranes have done so for a definite reason. The treatment has often been questioned, but the rupture of the membranes in cases of accidental hæmorrhage is supposed to bring on pains. It must be admitted on all hands that the contractions of the uterus will control the hæmorrhage.

Mauriceau, Puzos, or Ramsbotham, to whichever is due the doubtful credit, argued that because rupturing the membranes will in some instances bring on pains, or increase the pains in a normal case, therefore the same method will have a similar result in accidental hæmorrhage. But it is impossible to bring on pains rapidly in the majority of cases of accidental hæmorrhage. The uterus is in such a condition that it *cannot* contract. To show that it does not do so, Braxton Hicks's twenty-three cases* (with fifteen deaths) have been analyzed. Six of his cases, at all events, are arguments against his statement that 'evacuation of water tends to hasten labour,' as the following table shows.

* *Trans. Obstet. Soc. Lond.*, vol. ii.

Case.	After Rupture of Membranes, Delivery in—	Remarks.
No. III.	4 hours	Uterus commenced to act in about 2 hours after rupture of membranes.
„ VI.	5½ „	The membranes were ruptured when slight pains were on; eventually perforation and extraction were done.
„ VII.	5½ „	Labour began 2½ hours after the rupture of membranes.
„ VIII.	6 „ (death)	Ill all day; at 8 p.m. sent for help; the membranes were artificially ruptured at 12 midnight; at 2 a.m. the os was fully dilated, but there were no regular pains, nor at 6 a.m., and patient died at 6.10 a.m.
„ X.	12 hours (death)	Attack at 12 noon; seen in ½ hour; in another ½ hour membranes were artificially ruptured; no pains; in the hopes that, the membranes being ruptured, labour would come on, the doctor waited and watched; eventually the patient died without having had any pains, 12 hours after the rupture of the membranes.
„ XI.	3-4 days	Membranes were ruptured on the 1st of the month, without setting in of labour or any particular symptoms until the 4th.

A further analysis shows that in only 2 cases (Nos. 19 and 21) did the rupture of the membranes appear to hasten labour. In No. 21 the membranes were ruptured 24 hours after the attack occurred.

Dr. John Barrett records a case. Attack soon after 11 a.m., seen at 2.30 p.m., again at 4.30, when the membranes were ruptured artificially; the patient died in 1½ hours, labour having made no real progress.*

Goodell is more emphatic than Braxton Hicks as to the necessity for rupturing the membranes.† On p. 342 he writes: 'The importance of early interference is well shown from an analysis of the (foregoing) tables, whilst only fifteen deaths occurred in the fifty in which artificial aid was resorted to.'

His details are in so many instances insufficient, that it is really impossible to compare deaths. An analysis of his cases shows that in 31 out of the 52 the membranes were ruptured either:

1. Late—*i.e.*, hours after the attack of hæmorrhage first commenced.
2. When the patient was in labour; or
3. When the os was more or less dilated.

Further, 8 out of the 52 recoveries were not treated; from the descriptions they may be fairly regarded as not severe. This reduces the number for comparison to 44; therefore out of 44 severe cases which recovered in 31 the membranes were ruptured, as 1, 2, or 3.

* *Obst. Trans.*, vol. xiv., p. 58. † *Amer. Jour. of Obstet.*, vol. ii.

Recapitulation and Comparison of the two Lines of Treatment.

To recapitulate the various points :

1. Rupture of the membranes is only safe when the uterus is contracting vigorously, and is capable of keeping up the necessary rhythmical contractions to prevent further hæmorrhage.

2. In all severe cases the danger is due to the fundamental fact that the uterus is incapable of contracting down upon its contents, and of keeping up the necessary rhythmical contractions—*i.e.*, it is paralyzed. To rupture the membranes is to reduce the little pressure there is, by opening what was a closed sac ; bleeding can then more readily take place behind the placenta.

(It is because of the closed sac that the uterus distends in cases of concealed accidental hæmorrhage.)

3. If it were possible to increase the fluid pressure in the uterus until it became greater than the arterial blood pressure, the hæmorrhage would cease. This obviously means that at the same time the uterine walls must be prevented from further distension, the result of the increased intra-uterine fluid pressure.

4. The objection that plugging the vagina converts an external hæmorrhage into a concealed is only valid if the uterine walls are incapable, directly or indirectly, of withstanding a pressure within them equal to the arterial blood pressure.

5. If the uterine walls are so diseased that they distend as the result of intra-uterine pressure, then it is claimed that the plug and binder, applied in the manner which has been described, render them capable of withstanding the pressure of the escaping blood, and so control the hæmorrhage.

6. The proposition has been brought forward that the pressure of the binder is transmitted to the fluid inside the uterus ; thus the intra-uterine pressure is made more than equal to the blood pressure.

In clinical language it is claimed for the plug and binder that—

1. They control the hæmorrhage.

2. Opportunity is given to the patient to rally if possible.

3. They are the means of delaying the rupture of the membranes, by supporting the cervix and the dilating os when dilatation commences.

4. Delivery will, in consequence of the delay, be natural, for it will not take place until the uterus contracts with sufficient vigour to expel its contents.

5. All risk of post-partum hæmorrhage is done away with.

The arguments against the present more general line of treatment—namely, immediate rupture of the membranes with dilatation of the cervix and rapid delivery—are:

1. That this method is only justifiable when—

(*a*) Pains are vigorous.
(*b*) Os is dilated.

2. That in the absence of these conditions the operative procedures required cause additional shock and risk, besides probable injury to the cervix.

3. That in the absence of pains post-partum hæmorrhage is inevitable.

There is one other advantage in the plug and binder method—namely, that it can be done by anyone with a fair knowledge of obstetrics and asepsis, whereas the methods necessary for rapid delivery can only be successful in the hands of one unusually skilful. As the object of the Rotunda method is to allow of a natural delivery, the membranes must, therefore, not be ruptured until as late as possible. Great judgment is required on this point.

In case No. 9 (p. 169), on the removal of the plugs, the os was the size of four fingers; the patient delivered herself two hours afterwards.

In case No. 6 (p. 168), on the removal of the plugs, the os was the same size—*i.e.*, four fingers—but delivery did not take place for thirty-two hours.

If the pains become vigorous the perineal bandage ought to be taken off, and a few of the plugs removed. The contractions of the uterus will force out the rest; only then should the membranes be ruptured, if they are still intact.

Rotunda Cases.

Analysis of the Eighty-two Cases.

Eighty-two cases of accidental hæmorrhage, consisting of:

External	...	...	...	...	47	
Mixed ...	...	...	...	...	29	35
Concealed	...	...	...	...	6	
					82	

There were six deaths:

(1)	Concealed	Porro's operation.
(2)	Mixed	No treatment; moribund when seen by the extern maternity assistant; died undelivered.
(3)	Mixed	Admitted to hospital with membranes ruptured; after some delay, forceps and rapid delivery in consequence of the bleeding suddenly starting afresh. Death in an hour.
(4)	External	Severe; vagina plugged, but patient never rallied. Death occurred a few hours later, presumably a fatal loss before treatment.
(5)	Mixed	Death from ruptured uterus after natural delivery; plugged 18½ hours before.
(6)	Mixed	Death from sepsis some days after delivery; vagina was not plugged.

The methods of treatment adopted in the 82 cases were:

Concealed, 6 ...	No treatment, 1.
	Plug and binder, 2.
	Plug and binder and forceps, 1.
	Forceps, 1.
	Porro, 1.
Mixed, 29	No treatment, 7.
	Plug and binder, 16.
	Tight binder, 1.
	Membranes ruptured, 2.
	Forceps, 1.
	Plug and binder and forceps, 2,
External, 47 ...	No treatment, 6.
	Plug and binder, 21.
	Membranes ruptured, 12.
	Forceps, 2.
	Footling, 1.
	Perforation and version, 1.
	Tight binder, 3.
	Plug and binder and forceps, 1.

Altogether the plug and binder were used in 43 cases—*i.e.*:

In 22 cases of external hæmorrhage.
In 18 „ mixed „
In 3 „ concealed „

With reference to the infant mortality, the treatment adopted makes very little difference, the children are so often premature or dead before any diagnosis of the mother's condition is made.

To compare these 82 cases with those collected by Braxton Hicks (23 with 13 deaths), and by Goodell (106 with 54 deaths), only the 35 cases of concealed and mixed hæmorrhage can be taken:

(1) Treated in various ways (3 deaths, 1 being from sepsis) ...	6
(2) Untreated (1 death)	8
(3) Treated by plugging (1 death—ruptured uterus) ...	21
	35

Inasmuch as one patient died from sepsis some days after the delivery, this case ought not to be included as a direct result of the treatment, the death being due, not to the method employed, but to the way in which it was carried out. Hence it can be said that six cases were treated in various ways with two deaths.

Twenty-one cases were treated by the plug and binder with one death. The cause in this instance was a ruptured uterus.

Rupture of the uterus in cases of accidental hæmorrhage, especially of the concealed and mixed type, is not very rare.

Dr. Purefoy, the present Master of the Rotunda Hospital, continued the treatment which Smyly had employed for external accidental hæmorrhage cases in his later years of mastership. The use of the method has been considerably increased; it is now the routine treatment for all severe cases, providing that:

1. The pains are not vigorous.
2. The os is not well dilated.

My very grateful thanks are due to Dr. Purefoy for his kind permission to make use of the case-books and to publish his cases. Most of the eighty-two have already been published in brief form in the yearly clinical reports of the Rotunda Hospital. Dr. Lyle's list, also taken from the Rotunda Reports, overlaps my list by six. I have added a case occurring during labour, which I saw when junior extern maternity assistant. I am also indebted to Dr. Lloyd, formerly assistant-master, and to Drs. Carton and Fitzgerald, the

present assistant-masters at the Rotunda Hospital, for their ever-ready help in supplying me with particulars of the cases which they have had under their charge.

NOTES ON THE MORE SPECIAL CASES OCCURRING DURING THE AUTHOR'S STAY AT THE ROTUNDA.

CASE 1.—G. S., aged twenty-four; pregnancy, second, full time; date of delivery, April 26, 1901; extern maternity; male child, dead; presentation, vertex.

External Hæmorrhage.—Severe hæmorrhage on April 25, 1901. Vagina plugged on April 26. Some hæmorrhage through plugs. Plugs removed; os found to be fully dilated and membranes ruptured. Chloroform given; forceps applied. Some large clots in uterus; fair amount of post-partum hæmorrhage. Uterus curetted and douched. On April 30 (temperature 101·4°, pulse 144) uterus curetted and douched. May 1 (temperature 103·2°, pulse 120), patient refused any further treatment. It was discovered afterwards that the patient had a tedious convalescence. Time of delivery after plugging not stated.

CASE 2.—M. F., aged forty; pregnancy, ninth, full time; date of delivery, May 19, 1901; extern maternity; male child, dead; presentation, first vertex; expulsion of placenta in forty-five minutes.

External Hæmorrhage.—Severe hæmorrhage. Patient collapsed and blanched; revived by whisky and strychnine. Vagina plugged. Labour pains quickly came on, but were feeble in character. Some hæmorrhage through the plugs at 6 a.m.; plugs removed; os found almost fully dilated, so the membranes were ruptured. Time of delivery after plugging not stated. Normal puerperium.

CASE 3.—M. M., aged thirty-eight; pregnancy, ninth, six and a half months; date of delivery, June 4, 1901; extern maternity; female child, dead; presentation, breech; placenta expelled with child.

Mixed Hæmorrhage.—Time of delivery after plugging, eighteen and a half hours. Patient was out at a wedding the previous night. At 2 a.m. she had severe pain and hæmorrhage, and at once sent to the hospital. The uterus was three fingers' breadth below the ensiform cartilage, and felt hard, like a 'pavement.' No fœtal parts could be made out, and no fœtal heart heard. Her general condition was not bad, although the pulse was 120 and feeble. As she would not readily submit to the plugging, a very little chloroform was given, just enough to make her drowsy, and the vagina was plugged in the usual way, the os being undilated and hard. During the day she was quite comfortable, and her condition improved. At 8 p.m. some pains came on. The pulse then was 90 and good. An hour after an urgent message was sent down that the patient was very bad. She was much collapsed; there were no pains; she was in a cold sweat; pulse 140. The assistant-master was sent for, who, on arriving, removed the plugs, and found the bag of membranes bulging to the outlet. The os was not felt. Child, placenta and blood-clot were expelled on rupture of the membranes. The patient's condition was so bad that the master came up. A large rent in the left fornix was found running up into the left broad ligament. This rent was plugged with iodoform gauze, and all the usual remedies applied. Transfusion with salt solution was commenced, but death rapidly occurred. No post-mortem examination was obtainable.

CASE 4.—L. M. C., aged twenty-five; pregnancy, fourth, full time; date of delivery, July 15, 1901; extern maternity; male child, dead; presentation, first vertex; placenta expelled with child.

External Hæmorrhage.—Time of delivery after second plugging, two hours, five hours after first plugging. Slight, constant hæmorrhage, and soon afterwards pains commenced, about 5 p.m., July 14; at 10.30 p.m., pulse 80, uterus soft, vertex presenting, back easily felt, no fœtal heart, bleeding profusely, although having good pains. Vaginal examination: Os size of one finger, no placenta to be felt. A hot vaginal douche given, the os dilated to two fingers, membranes unruptured. The vagina was plugged in the usual way, and a hypodermic injection of ½ grain of morphia given. At 1.30 a.m., July 15, pulse 80, blood had come through the plugs, although pains were good. The plugs removed, os found the size of two fingers, and head well down. The patient would not be plugged again without chloroform, so a little was given, and the vagina plugged again. At 3 a.m. there was some hæmorrhage through the plugs, and the pains were forcing the plugs out. At 3.40 the pains were very strong, and the child was born, the membranes rupturing as it was expelled. A fair quantity of blood-clot followed the child, and in one minute the placenta was expelled. The placenta showed no signs of placenta prævia. The uterus contracted well, and the patient made a good recovery, and was found up on the seventh day well.

Case 5.—M. C., aged thirty-seven; pregnancy, tenth, seven and a half months; date of delivery, August 31, 1901; extern maternity; male child, dead; vertex presentation.

Concealed Hæmorrhage.—Uterus larger than full time, hard, and tender; pulse 158; no fœtal heart heard, no fœtal parts made out; os size of five shillings; membranes intact. Vagina plugged at 10.30 a.m. Later in the day the pulse dropped to 130, and patient improved greatly. Good labour pains at 8 p.m., and plugs commenced to bulge. They were therefore removed. The os was found fully dilated, and the membranes were artificially ruptured. Chloroform was given and forceps applied. The placenta was expressed in twenty minutes, retro-placental clot weighing 2 pounds. Uterus douched. On the third day temperature 101·8°, pulse 120; as the discharge was foul, on the sixth day patient was curetted and douched. This was repeated on the next day, and the uterus packed with iodoform gauze. Temperature normal on the ninth day. Time of delivery after plugging, ten hours.

Case 6.—Mrs. C., aged thirty-six; pregnancy, fourteenth; delivered September 8, 1901, at 2 a.m. First seen by student in afternoon, September 5. Patient was complaining of pain, and the uterus was harder than usual; there was a history of several fainting fits during the morning. The student reported that 'the abdomen was tighter than was usual with cases in the wards.' Temperature, 97·6°; pulse rapid. At 4.15 p.m. the uterus felt like a 'board'; nothing could be made out by abdominal palpation. The uterine tumour was up to the ensiform cartilage, although the patient said she was only eight months pregnant. No fœtal heart to be heard; pulse, 126. Facial expression bad; she was tossing herself about, complaining terribly of pain above symphysis, but the uterus was not tender. There were no pains, and patient said she had colic and was not in labour.

Vaginal Examination.—Os size of 1½ fingers, membranes not ruptured, vertex just felt, high up, and no placenta to be felt. No external hæmorrhage.

Diagnosis.—Concealed accidental hæmorrhage; the vaginal douche preparatory to plugging the vagina was purposely made rather hot, and the os dilated to the size of two fingers. The membranes were not bulging, and it was difficult to feel them. A hypodermic injection of strychnine had been given on arrival; the vagina was plugged in the usual way. On leaving a hypodermic injection of ½ grain of morphia was given. Patient slept at intervals, but no pains came on, and she took nourishment well

during the night. At 8 a.m., September 6, the binder was loose, and the T-bandage unfastened. About six the patient had wanted to pass urine, and the T-bandage had not been fastened again. A few plugs were loose and just stained with blood.

The binder was re-applied and also the T-bandage. Pulse was 100 to 108; patient looked better.

At 4.30 p.m., September 6, pulse 108. Patient distinctly better; no pains; plugs taken out; a few faintly blood-stained. Os the size of four fingers.

The patient was told to remain very quiet in bed, and to send up to the hospital as soon as pains commenced.

Early on the 8th a message came to the hospital. On arrival at 2.45 a.m. everything had been expelled; the uterus was beyond the umbilicus, and the vagina full of clots. The uterus was douched. The midwife said that the patient had had four good pains in rapid succession, and that almost before the husband had left the street 'the child, the afterbirth, and a lot of stuff looking like old liver had all tumbled out one after the other.' The placenta was large and had been separated over a considerable area, and there were two huge masses of old solid blood-clot. The patient's condition was distinctly good, and the puerperium quite normal.

Case 7.—E. R., aged thirty-seven; pregnancy, ninth; full time; date of delivery, October 15, 1901. Extern maternity; male child, alive; presentation first vertex; placenta came away with child. Hæmorrhage on October 14, 1901, from 6.30 p.m. to 10 p.m. when patient was seen. Abdomen soft; fœtal heart heard; presentation made out; fair quantity of hæmorrhage; os size of a two-shilling piece; membranes not ruptured; no pains; no placenta felt; temperature, 98°; pulse, 100. Vagina plugged; no pains until 11 a.m. on 15th, then only few. Stronger pains came on at 7 p.m.; everything expelled at 9.30. Quinine sulph., 5 grains, had been given at 5 p.m. Placenta showed traces of hæmorrhage; uterus douched; puerperium normal. Time of delivery after plugging, twenty-three hours.

Case 8.—M. C., aged twenty-nine; pregnancy, third; full time; date of delivery, October 29, 1901. Extern maternity; female child, dead; presentation, third vertex; placenta came away with child. On 28th, 10 p.m., fair quantity of hæmorrhage; uterus not tense; fœtal heart not heard; no pains; os admitted one finger; no placenta felt; vagina plugged. Considerable œdema of both legs and ankles; no albumen. On 29th, 4 a.m., pains came on, the plugs began to bulge, and a few plugs were expelled at first, then the rest. The membranes ruptured naturally at the same time, and in three minutes the child followed, preceded by clots, and immediately followed by the placenta. Time of delivery after plugging, six hours.

Case 9.—Mrs. F., forty; pregnancy, thirteenth; eighth month; first vertex; mixed accidental hæmorrhage. History of bad fall five weeks before. October 22, 1901, violent pains; sudden collapse at 1 p.m.; seen at 6 p.m., running pulse, 130 (?); abdomen tense; slight elasticity; uterus up to ensiform cartilage; no fœtal heart; vertex only felt on abdominal palpation; os easily admitted one finger; membranes not ruptured; no placenta to be felt. External hæmorrhage, slight amount; patient restless, looking ill, vomiting. Hypod. strych., $\frac{1}{100}$ grain, given before vagina plugged, tight binder, and on leaving, inj. morph., $\frac{1}{2}$ grain. October 23, 10 a.m., catheter passed; pulse, 112; patient looking better. At 3 p.m. plugs removed, some blood-stained; hot vaginal douche; os size of four fingers; pains; membranes tense. Quinine, 5 grains. At 5 p.m., after a few pains, macerated fœtus expelled, followed immediately by placenta and clots, about three handfuls; pulse, 120; normal puerperium.

Case 10.—C. H., aged thirty-six; pregnancy, tenth; eight months; delivered March 10, 1901, at 11.30 p.m.; male, dead; vertex presentation. This case is always referred to by everyone concerned in it as the record case.

On admission at 5.30 a.m., March 10, she had no pulse whatever, and was livid in colour. The nurse who superintended her removal from the lodge to the ward said that the patient was 'as cold as ice; even her breath was like ice.' The patient was put on to the couch at once and made as comfortable as possible, and given nourishment and stimulants. The chart note is: 'No radial pulse on admittance; temperature, 95°; in collapsed state. Vaginal examination: Os admits one finger, membranes unruptured; no placenta to be felt.' The patient was so collapsed that plugging the vagina was postponed for two hours; as soon as she became warm bleeding commenced, and the vagina was plugged at 7.30 a.m. At 9.30 a.m. patient became very restless, and there was some hæmorrhage through the plugs, but this ceased in a few minutes. At 12.20 p.m. the patient again became restless, and as there was some more hæmorrhage through the plugs they were removed under chloroform; the os was found to be the size of a five-shilling piece, the membranes intact, so the vagina was plugged again. At 11.30 p.m. the plugs were removed, the os was fully dilated, and the membranes were punctured; a quantity of liq. amnii escaped. Patient delivered herself very soon after, the placenta coming directly after the child with 2 pounds of blood-clot. Everything had been prepared for forceps. The patient was not expected to live. A vaginal douche was given. She took nourishment well, and made a slow but quite normal convalescence.

Case 11.—M. R., aged thirty-two; pregnancy, eleventh; seven months; delivered April 5, 1901, at 12 a.m.; female, dead; forceps. Extern case sent in. Faintness and pain at 2 a.m. while in bed, followed some hours later by external hæmorrhage of considerable amount; vagina plugged at 1 p.m.; pulse 130; abdomen tense; no fœtus palpable, and no fœtal heart to be heard; uterus nearly to ensiform cartilage, with seven months' pregnancy. Soon after admission to the hospital (at 9.50 p.m.) pains came on, and plugs began to be protruded; at 11.30 they were removed, and a large bag of membranes was punctured; the os was nearly fully dilated; there were strong frequent pains, and the head was resting on the brim. Forceps were applied, and the head drawn through the cervix, the blades being then removed. The fœtus (macerated) was soon expelled; the placenta, which had been completely detached, came away with it, and a large blood-clot followed the placenta. A quantity of clot was removed from the uterus, which contracted well. On April 11 the temperature rose to 102°; it fell to 100·8° at night, otherwise was normal.

Case 12.—M. B., aged thirty-six; pregnancy, eighth; full time; delivered June 26, at 12.15 a.m.; male, dead.

The patient's condition on admission at 11.30 a.m., June 25, was bad; there was no external hæmorrhage; the pulse was 80. It was a difficult case to diagnose; the points were merely a hard, distended uterus, with a history of fainting and vomiting. The patient looked bad; her face was pale; she was collapsed, although the pulse varied from 72 to 80, and was fair.

The history was that she had taken an ordinary dose of liquorice powder in the morning and vomited shortly after it, then she had a fainting fit, and pains came on soon after. On admission, the abdomen was very hard, tense, and painful; no fœtal heart was heard, and nothing felt on palpation. Os size of a two-shilling piece, presenting membranes unruptured, no placenta to be felt. Pulse 72, fair. A tight binder was put on and 5 grains quinine sulph. given. At 3.45 p.m. the pulse was 100

and feeble, but the voice was good; she was having feeble pains, a little chloroform was given, the vagina plugged, and then $\frac{1}{6}$ grain morphia hypod. She slept for two hours, when strong pains cames on.

At 11.30 p.m.: Good pains at intervals; some plugs protruded, so the plugs were removed; the os was half dilated; the membranes were punctured; pulse was rather feeble; a hypodermic of $\frac{1}{30}$ grain strychnine; $\frac{1}{50}$ grain digitalin was given.

At 11.50 p.m.: The child was expelled in haste after several violent pains, with several pints of blood; the placenta came away in ten minutes with a large quantity of black clot, and more clots were removed from the uterus afterwards. There was no urine in the bladder, and the patient had passed no urine all day; the catheter had been passed twice without a result. The uterus contracted well.

Case 13.—M. C., aged thirty-nine; pregnancy, ninth; nearly at full time; delivered August 11, 1901, at 10.12 a.m.; male, dead; forceps. Hæmorrhage took place internally before admission, with vomiting.

On admission at 6.30 p.m., August 10, pulse good (70); aspect pale and bad; os admits two fingers; membranes unruptured; vertex presenting. Some external hæmorrhage after admission, so at 8.30 p.m., as she was having some pains, the vagina was plugged. The patient dozed during the night, with occasional pains.

At 10 a.m., August 11, there was slight hæmorrhage through the plugs, which were being forced out by good uterine contractions; the remainder of the plugs were removed, and head was found on the perineum, occipito-posterior. Forceps were applied, and the child delivered. The uterus contracted well, the placenta had been almost completely detached, and there was a retro-placental clot weighing $1\frac{7}{8}$ pounds.

Case 14.—B. D., aged thirty-six; pregnancy, seventh; full time (stated); delivered November 19, 1901, at 1.30 p.m; breech; male, dead; weight, 3 pounds; length, 12 inches.

Admitted at 7.30 a.m., November 19, in collapsed condition, had fainted on the way to the hospital. No external hæmorrhage, but patient anæmic; face puffy; slight labour pains.

At 8.30 a.m.: Uterus half-way between ensiform cartilage and umbilicus; the symptoms were not usual: the uterus was not tense and not sensitive; fœtal heart was not heard; abdominal palpation negative—in fact, abdominal conditions seemed almost normal. Pulse 90; urine loaded with albumen.

At 9 a.m.: Some hæmorrhage and watery discharge; vagina plugged in the usual way. At 10 a.m. uterus sensitive to pressure.

At 1.30 p.m.: Plugs, child, placenta and clots expelled one after the other in rapid succession. Clots weighed $1\frac{3}{4}$ pounds; uterus was douched. Child born four hours and a half after plugging.

November 21: No albumen in urine; convalescence uneventful.

Case 15.—Mrs. N., aged twenty-seven; pregnancy, sixth; nine months; date of delivery, November 20, 1901; female, alive; external accidental hæmorrhage; pains at 6.30 p.m. Sudden profuse hæmorrhage at 8.30. p.m., bleeding continuously until 12.30 a.m., pains in the meantime stopping. At 12.30 a.m. pulse 120; blanched, restless; abdomen soft; fœtal heart heard; fœtal parts palpated; uterus almost at ensiform cartilage; os size of two fingers; membranes unruptured; vertex presenting; no placenta to be felt; $\frac{1}{30}$ grain hypod. strych. and whisky; vagina plugged, etc.; $\frac{1}{2}$ grain hypod. morph. About 1.30 a.m. weak pains, no bleeding through plugs; at 3.30 strong pains, which continued until 4.30, when the plugs were forced out; bag of membranes protruding, they ruptured, and child was 'shot out.' Placenta in five minutes; small clot, uterus contracted well; hypod. ergot., m. 40. Child asphyxiated; Schultzed for short time successfully.

October 24, 10.15 p.m.: Sent for in great haste, woman said to be dying.

On arrival 10.30 p.m. pulse 80 to 120, respirations 30 to 40; collapsed; no bruit; probably embolism; had been quite well, then suddenly moaned and became unconscious; revived by whisky; gave $\frac{1}{30}$ grain hypod. strych. No further trouble; normal puerperium.

SPECIAL CASE, AUGUST 28, 1901.

Concealed Accidental Hæmorrhage coming on during Labour.—At 5.45 p.m. on vaginal examination the os was found almost fully dilated, the membranes protruding in a large bag; the vertex was felt easily, and diagnosed L.O.P. because of the ear; the head was not fixed. The patient would not allow a tight binder to be put on. For half an hour pains continued. At the end of that time another examination was made, the head was almost fixed, and had advanced considerably; the membranes were ruptured with a stylet and pains got stronger. At 7 p.m. the patient suddenly collapsed; pulse was 130, temperature 95°; the uterus was hard, pulse feeble (100). Chloroform was given, the forceps put on, and the child delivered without any trouble. Presentation L.O.A.; blood-stained meconium came away with the child, and directly after two large clots, one the size of a fist, the other of two fists, followed by several others. Placenta in twenty minutes. Normal puerperium.