ON THE IMMEDIATE TREATMENT OF SEVERE POST-PARTUM HAEMORRHAGE.

BY

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THE term "*post-partum* haemorrhage" is one which, in its accepted clinical significance, is incapable of exact definition. Its meaning is conventional, and may be described with fair accuracy as an abnormally severe haemorrhage from the parturient canal occurring within twenty-four hours after the birth of the child.

The source assigned indicates the idea of the purely obstetric nature of the haemorrhage. The time limit has been arbitrarily fixed for convenience. The measure of quantity is unavoidably vague. Practically, it is the opinion of the medical attendant in the particular case that the haemorrhage is sufficiently severe to call for measures for its arrest, and to merit the term "*post-partum* haemorrhage."

Cases of *post-partum* haemorrhage are usually classified in three groups according to their causes, which in turn indicate the appropriate lines of treatment:

1. Laceration of the parturient canal.
2. Retention of the placenta (partial or complete) within the uterus.
3. Inadequate shrinkage of the uterus.

Obviously any two or all three of these conditions may coexist. In all of these cases, as indeed in all cases of haemorrhage in whatever situation, treatment has three successive objects, namely:

1. The immediate arrest of the haemorrhage.
2. The immediately succeeding maintenance of this arrest.
3. The permanent closure of the bleeding vessels.

The general principles of treatment are the same for all cases. The particular means employed for the first and second objects may properly depend to some extent on the severity of the haemorrhage in the particular case, and the same means can promote both objects. The third object is attained by purely natural means, namely, the formation and growth of new tissue.

Post-partum Haemorrhage due to Laceration of the Parturient Canal.

Its nature is proved by seeing or feeling the laceration or lacerations. Failing this, it may be confidently inferred from the presence of its characteristic feature, namely, persistence of the haemorrhage, despite firm uterine contraction, more especially after complete expulsion of the placenta. Treatment consists in suturing or plugging the lacerations.

Post-partum Haemorrhage from Retention in the Uterus of the Placenta.

When due to retention of the placenta in whole or in part, the haemorrhage takes place from the open blood channels in the uterine wall and in the placenta (when the latter is only partially separated). The haemorrhage here implies placental separation in some degree, for while the placenta is yet entirely attached to the uterine wall (that is, while as yet no separation whatever has occurred) the blood channels are intact, and therefore no haemorrhage can occur. Under normal conditions the same forces—contraction and retraction of the uterus—simultaneously cause separation of the placenta and closure (by compression) of the opened blood channels in the uterine wall. This sealing effect is maintained until clotting and organization perpetuate it.

With the commencement of placental separation the possibility of *post-partum* haemorrhage begins, and if at any time thereafter and before permanent haemostasis is secured shrinkage of the uterus fail and flaccidity occur, then the temporary sealing of the torn blood channels is liable to become undone and consequent haemorrhage to set in. Obviously, then, the later in the process of placental separation flaccidity of the uterus occurs the larger is the number of blood channels thus opened, and *pro tanto* the severer is the haemorrhage likely to be. Indeed,

the most serious and immediately dangerous cases of *post-partum* haemorrhage are to be found amongst those in which haemorrhage begins after the placenta has been delivered.

The two ready means of resolving doubt as to whether any placental tissue has been retained are inspection of the placenta delivered and palpation of the uterine interior.

In *post-partum* haemorrhage from retained placenta the essentials of treatment are two: (1) to empty the uterus—that is, to remove whatever part of the placenta is still within its cavity, and (2) to promote uterine contraction. Should haemorrhage continue despite complete removal of the placenta the case automatically passes into the next class, and is to be treated accordingly.

Post-partum Haemorrhage from Uterine Flaccidity after Expulsion of the Placenta.

Severe degrees of this form the more immediate subject of this paper. Different terms (for example, atony) have been used to denote the condition of the uterine wall. It matters comparatively little what terms are used provided that one has a clear mental picture of the essential feature, namely, an absence (more or less complete) of the normal shrinkage of the uterus, which shrinkage is due to contraction and retraction of the muscle fibres in the uterine walls.

Where *post-partum* haemorrhage of this kind is a continuance of a haemorrhage preceding expulsion of the placenta the medical attendant is in a favourable position to check it, because, engaged in the delivery of the placenta, he is bound to be aware of its existence at the earliest stage.

Matters are very different where haemorrhage begins after expulsion of the placenta. Here one meets with the gravest cases of *post-partum* haemorrhage. Probably no haemorrhage of equal severity occurs in circumstances so little likely to attract the immediate notice of either the medical attendant or the patient. Here is no dramatic violence compelling attention as in the case of surface wounds. There is here no pain to enforce complaint, such as accompanies the blanching haemorrhage of ruptured tubal pregnancy. Unlike a haematemesis, this haemorrhage, occurring under bedclothes, is unseen. The patient, exhausted by her confinement, is at first aware only of an increase in the flow of warm discharge, which she has no reason to suppose is not quite usual and natural. She soon feels faint but not surprised, and almost immediately is beyond power of speech. Such are the cases in which the medical attendant, having delivered the placenta, felt the uterus to be contracted, and finished his bedside duties, inspects the child, washes his hands, and, returning to his patient's side, is staggered to find her blanched, breathing almost imperceptibly, scarcely conscious, dying.

It is when faced with such a situation as this that one appreciates the immense advantage of having at instant command a simple, direct, efficacious, and easily applied line of treatment which has been thought out by oneself beforehand. It may be said that this is so self-evident and is so universally realized as to call for no remark. Experience in cases seen in consultation has proved the contrary. Conversation with different medical men has confirmed this conclusion. A reference to various textbooks in the English language suggests that their authors have succeeded in describing an encyclopaedic list of the different means that have at any time been used to check *post-partum* haemorrhage rather than in giving a clear lead in the selection and precise application of the best.

This paper has been written in order to emphasize the importance of a pre-determined line of treatment, to describe and discuss a method used by the writer for a number of years with good results, and to urge the great value of a particular measure in that treatment—namely, immediate elevation of the bleeding surface.

The morbid condition is a mixed haemorrhage, of which the immediate cause is uterine flaccidity, and the predisposing causes are any and all conditions that make for uterine flaccidity. That the haemorrhage is in part arterial is indicated by the immediate effect of compression of the abdominal aorta. That it is in part venous is indicated by its colour. The arterial haemorrhage is by onward flow from the curling arteries. The venous

haemorrhage is by regurgitation through the uterine veins, facilitated by the absence of valves from them and from the veins that they feed.

Uterine flaccidity connotes corresponding inadequacy in the mechanical closure by muscular compression of the blood channels traversing the uterine wall at the placental site. It is almost certainly not the only causal factor in every case, but in every case it is to be regarded as the dominant one, and the only one to which attention need be primarily given. Where adequate retraction and contraction exist no *post-partum* haemorrhage occurs.

The conditions predisposing to uterine flaccidity fall into two main groups which obviously are not mutually exclusive, namely:

1. *Conditions existing before labour, and facilitating uterine exhaustion*, including, besides any condition of impaired health, what one can at present only label as "idiosyncrasy," exemplified by those women who, despite reasonably good health and easy labours, suffer from *post-partum* haemorrhage in confinement after confinement. Such a condition cannot be forecast in a first confinement, and need never be overlooked in a subsequent one.

2. *Conditions occurring during labour, and producing uterine exhaustion*—a group practically equivalent to unduly prolonged and unduly precipitate delivery—for example, rapid delivery by forceps after a tedious second stage with consequent failure of pains. Even here the risk of *post-partum* haemorrhage is much diminished by leaving the placenta alone—not seeking by manual compression of the uterus to separate and expel it immediately.

Circumstances Governing Choice of Treatment.

Of these the first is the fact that the haemorrhage is severe, threatening life. Hence the measures chosen should be of prompt applicability and of immediate effect. They should be in action within a few seconds. The other circumstances are chiefly domestic. The majority of confinements take place in cottage homes (often lacking conveniences) where assistance is relatively slight and often unskilled. Here measures of treatment which are and ought to be matters of course in a lying-in hospital are out of the question. The *essentials* of treatment must therefore be independent of all but the most primitive accessories. The mechanism must be personal to the medical attendant. In fine it consists of his head and his hands.

In applying these considerations it is well to regard the problem not as peculiarly an obstetric one, but substantially as a problem in first aid to the wounded, the approximate but not the precise seat of the wound being known. The first object of treatment is the immediate arrest of haemorrhage. Precisely the same principles apply, precisely the same kind of measures should be employed, as in the case of a severely bleeding wound of a limb, namely:

1. *Pressure*—(a) Proximal to the bleeding area.
(b) Local—at the bleeding area.
2. *Elevation* of the bleeding area.

The facility with which these measures can be applied depends to some extent on the assistance at command. Single-handed one can apply pressure. With one assistant it is possible to carry out both lines of treatment simultaneously. But the help of a second assistant greatly facilitates matters. There must be few occasions on which this assistance is not available.

The procedure here advocated may be described in connexion with an imaginary case. The patient's appearance suggests the condition present. The bedclothes are at once thrown off and the quantity of blood seen practically clinches the diagnosis. With one hand the abdominal aorta is compressed—an easy thing to do through the lax abdominal wall, and one which should not require more than three seconds. Meanwhile the nurse is called to the bedside and further assistance, if not in the room, is shouted for. The other hand separates the thighs and is then passed into the vagina. The cervix is felt and grasped with moderate firmness in order to steady it and so help the other hand in its next manœuvre. As soon as this is done the abdominal hand, leaving the aorta for the moment, "gathers" the relaxed and blood-filled uterus in its hollow, squeezes it, and presses it down in an ante-flexed position against the vaginal hand, which meanwhile has been shut and moved into the anterior vaginal fornix.

The anterior and posterior uterine walls are now pressed against each other by the two hands. At the same time some pressure, if thought desirable, is made on the aorta by the back of the wrist of the abdominal hand.

While this is being done an assistant places a pillow between the patient's head and the top of the bed to act as a buffer. As soon as the uterus is gripped between the attendant's hands the nurse lifts up the patient's pelvis as high as possible—practically to an angle of 60 or 70 degrees with the bed—that is, the patient is placed in the Trendelenburg position. The necessary counter pressure is given by the resistance of the bed-head to the head of the patient who now rests on the back of her shoulders, neck, and head. All the above manœuvres need not occupy more than thirty or forty seconds.

Meanwhile the additional help, which by this time has arrived, prepares whatever is necessary and available to maintain the Trendelenburg position in order to relieve and set free the nurse. Suitable mechanical supports are pillows, etc., a partly inverted chair, and a towel or sheet as a sling from the bed-top. Others will readily suggest themselves.

The above measures will, with practical certainty, secure the complete arrest of haemorrhage as soon as they are in operation. No other *local* treatment is attempted. But if the patient's condition suggest danger from low blood pressure, then her arms and legs are raised to the vertical and held there by the assistants.

When the uterus is felt to be firmly contracted (and on no account before this is so) the vaginal hand is withdrawn, and is then available for other purposes, a wet pad being applied to the vulva as the hand is withdrawn.

As soon as uterine contraction and the patient's general condition are satisfactory the pelvis is lowered to an angle of about 30 degrees and the abdominal hand removed, being returned from time to time to observe the condition of the uterus. A binder is tightly applied. The patient is kept in this elevated position for as long as seems desirable—never less than several hours—her legs being supported in a horizontal position. Whatever additional measures may be thought desirable for the maintenance of haemostasis and uterine contraction are applied, and suitable arrangements are made for the patient's general comfort.

REMARKS ON THE FOREGOING.

Proximal Pressure: Compression of Aorta.—The object of this is to check arterial haemorrhage by preventing blood reaching the uterus. It is the first manœuvre employed because it can be most quickly applied. Since almost the entire arterial blood supply of the uterus reaches it through the terminal branches of the aorta the effect of compression is to prevent this blood reaching the uterus, and *pro tanto* to diminish the haemorrhage. But compression of the aorta can have further effects. The uterus, being relaxed and containing much blood, extends a considerable distance up into the abdomen, lying in front of the aorta. Hence pressure on the aorta will be exerted through the uterine walls. The effects of this on the uterus will be to stimulate it in some degree to contract, to express blood from its interior, and to "block" the placental site should this be in the line of pressure.

As probably much of the haemorrhage is due to regurgitation from the iliac and caval veins it might be thought worth while to use the abdominal hand for simultaneous compression of the aorta and inferior vena cava. No doubt the greatly relaxed abdominal wall and low blood pressure would permit of this being readily enough done. But there are strong reasons against any attempt, for example, the slightly longer time required to get the hand into accurate position, the risk of failing completely to compress the aorta, the certain diversion by regurgitation to the uterine veins of blood returning from the lower limbs.

Local Pressure: Bimanual Compression of the Uterus.—pressure of the anterior and posterior uterine walls against each other between the abdominal hand and the fist in the anterior vaginal fornix—has three objects, namely: (1) To "block" the open blood channels of the placental site by direct pressure, and so to prevent escape of blood from them. (2) To empty the uterus of blood. (3) To stimulate the uterus to contract, and so itself to continue to fulfil the other two objects. The area specially sought to be affected

is the placental site. As the exact position of this is rarely known the entire uterus is compressed in order that the placental site may not be missed. The compression of the placental site is calculated to check *all* haemorrhage, arterial and venous.

Bimanual compression of the uterus, the internal hand being within the uterine cavity, has been advocated as having the following advantages over the above method—the better emptying of the uterus of blood; the more direct compression of the placental site; a greater stimulus to the uterus to contract. Granted that in each method reasonably strong pressure is exerted, then it may be said of the intrauterine method that its first advantage is probably *nil*, at most very slight; its second is *nil*; its third is real, but probably not great. The outstanding disadvantages (they imply the corresponding advantages of the vaginal method) are (1) that a larger area of the flaccid uterine wall will escape compression, and this area may contain the whole or part of the placental site; and (2) the greatly increased risk of intrauterine sepsis, and this in a patient but ill fitted to cope with it. This risk is very great, for the urgency of the case forbids time being spent in any attempt at surgical cleanliness of the hand immediately before its introduction.

Of the two methods, the intrauterine one has slight advantages, serious disadvantages. The balance of value is obvious.

Elevation of the Bleeding Area.

This is of the first importance on account of its efficacy, simplicity, and facility. The more nearly the patient's inverted trunk is to the vertical the more effective is this haemostatic. The effects of this position are that venous haemorrhage by regurgitation is rendered practically impossible, whilst arterial bleeding is greatly diminished. Indeed, where much blood has already been lost, and consequently the heart's action is feeble and the blood pressure low, it is probable that little, if any, arterial haemorrhage would occur even were no other treatment resorted to.

But further important effects follow. Elevation of the pelvis not only automatically lessens or arrests bleeding, it also by gravity drives the unshed venous blood back to the heart and facilitates the flow of blood to the brain, in both of these ways stimulating circulation and respiration at precisely the time when this is most urgently needed. Nay, further, should the patient's condition seem desperate despite these measures, it is enough in addition to have the four limbs held vertically up to secure that practically all the blood in the body is (anatomically) above the level of the navel. If this cannot secure enough blood nourishment to the vital centres there is nothing that can do so short of the introduction of fluid from without. The elevated position recommended greatly facilitates the rapid introduction and retention of such fluid—for example, enemata of hot saline solution.

The degree of elevation here advocated may suggest a risk of air embolism from "adsorption" into the uterus and thence to the uterine veins on withdrawal of the vaginal hand. Whatever this risk might be it is counteracted by two precautions, namely, (1) uterine contraction; the hand is not to be withdrawn from the vagina until this natural preventive is in active operation; while it is so in operation air may enter the vagina, but cannot enter the uterus; (2) closing the vaginal orifice with a wet pad on the vulva as the hand is withdrawn. This prevents a rush of air into the vagina.

CONCLUSION.

In the foregoing remarks I have sought to emphasize the great importance of high elevation of the pelvis as a *primary* measure because I know of no contra-indication to its use; because it does not interfere with any other appropriate measure of treatment; because it promptly, simply, and effectively deals with the immediate cause of great danger; and because it continues to act in the promotion of the patient's subsequent recovery. It is almost incredible that there have not been many men who on many occasions have used to check *post-partum* haemorrhage a measure so simple, easy and effective, resting on a principle so familiar as the law of gravity, and taught and employed time out of mind in connexion with wounds of the extremities. I have there-

fore been surprised to find that of the many obstetricians, general and special, to whom I have mentioned the matter in conversation, every one found the suggestion a novelty. I have looked up a number of English and American textbooks on midwifery. In none of these did I find any mention of this measure of treatment. It is true that elevation of the pelvis by raising the foot of the bed after arrest of haemorrhage has been secured is mentioned. But the employment of the high position as a primary measure rests on a quite different conception from the other. From that the elevation advocated in this paper differs in its object, its degree, and in the time and mode of its application. There would thus appear to be some ground for thinking that familiarity with the use of this measure is not as wide as it might be. It is for this reason that I have sought to call special attention to its value.

Of the whole line of immediate treatment advocated above, the essential value lies in these facts:—it is simple in application; it is prompt and effective in action; and it is entirely personal in its mechanism; that is, it is independent of environment, it needs no "apparatus," it is carried out as easily in a hut as in a hospital.

CAESAREAN SECTION IN A PITMAN'S COTTAGE.

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ON September 7th, 1915, I was asked by Dr. Anderson, of Seaham Colliery, to see a patient who had been fifteen hours in labour at full time without any signs of the head engaging in the pelvis. There was a history of two previous labours which had ended in the sacrifice of the child.

Measurements showed the conjugate diameter to be just over 3 in., and the promontory of the sacrum was within rather easy reach by digital examination.

As the parents were very unwilling to risk the loss of another child, and as the conditions demanded either craniotomy or Caesarean section, I elected to do the latter.

There was one clean room available; the removal of superfluous ornaments, hangings, and furniture was followed by a cleansing with a damp cloth and the spraying of the walls, floor, and ceiling with formalin; the room was then closed for two hours; this gave me the nearest approach possible in the circumstances to the surroundings of an operating-room. Meantime detailed preparations were made for the sterilizing of all necessary articles. Two drums of sterile dressings and masks can always be at hand, but in addition I transported a small Cathcart sterilizer, which was placed on a gas ring, and towels and gowns were steamed, sterilized, and dried in this. Instruments and gloves were easily dealt with in the small portable sterilizer contained in most operating bags. The skin of the patient was prepared in the usual way, and after being thoroughly dried, was coated with a 2½ per cent. solution of iodine in spirit and water.

Preparations were all completed within three hours from the time the message was received; the patient's condition was good, the pains strong and frequent, and re-examination revealed not the slightest progress.

The details of the operation scarcely differed from the description in Berkeley and Bonney's *Gynaecological Operations*, and included the use of boiled silk throughout except for skin sutures. A variation from their technique was, I think, a slight improvement for the prevention of haemorrhage from the cut uterine surfaces. A large vulcanite pessary was boiled along with the instruments, moulded to the shape of a carouche, fixed in this position by tying with silk while it was still plastic, and re-hardened in cold, sterile water. By pressing firmly on one side of this myself, and the assistant doing the same on the other side, we had no difficulty in avoiding bleeding. I believe this method was suggested years ago by Professor Murdoch Cameron of Glasgow.

The child, a girl weighing 8 lb., was easily removed and breathed at once. It lacked the usual frontal and occipital moulding of the ordinary baby, and therefore looked more