EMERGENCIES IN GENERAL PRACTICE**POST-PARTUM MATERNAL COLLAPSE**

BY

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For the purpose of this article it is proposed to limit discussion to those cases in which sudden collapse of the mother occurs within a few minutes or hours after delivery. Such a condition may arise at any time during pregnancy or during the puerperium, but the varieties most commonly encountered in practice occur mainly during the immediate post-partum period.

A full discussion of these conditions would involve a survey of all the general medical and surgical conditions, to say nothing of those of obstetrical origin, which can lead to sudden collapse or shock. Broadly, they can be divided into conditions directly due to pregnancy and childbirth—that is, to obstetrical conditions—and those due to general medical or surgical diseases which are acutely exacerbated by the process of labour.

Obstetrical Causes

The causes arising directly out of pregnancy and labour which may lead to post-partum collapse may be defined as follows.

Haemorrhage.—This must be regarded as the commonest and most important cause of post-partum collapse. Bleeding may come from the birth canal and be visible externally; the main causes are retained placenta, uterine inertia, and bleeding from lacerations of the genital tract. Internal haemorrhage may occur, the most frequent cause being rupture of the uterus; internal bleeding may also occur from rupture of a vessel in the broad ligament or tearing of the vaginal vault. Antepartum haemorrhage, whether of the accidental variety or due to placenta praevia, is apt to be followed by post-partum haemorrhage.

Trauma.—Surgical shock may result from a difficult delivery or may follow precipitate labour. Many obstetric operations, and especially difficult forceps delivery and craniotomy, may lead to maternal shock; the cause appears to be linked with the effect of traction on the broad ligaments. A similar effect is seen when shock follows an attempt to deliver the placenta by Credé's method. The dangers of forcible manipulation of the uterus cannot be overemphasized, and indeed Credé's method has now been entirely abandoned by many obstetricians, who feel that they prefer manual removal of the placenta as the safer procedure.

Acute Inversion of the Uterus.—This may result from trauma, but in many recorded instances the uterus has become inverted in the absence of any interference. Acute inversion may be complete, the uterine fundus protruding from the vulva and lying between the mother's thighs, or it may be partial so that the fundus is not visible. In either instance the mother collapses in a state of profound shock which is probably caused by traction on the broad ligaments.

Embolism.—Pulmonary embolism may occur from previous venous thrombosis in cases in which thrombophlebitis or phlebothrombosis has occurred during the latter part of pregnancy; in general, however, pulmonary embolism from this cause is commonest between the tenth and fourteenth days of the puerperium. In cases of cardiac disease thrombi in the heart itself may be displaced during labour. Amniotic fluid embolism is a somewhat obscure condition, but the presence of amniotic fluid in the mother's lungs has been demonstrated in cases of unexplained sudden death during

or shortly after labour. Air embolism is recognized as an occasional happening in labour. It may occur at forceps delivery, during manual removal of the placenta, or during packing of the uterus. It is possible that a low-lying placenta may predispose to its occurrence.

Drugs.—Pituitary shock is well recognized as a cause of collapse in the recently delivered woman and is believed to be due to spasm of the coronary vessels. Two important points must be made in this connexion. The danger of shock results chiefly from repeated administration of posterior pituitary extracts for arrest of post-partum haemorrhage. For this reason many prefer not to use them but to rely on ergometrine, which does not carry this risk and is equally effective. Posterior pituitary extract is much more dangerous than injectio oxytocini (*B.P.*), as the latter contains mainly the oxytocic factor. Nevertheless, as no pure preparation of oxytocin exists as yet, all known preparations of oxytocin containing a small proportion of vasopressin, shock may follow the use of the oxytocic factor. Thus if pituitary extract is given in the post-partum period, oxytocin should be used, but only one injection should be given; it should be used intravenously only with the greatest caution and in a dose not exceeding two units, if indeed it is used at all. Sudden collapse may follow the administration of anaesthetics during labour; the recently delivered woman appears to be particularly susceptible to this. Recent reports of maternal deaths due to inhalation of vomit have received considerable notice, and it must always be remembered that the stomach empties slowly during labour. Chloroform is especially dangerous in causing collapse.

Toxaemia of Late Pregnancy.—An eclamptic convulsion may occur in the recently delivered mother, and in severe toxaemia cerebral haemorrhage may cause collapse with coma.

Nervous Influences.—There are many who believe that post-partum collapse rarely if ever occurs without a cause such as one of those already described. Occasional cases are, however, encountered where the mother goes into profound shock after a normal delivery and no apparent cause is found. Collapse may sometimes follow a psychological shock at the time of delivery. Such an occurrence is described in the First Book of Samuel, Chapter 4, where the death of Eli and the birth of Ichabod are described: "And his daughter in law, Phinehas' wife, was with child, near to be delivered: and when she heard the tidings that the ark of God was taken, and that her father in law and her husband were dead, she bowed herself and travailed; for her pains came upon her. And about the time of her death the women that stood by her said unto her, Fear not; for thou hast born a son. But she answered not, neither did she regard it."

In practice, post-partum collapse in the absence of shock or haemorrhage is very uncommon, and it should be a rule always to exclude all possible physical causes before ascribing it to nervous influences.

Non-Obstetrical Causes

In the majority of cases where the mother collapses suddenly after childbirth an obstetrical cause is responsible. Nevertheless there is a variety of non-obstetrical causes for such a catastrophe. The main group consists of cases of heart disease, especially mitral stenosis. The woman who is in incipient heart failure before the onset of labour may

collapse suddenly when the uterus empties. Here an overloading of the maternal circulation results from the sudden release of blood from the pelvic organs, and this may even be fatal. Other less common cardiovascular diseases include myocarditis, pericarditis, and pericardial effusion.

Rupture of a vital organ may occur, as, for example, the heart, spleen, pancreas, aorta, mesenteric vessels, bowel, or gall-bladder. Internal haemorrhage may occur from the lungs, stomach, or splenic veins. Cerebral haemorrhage sometimes occurs even in the absence of severe toxæmia. Uraemia may become manifest for the first time in the immediate post-partum period. Profound anaemia in pregnancy may become evident for the first time after delivery, especially if there has been loss of blood during labour.

Diagnosis

The practitioner who is called to a case where the mother has collapsed suddenly after delivery is faced with a grave situation demanding immediate action. There will be time only for a rapid survey of the situation, but this is well rewarded, as correct diagnosis is essential before treatment is begun.

A brief history is taken; this will include the history of past illnesses, with special reference to conditions such as heart disease and anaemia. The history of past pregnancies is important. Operations such as caesarean section, hysterotomy, and myomectomy may have left a potentially dangerous uterine scar. The history of the present pregnancy will include the presence of any abnormalities and the amount of antenatal care received. Important events include toxæmia, anaemia, breathlessness, varicose veins, or antepartum haemorrhage. The history of the labour is next taken, including the length of each stage, and of the actual delivery, whether normal, difficult, or precipitate. A note is made of all drugs, including anaesthetics, given during labour and of any untoward symptoms such as vomiting or pain in the chest or abdomen. The history of the third stage is very important and should include an account of all attempts, whether successful or not, to deliver the placenta. If the placenta is available it should be examined to ensure that it is complete.

A general examination of the mother follows. The skin and mucous membranes are inspected for pallor and sweating. The rate and volume of the pulse are noted and the blood pressure is recorded. A note is made of obvious symptoms such as dyspnoea, restlessness, or pain in the chest or abdomen. The heart and lungs are next examined; a churning sound in the heart is characteristic of air embolism. The lungs may show evidence of pulmonary oedema.

Examination of the abdomen follows; the uterine fundus is felt to see if it is firmly contracted and palpable per abdomen. Tenderness or rigidity may be felt in the abdominal wall or over the uterus itself. Free fluid may be detectable if there is intraperitoneal haemorrhage. The vulva is next inspected to see if blood is still being lost. A pelvic examination should follow but may be deferred if the placenta is still retained. Pelvic examination after removal or expulsion of the placenta may reveal a laceration of the cervix or vagina or an incomplete inversion of the uterus.

The clinical signs of shock and haemorrhage are very similar. The patient is pale, sweating, restless, and anxious, the pulse is soft, and its rate rapid, often up to 150 a minute. The blood pressure falls, the systolic pressure falling more in proportion than the diastolic.

Prevention

Prevention of post-partum collapse begins in the antenatal period, when abnormalities such as toxæmia, anaemia, heart disease, and thrombophlebitis may be detected and treated. Disproportion, even in multiparae, must be excluded and potentially dangerous conditions such as multiple pregnancy and malpresentation diagnosed. The choosing of cases for home delivery is important: all cases with a previous history of grave disease and cases of multiple pregnancy, of mal-

presentation and of suspected disproportion are safest in hospital, where there are facilities for any emergency treatment that may become necessary.

During labour the emphasis must above all be on avoiding trauma and haemorrhage. Caesarean section has become so safe that it is to be preferred to difficult delivery, and it is now used without hesitation in many conditions. Few would condone the old "difficult forceps" delivery with excessive traction on the maternal soft parts and foetal skull; forceps should rarely if ever be applied before full dilatation of the cervix. The danger of Credé's manoeuvre for expulsion of the placenta cannot be overemphasized, and it is doubtless still responsible for much unnecessary obstetric shock. In fact its use should no longer be taught to medical students or pupil midwives except to stress its dangers. Care must be exercised in the use of all drugs during labour, two of the most dangerous being chloroform and posterior pituitary extract. Perineal sutures should be inserted under local analgesia.

A massive post-partum haemorrhage will demand immediate treatment. The slow, steady trickle is almost more dangerous in that it may go on unnoticed until the mother is in a grave condition. The amount of blood lost after delivery should be most carefully watched and action taken when the total reaches 20 oz. (568 ml.), if not before.

Treatment

The treatment adopted in the individual case of post-partum collapse will depend on the cause; in most cases haemorrhage or shock will be responsible, and their treatment is dealt with in some detail.

The treatment of post-partum haemorrhage may be outlined as follows. If the placenta has not been delivered the uterine fundus must be gently grasped and rubbed up until it contracts: ergometrine, 0.25 to 0.5 mg., is then given intravenously. A strong contraction will occur in about half a minute and an attempt may then be made to deliver the placenta by gentle fundal pressure. Excessive force must be avoided, as this will only increase existing shock. If the attempt fails preparations should be made for manual removal, and meanwhile haemorrhage will have been checked. It has been shown that shock tends to increase for as long as the placenta is retained. Anaesthesia for manual removal will depend on the circumstances; the ideal anaesthetic for this purpose is a small dose of thiopentone, provided the necessary equipment, which must include oxygen, is available. In an emergency, manual removal can be gently performed without anaesthesia, or with analgesia with gas and air or trichlorethylene ("trilene").

If bleeding occurs after complete expulsion of the placenta, ergometrine should immediately be given intravenously; intramuscular injection is apt to be less effective in the shocked patient. The uterus will contract and bimanual compression should be carried out until bleeding is arrested. This is best done by the external method; the uterus is lifted well up into the abdomen and held firmly between the two hands. The patient's legs should be straightened and the foot of the bed raised. If bleeding continues and the uterus is empty and well contracted, the blood may be coming from a laceration of the genital tract, and arrangements should be made to suture this as soon as possible. In domiciliary practice it may be necessary to pack the vagina firmly with gauze until such arrangements can be made.

All cases of serious haemorrhage require blood transfusion, and it is here that in domiciliary practice the obstetric flying-squad service has proved most valuable. Restorative measures must be carried out while awaiting the arrival of blood. The foot of the bed is raised and moderate but not excessive warmth applied to the patient's body. Morphine, $\frac{1}{4}$ gr. (16 mg.), is given if she is restless and anxious. Blood should be taken for cross-matching and intravenous therapy begun without delay. There is no substitute for blood in a case of haemorrhage, but it may be some time before transfusion can be given. In the interval, glucose saline, or,

better still, one of the plasma substitutes, may be given by intravenous drip. Every practitioner who conducts midwifery cases should include in his equipment a giving set and one or more bottles of plasma substitute.

Three satisfactory plasma substitutes are at present available: polyvidone ("plasmosan" consists of a 3.5% aqueous solution of polyvidone with electrolytes in the same proportion as in plasma), dextran, and improved preparations of gum acacia. Blood must be taken for cross-matching before administering plasma substitutes, as their effect on the red corpuscles may make subsequent matching of blood difficult.

Plasma substitutes are advantageous in the treatment of post-partum collapse in that they have a pressor effect, so that within a short time of commencing administration there is often a dramatic improvement, the blood pressure rising and the pulse rate falling. In cases in which the blood pressure remains persistently low a small dose, say 10 mg., of methylamphetamine hydrochloride may be added to the drip, but this drug should be used with caution and in the minimal dose.

As a general principle, where there has been haemorrhage the amount of blood lost should be replaced by transfusion, but care must be taken not to overload the circulation, and the actual amount given will depend on the response to treatment.

When no improvement follows the arrest of external haemorrhage and adequate restorative treatment, including blood transfusion, internal haemorrhage must be suspected and the situation is grave. Immediate laparotomy is likely to offer the only chance of saving the patient's life, and arrangements for this, including removal to hospital if necessary, must be undertaken without delay.

Cases are now being described of post-partum haemorrhage due to afibrinogenaemia; they usually follow accidental antepartum haemorrhage. Steady and continuous loss of blood occurs after delivery, and if the blood is examined in a test-tube it is found that normal clotting is not occurring. The treatment of such cases is to give fibrinogen, but supplies of this substance are not as yet easily available. Bottled blood is useless as it contains little fibrinogen, but fresh blood or reconstituted dried plasma may be given if fibrinogen is not obtainable.

Oxygen is invaluable in all cases of shock and collapse, and should be given in high concentration, preferably with a special oxygen mask.

In treating shock in the absence of haemorrhage the same general principles apply, except that blood should not be given; general restorative measures should include moderate warmth, morphine for restlessness, oxygen, and intravenous infusion of a plasma substitute, with a small dose of methylamphetamine hydrochloride when the blood pressure remains low.

Acute inversion of the uterus may be responsible for unexplained shock; incomplete inversion may not be diagnosed without vaginal examination. The patient is likely to show profound shock, and, in addition, there may be haemorrhage. Restorative treatment should be begun at once. Replacement of the uterus may be undertaken by O'Sullivan's method. If the placenta is still attached to the uterus it is gently peeled off; the uterine fundus is replaced by giving a hot douche under pressure, while occluding the vaginal orifice with the forearm. This simple method has proved its value in many recorded cases.

In cases of embolism little can be done except to give oxygen; intravenous therapy is best avoided owing to the risk of overloading the already embarrassed heart. In the cases of collapse due to the rarer conditions treatment must be applied according to the cause, and accurate diagnosis becomes of the utmost importance.

Conclusion

Post-partum collapse is most frequently the result of haemorrhage or shock, and these still rank high among causes of maternal mortality. Their prevention and prompt

treatment can save many lives. The contributions made by the National Blood Transfusion Service and the obstetric flying squads have done much to reduce maternal mortality to its present low level.

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JUBILEE OF SHEFFIELD UNIVERSITY

The University of Sheffield, with its 2,000 full-time students and 300 full-time staff, is engaged in a session-long celebration of its jubilee. The celebrations began last October with a visit by the Queen, were continued during the month of April in a series of "open days," when the public visited the departments, including the 13 departments of medicine, and they reach their climax on May 31 with a cathedral service and a little later with an honorary degree congregation. It was on May 31, 1905, that the royal charter was brought to the city, escorted from the station, we are told, by a procession of thirty carriages decorated with college colours.

The School of Medicine

Sheffield University grew out of three institutions, the oldest of which was the Medical School, founded in 1828. This was known earlier as the Medical Institution, but by 1868 it had become the Sheffield School of Medicine, having passed through many vicissitudes and perils, but gradually altering its character from an old school of anatomy concerned with apprentice assistants to that proper to a medical faculty. The greatest of its builders was Arthur John Hall (1866-1951), who joined the staff in 1889 and became eventually a legendary figure in the university. Another name who appears in the early records is Christopher Addison, who was professor of anatomy at Sheffield from 1897 to 1901. In the year that Addison came to Sheffield, University College (1897-1905) was founded, the Medical School joining with two institutions for arts and science and technology. The movement for higher education in Sheffield had been started by a group of great industrialists—Mark Firth, the Master Cutler, after whom the present Firth Hall is named, Henry Stephenson, and Frederick Thomas Mappin, all of whom belonged to the mid-Victorian era and established Firth College as an embryo university in which research in relation to local industries was specially developed. The Medical School came into the set-up not as a poor relation, as had been feared at one time, but as an equal partner, though it is true that, left on its own, the Medical School could hardly have developed into a university.

In 1905 King Edward VII opened the new university buildings on Western Bank, which meant for the medical departments far more satisfactory accommodation than they had had hitherto in their cramped quarters in the centre of the city. The first decade of this century saw the rise of a number of new universities. Leeds had been incorporated the previous year, Liverpool the year before that. The steel metropolis was in no way behind in the acclaim with which the creation of its university was greeted. At its