wise to move her to hospital if her condition permits and the facilities are easily available. When for any reason this is impracticable, measures must be taken to conserve the cardiac reserve, and arrangements made to deliver the patient by the quickest and least shocking method. Sometimes sedatives may be sufficient to tide the patient over the fatigue of the first stage, and forceps applied as soon as the necessary indications are fulfilled, whilst version to breech may sometimes be the method of choice. There should be no hesitation about performing craniotomy when the child is dead, or when in the presence of an insuperable obstacle Caesarean section is contra-indicated or impracticable.

Third Stage Bleeding.

Bleeding during the third stage is more common and more dangerous among old multiparae than any other type of case—whereas traumatic haemorrhage is restricted almost entirely to primigravidae and requires no comment here. The common atonic type is due to two factors—an irregular attachment of the placenta to the uterus whereby one part of the placenta is too lightly attached and the remainder too firmly adherent to the placental site, and to defective tone of the uterine muscle which renders it incapable of producing and sustaining the strong contraction necessary to complete the detachment of the placenta. Treatment may again be preventive, iron, calcium hormones, and other measures may be given during pregnancy to improve the tone of the uterus, and if the old multipara type is recognised, arrangements made for admission before labour. During the third stage of labour the uterus should not be “hustled” during the period of temporary relaxation which follows delivery. Massage at this resting stage is unnecessary because the placenta has not yet separated from any part of the uterine wall, and it is positively harmful because it may lead to separation at areas of light attachment and thus actually encourage bleeding. When bleeding occurs the following procedures must be carried out forthwith:

1. The patient must not be moved until the bleeding has been controlled and the placenta has come away or been removed manually. The temptation to send the patient to hospital is great, but it must be resisted.
2. The fundus must be massaged gently in order to stimulate general contraction of the uterus.
3. If bleeding persists, Crede's method of expression must be tried—i.e. squeezing the fundus without depressing the organ, care being taken to avoid injury to the sensitive ovaries.
4. Crede's method must not be employed more than twice because it causes shock, and if the attempt is unsuccessful the patient is left worse off than she was beforehand: repeated attempts to express the placenta may render the patient unfit to stand any further active treatment.
5. If Crede's method fails—then manual removal must be carried out, and so long as rigid antisepsis is maintained, and the patient is not deeply shocked, this method is less dangerous than repeated and futile attempts at expression.
6. Antishock measures are essential during and after the control of the bleeding—warmth, posture, fluids, etc.

ANTE-PARTUM HAEMORRHAGE

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THE CLINICAL DIAGNOSIS

Haemorrhages in the later weeks of pregnancy, no matter how slight, are a source of anxiety. The first haemorrhage is often slight, there may be no further bleeding, or several days or weeks may elapse before the bleeding recurs. This recurrent haemorrhage may again be slight, but it

may be severe, and may occur at any time of the day or night. A further source of anxiety is that these haemorrhages often occur before the thirty-fifth week of pregnancy, that is before the foetus is viable. We know also that one-fourth of the maternal mortality is due to haemorrhages during pregnancy, and that the associated foetal mortality is high. The treatment of ante-partum haemorrhage to ensure minimum risk to the mother and child calls for careful consideration of each case.

The first step in considering treatment is to make a diagnosis. Ante-partum haemorrhage is defined as haemorrhage occurring from the genital tract in the late months of pregnancy, or in the first and second stages of labour. Clinically it falls into four groups:—

(1) **Unavoidable haemorrhage of placenta praevia**, in which the placenta has been demonstrated by internal examination or by X-ray.

(2) **Accidental haemorrhage from premature separation of a normally situated placenta** demonstrated in the same way.

(3) **Ante-partum haemorrhage of doubtful origin** in which no complete investigation has been made.

(4) **Ante-partum haemorrhage arising from extra-placental causes**, e.g. carcinoma of the cervix, cervical polyp, cervicitis, etc.

At University College Hospital, where this classification has been in use for some years, 163 patients with ante-partum haemorrhage were admitted in the 10-year period 1933-1942: 69 had placenta praevia, 33 accidental haemorrhage, 53 ante-partum haemorrhage of unknown origin, and in 8 the haemorrhage was due to extra-placental causes. The diagnosis in each of these cases was the final one made after the patient was delivered. The large number of cases of ante-partum haemorrhage of unknown origin (53 out of 155—excluding 8 of extra-placental origin) brings up several problems in diagnosis.

We have been taught that when a patient has a sudden painless vaginal haemorrhage, and when on clinical examination the uterus is not tender, the foetus is palpable and the foetal heart is heard, a diagnosis of placenta praevia is probable; and, on the other hand, where there is sudden abdominal pain with or without vaginal haemorrhage, when the uterus is tense, tender and board-like, the foetal outline cannot be defined and the foetal heart is not heard, the patient is shocked, and there are signs of toxæmia, the diagnosis of accidental haemorrhage can be made.

This is true, but the large number of undiagnosed cases of ante-partum haemorrhage in this series shows that the clinical picture is not always typical. A small number of patients with placenta praevia may also have toxæmia (3 out of 69), and they may complain of lower abdominal pain. Some cases of accidental haemorrhage may have no evidence of toxæmia. The diagnosis of toxæmia in accidental haemorrhage is sometimes difficult when the patient is seen for the first time after the haemorrhage has occurred as the associated shock is accompanied by a low blood pressure and the onset of labour makes the diagnostic significance of albuminuria of doubtful value, since albuminuria is found in 90 per cent of women during normal labour. In the minor degrees of revealed or even concealed accidental haemorrhage the outline of the foetus may be palpable and the foetal heart heard.

This therefore brings us to the next problem. Is it justifiable to make a vaginal examination when the patient is first seen to establish the diagnosis? The answer is no, unless the examination is done in the operating theatre and the patient is prepared for Caesarean section because—

(1) If the bleeding is severe, and more so if it is recurrent and severe, the most probable diagnosis is placenta praevia, and a vaginal examination is unnecessary, as the best treatment in the interests of mother and child is usually Caesarean section.

(2) If the bleeding is slight and due to a placenta praevia a vaginal examination may cause a severe haemorrhage, causing the patient to become rapidly ensanguinated. If this happens, and the patient is not prepared for Caesarean section, or there are no facilities for Caesarean section, or if the cervix is closed or admits only one finger, the only alternative treatment is to pack the vagina or to rupture the membranes and apply Willett's forceps. Both these methods have a considerable maternal morbidity and rate a high foetal mortality.

What should be done in the best interests of the patient? Every patient with ante-partum haemorrhage, no matter how slight, should be transferred to hospital, where she can be under supervision, and where there is a resident medical staff who can deal with an emergency, and, if necessary, perform Caesarean section, at once.

The next question to be answered is what treatment should be carried out when the bleeding occurs at home, and the patient lives at some distance from hospital? The best thing under these circumstances is to call on the emergency obstetric squad. If there is no emergency squad available, give morphia gr. $\frac{1}{4}$ — $\frac{1}{2}$, apply a tight abdominal binder, vulvar pads, wrap the patient in warm blankets, and transfer straightway to hospital. No vaginal treatment should be carried out as this limits the further operative procedures which may be necessary, it adds to the risk of occurrence of further haemorrhage while vaginal manipulations are being made, and it adds to the risk of septic infection. Significant figures on the importance of sending the patient into hospital early and without a vaginal examination have been given by Schweitzer, who found that the maternal death-rate from sepsis in patients who had been sent to hospital without a vaginal examination having been made was nil. In those who had been examined *per vaginam*, but not otherwise interfered with, it was 2 per cent; in those who had had a vaginal pack inserted it was 6 per cent; while it was 11 per cent in those who had other internal manipulations.

When a patient is admitted to hospital suffering from ante-partum haemorrhage the history and clinical examination will assist in the diagnosis. The amount of bleeding should be noted, the condition of the uterus, the height of the fundus uteri, and the foetal heart listened for, the pulse rate counted, the blood pressure estimated and the urine tested. The blood group should be ascertained, and, if there is time, a complete blood count done. A relative should be grouped and permission for operation obtained.

When the diagnosis is ante-partum haemorrhage and the patient is in hospital the question is, should a vaginal examination be made to exclude placenta praevia? No hard-and-fast rules can be laid down, but some general lines of treatment may be suggested:

(1) A vaginal examination should only be done in the operating theatre, with the patient prepared for Caesarean section.

(2) Where there is severe vaginal bleeding, the patient is not in labour, and the probable diagnosis is placenta praevia, a vaginal examination is unnecessary and unwise since—

- (a) A general anaesthetic is required as when the cervix and presenting part are high, and beyond the reach of the fingers, the whole hand must be inserted into the vagina.
- (b) Another severe haemorrhage may be precipitated by further separation of the placenta by the examining finger.
- (c) The diagnosis may not be satisfactorily established as, particularly in primigravidae, the cervical canal may be closed.
- (d) The best treatment in the interests of mother and child is Caesarean section, preferably under local anaesthesia. The stimulation of labour pains by other methods of treatment takes hours, probably days, during which time the mother is exposed to the risk of recurrence of haemorrhage and of infection spreading up from the vagina.

(3) Where there has been a slight vaginal bleeding, followed by a continuous vaginal loss, especially if there are blood clots, and the patient is not in labour, a Caesarean section without a vaginal examination is the best treatment for the reasons already given in paragraph (2).

(4) Where the loss is continuous and the patient is in labour, and the cervical is therefore dilating, a vaginal examination should be done under general anaesthesia in the operating theatre with the patient prepared for a Caesarean section. It may be that in such a case artificial rupture of the membranes with or without the application of Willett's forceps, or some other method of vaginal treatment, is all that may be necessary or advisable.

(5) Where there has been one slight vaginal bleeding and the duration of pregnancy is less than thirty-five weeks, a vaginal examination may or may not be done. The best treatment is to temporise in the hope that the bleeding may not recur and the pregnancy continue to term. A vaginal examination may precipitate the onset of labour with resulting high foetal mortality. In an elderly primigravida this risk of the onset of premature labour may not be justifiable, and must be weighed against the risk of a sudden severe haemorrhage at any moment.

Before temporising we should try to make a diagnosis. Slight ante-partum haemorrhage may arise from placenta praevia, from accidental haemorrhage, or from an extra-placental cause. If there is no sign of toxæmia and the uterus is soft, not tender or tense, and the foetal heart is heard, and the maternal pulse rate is not increased, we are justified in assuming (a) that

there is at least no severe degree of accidental haemorrhage present, and (b) that the cause may be either a placenta praevia or an extra-placental one. An extra-placental cause may be diagnosed by passing a bivalve speculum and exposing the cervix. This may be done in the ward. Such rare causes of bleeding as carcinoma of the cervix, cervical polyp, cervicitis, varicose veins of the cervix can thus be excluded.

An attempt to diagnose placenta praevia without doing a vaginal examination may be made by radiography. There are various methods employed.

(a) By injection of an *opaque substance into the urinary bladder*. Normally when the head is in the lower uterine segment there is only a thin layer of tissue between the bladder and the foetal skull. If the head is displaced upwards by a solid mass such as the placenta the distance is increased by from 3 to 4 cms. This method is applicable only in the later weeks of pregnancy, and only when the vertex presents. Further, a placenta can be so demonstrated only when it is situated on the anterior or antero-lateral wall of the uterus, not when on the posterior or postero-lateral segments. It has been suggested that the injection of barium into the rectum might show a placenta praevia on the posterior or postero-lateral aspects.

(b) By injection of an *opaque substance into the amniotic cavity*. The resulting shadow on the film outlines the uterine cavity except at the site of the attachment of the placenta. This method is not without risk. Premature labour may be brought on and the death of the foetus may be caused by the injection of the opaque media into it.

(c) By *direct visualisation of the placenta on straight radiograms*. Recently some investigators of this method have reported a high percentage of successful results.

(d) A method of *localisation of the placenta by tomography* was described in 1941.

When there is a slight vaginal bleeding and a placenta praevia has been excluded, one may decide to temporise in the interests of the child. The patient must be kept in hospital and kept in bed for ten days after the bleeding has stopped. Thereafter she should be allowed up for a short time daily. Such treatment is frequently successful, there is no recurrence of bleeding, and the pregnancy continues to term. Labour may be allowed to come on spontaneously, but if the patient is an elderly primigravida Caesarean section is probably the best treatment.

(6) Where the bleeding has been slight and the duration of pregnancy is more than thirty-five weeks we may either follow the line of treatment given in paragraph (5), or we may do a vaginal examination since (a) the risk to the foetus of a premature labour after thirty-five weeks gestation is small; (b) if there is no placenta praevia the patient and her relatives are relieved from prolonged anxiety; (c) if there is no placenta praevia the patient may be discharged from hospital and the pressure on hospital beds reduced.

TREATMENT OF PLACENTA PRAEVIA

Caesarean section is often the best treatment in the interests of the mother and child. It should always be done when the placenta praevia is of the complete and central varieties, and is strongly advisable in all varieties in primigravida as the duration of labour is more prolonged. So long as labour lasts the risk of haemorrhage remains. With Caesarean section the amount of bleeding can be controlled, the chance of obtaining a living child is greater, and the risk of introducing sepsis is smaller.

When the patient is in labour and the praevia is of the lateral or marginal varieties, treatment may be:

(1) If the os is at least two fingers dilated, **external or bi-polar version** (when the vertex is presenting) and pulling down a leg. To control the bleeding by this method a foot must be drawn right down and out at the vulva and a fillet of gauze then passed over the ankle by a clove hitch. Sometimes the other end of the gauze is tied to a 2-lb. weight, which is hung over the foot of the bed, and in this way continuous pressure maintained on the lower uterine segment. It is, however, better to leave the long end of the fillet of gauze loose, and if the bleeding recurs to exert intermittent traction on the gauze. The half-breech exerts sufficient pressure to stop the bleeding, and prolonged traction on the lower uterine segment may stimulate too rapid dilatation with consequent tearing of the cervix and lower uterine segment. Continuous traction also interferes with the placental circulation. This method is certain to be followed by the birth of the child without further interference within a few hours, but it is associated with a high foetal mortality.

(2) **Artificial rupture of the membranes.** The membranes are ruptured near the margin of the placenta, and at least one pint of liquor amnii is allowed to escape. As a result the uterine cavity is diminished in size and the contraction and retraction of the uterine muscle pushes the presenting part down into the pelvic cavity and compresses the placenta. *Unless the patient is having good contractions this method should not be used.* The risk of sepsis being introduced into the amniotic cavity is high, and we know that eight hours after the membranes are ruptured the amniotic cavity is no longer sterile.

(3) **Artificial rupture of the membranes and the application of Willett's forceps** to the foetal head is used when the os is one finger dilated. The child's scalp is grasped by forceps as far back on the vertex as possible, and a sterile bandage is attached to the handles of the forceps and traction exerted when necessary. *The advantage of Willett's forceps is that the risk to the foetus is small and the forceps can be applied when the os is only one finger dilated.* The disadvantage is the risk of infection. Two cases of Bacillus Welchii infection, one fatal, have occurred after this method of treatment at University College Hospital, and we use it only when the uterine contractions are good and the patient likely to be delivered soon afterwards.

(4) *Packing the vagina and applying a tight abdominal binder.* This method is associated with such a high risk of sepsis that **it should be avoided whenever possible.** The only indication for its use is a severe haemorrhage when the patient is not in labour, the cervical os is closed, and a Caesarean section is contra-indicated or refused. A general anaesthetic is required. The patient is put into the lithotomy position, the vagina is swabbed out and all clots removed, and the vagina either douched with an antiseptic lotion or painted with an antiseptic solution. The perineum is retracted by a large-sized Sims speculum, and the vagina systematically packed from above downwards—the cervical canal if it is open first, then the fornices and the whole vagina tightly packed and its walls distended. Either sterilised gauze wrung out of 1 in 40 Dettol, or better sterile wool pledgets which have been wrung out in 1 in 40 Dettol are used. A tight abdominal binder reaching above the fundus is then applied, together with a vulvar pad and a T bandage. The pack should be removed in about eight hours. The maternal mortality of this method of treatment is 10 per cent, and this is doubled when further treatment involving internal manipulations is necessary.

The hydrostatic bag has passed into disuse in the treatment of placenta praevia.

TREATMENT OF ACCIDENTAL HAEMORRHAGE

When there is slight external accidental haemorrhage and there is no shock, expectant treatment may be used, giving an injection of morphia gr. $\frac{1}{4}$, followed by a sedative mixture such as sodium bromide gr. 15, choral hydrate gr. 15, tinc. opii m. 7, aq. ad. $\frac{1}{2}$ oz. at eight-hourly intervals for forty-eight hours combined with rest in bed. This may be sufficient. The patient should be kept in bed for ten days after the bleeding has ceased. Such treatment is frequently successful, the bleeding ceasing, and the pregnancy continuing to term.

When there is external haemorrhage of moderate severity and the patient is in labour the treatment varies according to the circumstances of the case.

(a) If the uterine contractions are good, the best treatment is to watch the patient carefully, but to do nothing active except possibly to apply a tight abdominal binder, since the object of treatment is to get the uterus empty, contracted and retracted with as little risk to the mother as possible.

(b) If the haemorrhage is of moderate severity and the patient is in labour, but the uterine contractions are poor and occurring at long intervals, treatment consists in giving intramuscular injections of pitocin 2 units at half-hourly intervals until a maximum of 10 units have been given or until good uterine contractions are established, whichever occurs first. If satisfactory uterine contractions are not established by this method, the membranes should be ruptured and a pint of liquor amnii allowed to escape.

Where the accidental haemorrhage is accompanied by shock there is probably a combination of concealed and revealed haemorrhage. The uterus will not contract and retract as long as the patient is shocked. Therefore the essential point in the treatment is to tide the patient over the shock and the blood loss before undertaking any active steps to deliver her. She should be put into a warm blanket bed with plenty of hot-water bottles, the foot of the bed raised, and given morphine gr. $\frac{1}{4}$. This is usually sufficient, but occasionally a glucose saline

may be given per rectum, and, if the bleeding has ceased, a blood transfusion. A watch should be kept on the amount of blood lost, the pulse rate and the height of the fundus. As the patient's condition improves labour usually sets in spontaneously, but if it does not labour should be induced by pitocin or by the artificial rupture of the membranes.

Concealed accidental haemorrhage is a rare and very grave condition. The patient is shocked, and the first essential is again to *treat the shock*. As a rule, when it is diagnosed, a large quantity of blood has escaped into the uterine cavity, the uterine muscle fibres have been ploughed up by haemorrhage, and the uterus is completely inert. Haemorrhage will continue into the inert uterus until it is emptied. Abdominal section is necessary, and if after the uterus is emptied it fails to contract either the uterus should be packed or a hysterectomy should be performed. The maternal mortality of this condition is about 50 per cent of all cases.

PROLAPSE

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Prolapse is one of the commonest conditions necessitating surgery for its treatment. Diminution of tone of the body muscles and loss of tensile strength of the fibrous supporting tissues are predisposing factors, but the outstanding cause is undoubtedly child-bearing, which results in the stretching of all the pelvic connective tissues, especially the cervico-pelvic ligaments, utero-sacral ligaments, and the sub-vesical fascia, and also the fascia that supports the vagina laterally.

During pregnancy the vagina undergoes growth and great hypertrophy, enabling it to expand and transmit the foetal head. Frequently this growth is not followed by complete involution, and the vaginal walls remain hypertrophied and lax. Also during delivery of the foetal head the levatores ani muscles may be torn apart, and become stretched and attenuated.

Occasionally the ligaments supporting the uterus and vaginal walls are congenitally lax, and in such cases even in vigorous women who have neither been pregnant nor borne children, prolapse, extending to complete procidentia, may be found.

Prolapse is always associated with some feeling of disability, lassitude, and a sense of insecurity; the patient complains of a feeling of "bearing down" and general discomfort, and when cystocele is present there is sometimes frequency of micturition, and often an inability to empty the bladder unless pressure is exerted on the bulging wall. There may be discharge, often blood-stained, due to ulceration caused by rubbing of the clothing against the protruding part. When prolapse is associated with rectocele there is often difficulty in defaecation.

The different forms of prolapse with which we propose to deal are cystocele, a bulging downwards of the anterior vaginal wall; rectocele, or bulging of the lower part of the rectal wall; hernia of the pouch of Douglas, which is a protrusion of the viscera through the posterior vaginal fornix, between the rectum behind and the cervix in front; and descent of the vaginal vault, or true utero-vaginal prolapse, which may be of any degree up to complete extroversion of the vagina. These different forms of prolapse, however, seldom occur alone. They are usually associated with complications such as uterine haemorrhage or growth, uterine backward displacement, with prolapse of the ovaries, laceration or chronic infection of the cervix, or inflammations and degenerative changes of the vagina.

In this paper it is proposed to deal with the different types of prolapse, together with their complications and the surgical treatment for their relief.

One of the commonest conditions is general relaxation of the pelvic floor and stretching and attenuation of the levatores ani muscles, together with a greater or lesser degree of bulging forwards of the lower part of the posterior vaginal wall and the adjoining portion of the anterior