is the site of a mild infective process, such as we find in osteo-arthritis.

The problem of treatment is by no means easy. It would seem a minor and satisfactory procedure to remove the spur, but we have no guarantee that it will not re-form, and in a more extensive degree. When we recall that these spurs may disappear spontaneously, we feel that there is room for non-operative treatment. This takes the form of "protection." A thick felt is placed below the situation of the spine, a cup-shaped hollow ensuring freedom from pressure on the offending prominence. I am told that diathermy is of great value in hastening absorption of the deposit, but I cannot speak of this from personal experience.

Irregular Ossification of the Calcaneus.

The next two cases are examples of pain complained of at the back of the heel. The first patient is a 10-year-old schoolboy, in whom the pain first occurred after a long run. Since its onset it appears to have been produced by any undue amount of walking or running. It is described as an ache rather than a sharp pain, and with it there is often a cramp-like contraction of the muscles of the calf.

On examining the part two features are evident: the calcaneus is slightly broadened behind, while pressure over

FIG. 12.—Apophysitis of the calcaneus in a boy aged 10. The epiphysis shows characteristic irregular ossification.

this area produces slight discomfort. An x-ray photograph shows that the metaphysis of the heel bone at the junction of the epiphysis and the body of the bone is the site of an intense but somewhat erratic activity. New bone is being formed in isolated clumps rather than in the uniform deposit of a healthy ossification; there is undue congestion, and the epiphysis itself shows the mottling of irregular ossification. (Fig. 12.) The appearances are those of a selective irritative process, probably toxic in character,

though why it should exercise so local a selection is a mystery.

The condition need cause no alarm; it responds to counter-irritation, raising of the boot heel to relax the tendo Achillis, rest, and the elimination of any undue degree of local pressure.

Calcaneal Bursitis.

The other case in this group illustrates a different explanation of somewhat similar symptoms. The patient complains of pain over the back of the heel, with recurrent cramp of the calf muscles and the appearance from time to time of a tender swelling at the point from which the pain seems to originate. An x-ray examination yields negative results. On investigation it is found that there is an area of local tenderness over the upper part of the posterior aspect of the heel, and it may be possible to detect a localized swelling at the point of tenderness. The case is one of inflammation of the calcaneus bursa. The anatomical bursa lies between the tendo Achillis and the posterior surface of the calcaneus, but an adventitious bursa frequently arises in a subcutaneous position and immediately overlying the point of insertion of the tendon. Both bursae, but particularly the latter, are liable to irritation by ill-fitting shoes, and, if the overlying skin becomes blistered or broken, a lymphatic infection of the bursal space ensues.

Attention to the footwear may be all that is required to remedy the error, but, if a definite infection of the bursa is established, it is wiser to remove the sac under local anaesthesia and thereafter to take precautions against recurrence of the irritation.

PLACENTA PRAEVA AND ITS RESULTING FOETAL MORTALITY.

BY

F. NEON REYNOLDS, F.R.C.S.ED.

It appears from statistics that placenta praevia is found about once in every 500 cases, and is most common in women who have had many pregnancies, especially if these have occurred in rapid succession. Little is known of the etiology of the condition, but two theories have been put forward:

1. The ovum may be implanted from the beginning in the lower uterine segment and the placenta formed, as usual, from the decidua basalis. It is not known why the ovum becomes attached to the lower segment; it may be due to a deficiency in the ordinary properties of the chorionic villi or to some condition of the decidua, such as previous inflammatory changes, which render it unsuitable for implantation.

2. The ovum may be implanted in the upper segment in the usual way, but the villi of the decidua capsularis proliferate instead of undergoing atrophy, and invade the decidua vera of the lower segment after contact has been brought about by growth of the ovum. Then proliferation of the villi of the decidua capsularis would form part of the placenta in the lower segment.

PATHOLOGY.

The placenta is usually larger, more degenerated, and contains more infarcts than normal. These changes may be accounted for by the fact that it can obtain only a comparatively poor blood supply. The cord often has its insertion at the margin. The lower segment and the cervix are generally thicker than usual and more vascular; they do not dilate as easily, and tear more readily. The haemorrhage, which is the chief symptom, comes from the maternal blood vessels, which are opened by the separation of the placenta when the cervix dilates. There is no foetal haemorrhage unless the placenta is torn by manipulation in treatment.

VARIETIES.

There are two varieties of placenta praevia: (1) Complete, in which the placenta entirely covers the internal os. (2) Incomplete, in which the placenta does not cover the os. Of this variety there are two types: (a) in which the placenta partly covers the internal os so that it can be felt by the examining finger through the os; (b) in which the placenta is situated in the lower uterine segment but does not come as low as the internal os, and therefore cannot be felt unless examination be made above this level.

The terms "central," "marginal," and "lateral" are also used to denote three degrees. It must be remembered that a placenta which appears to be central when the os admits one finger may be marginal when the os is further dilated.

SYMPTOMS.

Haemorrhage is the only symptom, and usually takes place during the last four weeks of pregnancy; it may, however, occur at any stage. It is not necessarily accompanied by labour pains, being caused in some cases by painless contractions which open the os. The bleeding may start as small repeated losses or as a severe and alarming haemorrhage, but is always intermittent. There is sometimes a history of trauma or somewhat strenuous exercise, but commonly no apparent cause is present to determine the onset. There is no pain apart from possible labour pains, and on palpation no tenderness of the uterus is noticeable. Foetal parts are felt as usual, and there is no alteration in the normal tension of the uterus.

DIAGNOSIS.

The diagnosis may be considered in two stages: first, before there has been any haemorrhage, and secondly, after the onset of haemorrhage, the latter being the stage at which placenta praevia is usually diagnosed.

Before the Onset of Haemorrhage.

All cases of pregnancy should be examined particularly carefully during the last few weeks, as it is during this period that the abnormalities, such as placenta praevia, can be discovered or suspected. The signs which might excite suspicion of the presence of this condition are:

(1) *On abdominal examination:* (a) Abnormal lie of the foetus. There may be a transverse lie, or the head may be felt very high up, perhaps lying in one or the other iliac fossa. (b) An unusually loud souffle heard over the pubic region.

(2) *On vaginal examination:* Difficulty in reaching the presenting part or feeling it in one fornix but not in another, or failing to feel any presenting part at all. Inability to push the presenting part into the pelvis in spite of normal pelvic measurements, and the fact that the promontory of the sacrum cannot be felt, or that there have been previous confinements without trouble. The feeling of a soft, boggy mass filling all or part of the fornices. This, once experienced, is not likely to be confounded with a breech presentation or hydatidiform mole, in both of which conditions there are other definite guiding signs.

If the diagnosis can be made at this stage, or the condition be suspected, precautions can be taken and arrangements made to institute prompt treatment in what is one of the most serious complications of pregnancy.

After the Onset of Haemorrhage.

This resolves itself into the differential diagnosis of antepartum haemorrhage; we have to distinguish between placenta praevia and accidental haemorrhage. The only definite sign of a placenta praevia is feeling the placenta through the partially dilated os. In attempting to do this it must be remembered that the edge of an incomplete placenta praevia may be some distance from the os, and no case should be labelled as one of accidental haemorrhage without a thorough examination. In this connexion I would urge the use of an anaesthetic in all but those cases which can be examined without straining, and in which the placenta is felt immediately upon introducing the finger into the os. Under an anaesthetic the examination can be made carefully and completely with less risk of trauma, which would increase the haemorrhage, and less risk of introducing infection—a further consideration of very great importance. Supporting evidence will be found in those signs which have been mentioned under the heading of diagnosis before the onset of haemorrhage.

In accidental haemorrhage the foregoing evidence is lacking except in those rare cases in which placenta praevia and concealed accidental haemorrhage are present together. We must not be misled by the presence of blood clot in the vagina or cervix; this should be carefully cleared out, with the help of a douche if necessary, and further examination made. The bleeding in accidental haemorrhage is steady and continuous. In a case of mixed external and concealed accidental haemorrhage the presence of pain apart from uterine contractions, tenderness on palpation, and increased tension of the uterus, together with the general condition of the patient, are sufficient to distinguish the condition.

To summarize these points:

<i>Placenta Praevia.</i>	<i>Accidental Haemorrhage.</i>
No pain.	Pain (concealed variety).
Uterus flaccid except during contractions.	Uterus not relaxed between contractions (concealed).
Uterus not tender to palpation.	Uterus tender to palpation (concealed).
Haemorrhage intermittent.	Haemorrhage continuous.
Presenting part felt only partially or not at all.	Presenting part felt normally.
Placenta felt per vaginam.	No placenta felt per vaginam.
Malpresentations common.	Malpresentations not specially associated.
Not commonly associated with toxæmias.	Commonly associated with toxæmias.

Hydatidiform mole with haemorrhage, and in which the mole can be felt through the os, may be confused with placenta praevia. In this, however, we have to guide us the size of the uterus, which is greater than it should be for the supposed period of pregnancy, and the absence of any foetal parts. Two other conditions which must be borne

in mind are bleeding from a cervical polypus or from a carcinoma of the cervix. Both of these are generally easily discovered if careful examination is made.

TREATMENT.

This is by far the most difficult problem presented by placenta praevia. Each case must be carefully examined in all detail, and no hard-and-fast rules can be laid down. Certain lines of treatment are open to us.

1. Leaving alone.
2. Rupturing the membranes.
3. Rupturing the membranes and plugging the vagina.
4. Version and bringing down a leg.
5. Insertion of a de Ribes's bag.
6. Caesarean section.

All these methods have as their object control of the haemorrhage and the safe delivery of the patient. Choice of them can only be made after a careful study of the following points.

Condition, age, and parity of the patient.

Type of placenta praevia to be dealt with.

Period of gestation and condition of the infant.

Stage of labour—that is, degree of dilatation when the diagnosis is made.

Conditions under which treatment has to be carried out.

If the patient is fit and not yet affected by loss of blood any of these methods may be considered; if, however, we have to deal with a shocked, exsanguinated patient, our first consideration must be to stop the haemorrhage and combat the shock by the quickest and most effective method which does not, in its performance, involve any added strain or exhaustion. The method of choice here is to rupture the membranes, plug the vagina, and apply a tight abdominal binder from above downwards. The shock can then be dealt with by the usual means, and later, when the patient has somewhat recovered, other treatment can be decided upon if necessary. In this connexion the value of blood transfusion, which often may be the measure determining recovery, must not be overlooked. The operation can easily be carried out in the patient's home with simple apparatus; a microscope is not necessary for testing the blood of the donor against that of the recipient, and a complete grouping of both need not be done.

Age and parity are important in the case of the elderly primipara, with little chance of further pregnancies, for whom a living child is very essential. Immediate Caesarean section is then indicated, except in the very mild, incomplete type of case requiring no active intervention. In a multipara with several living children, or a young primipara with plenty of time for further chances, the infant is generally disregarded and treatment directed solely in the interests of the mother. In considering the period of gestation and the condition of the child it is obvious that in a very premature labour, or if the child is already dead, the mother is again the only consideration.

The type of placenta praevia is important; in the complete or central type Caesarean section should always be performed, provided the child is alive. The nearer the approach to the lateral type the more effective will be the natural force of labour in controlling the haemorrhage.

The stage of labour—that is, the amount of dilatation of the os when the diagnosis is made—has a direct bearing upon the treatment, since the less the dilatation the more difficult and dangerous to the patient is any form of treatment involving manipulation through the os. Therefore, with a dilatation of less than two fingers, rupturing the membranes and plugging the vagina is generally indicated (subject to the other conditions being satisfied), even if only as a preliminary to other procedures. With a dilatation of two fingers or upwards there is the choice of version and pulling down a leg or the insertion of a de Ribes's bag.

The question of the conditions under which treatment is to be carried out is one upon which there can be very little difference of opinion. Every case of placenta praevia, unless so slight that no treatment, beyond perhaps simple rupture of the membranes, is required, should be treated in hospital or a nursing home unless the patient's home allows facilities equal to those afforded by such institutions. The most difficult and important part of any form

of treatment is the prevention of sepsis; such undertakings as plugging the uterus cannot be carried out efficiently and with a minimum risk of subsequent sepsis unless conditions conform to a standard which is seldom available in patients' homes.

Having considered these factors which guide us in the choice of treatment we can now take the individual methods and see in what type of case each one is indicated. We can leave alone the very slight case with an occasional small haemorrhage, provided that the labour is not prolonged sufficiently for the patient to be affected by the repeated slight losses. Many such cases are diagnosed as accidental haemorrhage, but it is more probable that they are due to a low placenta.

Rupturing the membranes is sufficient in the milder cases of the lateral type in which labour has begun, and also in those cases in which there is no serious loss until the os is more than half dilated. If the membranes are then ruptured the presenting part can be pushed well down and a binder applied with good control of the haemorrhage. It must be remembered that rupturing the membranes is not a reliable method of inducing labour, and for that reason should not be used alone in the absence of good uterine contraction.

Rupturing the membranes, plugging the vagina, and applying a tighter binder is indicated in the incomplete type of moderate severity with dilatation of less than two fingers, in cases in which labour has not begun, and in all cases in which the condition of the patient, from shock and loss of blood, is too bad to admit of any more extensive treatment. It must be remembered that, to be effective, the plugging must be carried out very carefully, if possible under an anaesthetic and with the aid of a speculum; it must start well back, and care must be taken that the plugging is placed behind the cervix to start with, and does not merely push the cervix backwards. If not carried out efficiently haemorrhage will continue above the plug. The danger of sepsis following this procedure cannot be too strongly emphasized, and the plug should always be removed as soon as possible. This method should, in fact, be looked upon only as a preliminary to other treatment in the severe cases, or as a means of inducing uterine contractions.

Version and pulling down a leg is a sure and fairly safe method of immediately controlling the haemorrhage in cases of the incomplete type with severe bleeding, or in the central type seen too late for Caesarean section. It almost invariably results in good contractions and subsequent delivery without further intervention. It is always indicated in the case of a small or premature foetus with a vertex presentation and in transverse lies. Breech presentation should be treated by bringing down a leg. Version should always be by the external method where possible; this will give a minimum of trauma and of risk of sepsis. Once the breech is down, a leg can be seized with very little manipulation. It should not be persisted in if found very difficult, and should never be carried out if there is any disparity in size between foetal head and pelvis.

De Ribes's bag can be used instead of the half-breech; it can be introduced with less dilatation than is required for pulling down a leg; it is effective in controlling the haemorrhage, and gives a better chance of a living child. There are, however, very definite disadvantages. It is not such a good stimulus to labour, and it may dilate the os without producing labour pains, especially if traction is used. Thus there is considerable risk of a severe and sudden haemorrhage when the bag is expelled into the vagina. This will necessitate further procedure to get the presenting part down in order to maintain controlling pressure. The presenting part may be displaced by the bag and an oblique lie result; the bag perishes easily, is not always available in an emergency, and is a ready means of introducing sepsis.

One other method of this type must be mentioned—namely, traction from Willet's forceps applied to the foetal scalp. Good results have been obtained, and it causes surprisingly little damage to the child other than a cephalhaematoma.

Caesarean Section.

The use of Caesarean section in placenta praevia is a much-discussed question, and one upon which unanimity of opinion is seldom found. Certain cases, however, definitely require this method of treatment.

1. All cases of the complete, or central, type if the condition of the mother allows it.
2. Cases in which the birth of a living child is of great importance—for example, in elderly primiparae.
3. Cases in which there is any mechanical obstruction to delivery, such as a rigid cervix or disproportion between the size of the child's head and the pelvis, however slight. (It can be understood that the extra difficulty produced by such complications might be just too much for a patient who has undergone a somewhat prolonged labour and is weakened by loss of blood.)
4. Cases complicated by toxæmia or constitutional conditions, such as cardiac disease, which require the labour to be as short and as easy as possible.
5. Cases of twin pregnancy.

In considering this method of treatment the conditions under which it has to be applied are all-important. Carried out in suitable surroundings by one accustomed to the operation it has the advantage of being a fairly safe means of terminating a condition which seriously threatens the life of the mother; also it gives the best chance of a living child, and its performance is not affected by such conditions as an abnormally large child or comparative pelvic contraction, which increase the difficulties of the other methods. The disadvantage lies chiefly in the potential weakness of the uterine scar and its behaviour in subsequent pregnancies. This is a point to which I shall refer again later.

DANGERS OF PLACENTA PRAEVIA.

There are certain dangers which have to be faced in placenta praevia no matter which particular treatment is used.

1. *Post-partum Haemorrhage from the Lower Uterine Segment.*—This is due to the relatively poor power of contraction possessed by the lower segment, and the consequent failure to occlude the large sinuses opened up by the separation of the placenta. This haemorrhage must be treated by the usual means, such as compression, packing, and drugs. It may be necessary, in cases in which Caesarean section has been performed, to remove the uterus, but this is generally only called for when the whole uterus is soft and flabby, and cannot be made to contract. Treatment of such a case by Caesarean section facilitates control of the haemorrhage, as with the abdomen open direct pressure can be applied and the uterine arteries compressed.

2. *Rupture of the Lower Segment.*—In normal cases the lower segment is much thinner, more friable, and less elastic than the upper, and this is still more marked at the site of implantation of the placenta. For this reason all manipulations must be carried out with the greatest possible care, especially such procedures as version or the application of forceps, which may be necessary after the expulsion of a de Ribes's bag. It is an accident which is very sudden in occurrence, and is almost always fatal.

3. *Sepsis.*—The placental site is close to the vagina, which is never sterile; it is therefore very easily infected during examination or manipulations, or subsequently during the puerperium. In addition, the resistance of the patient is lowered in proportion to the amount of blood which has been lost.

PROGNOSIS.

The outlook for the mother depends very largely upon how soon the diagnosis is made. Many fatalities are due to the occurrence of severe haemorrhage, or to the introduction of sepsis before the true condition is appreciated and efficient treatment instituted. In arriving at a prognosis the presence or absence of uterine contractions must be considered. A well-contracting uterus means a healthy one, not yet weakened by excessive loss of blood, and is

an indication that the patient is still in a fair condition to withstand the severe demands to be made upon her.

The cause of death is haemorrhage, either ante-partum or post-partum, shock from manipulation or instrumental delivery, sepsis, or such tragic accidents as rupture of the lower segment or pulmonary embolism, the last of which is, perhaps, specially liable to occur in this condition. The maternal mortality may be taken as about 5 to 6 per cent. The figure given by Queen Charlotte's Hospital¹ in a series of 308 cases is 5.5 per cent., taking all methods of treatment together. It is interesting to look at the results of the individual methods.

	Cases.	Per cent.
Spontaneous delivery	62	6.4
Vaginal plugging	53	1.9
De Ribes's bag	38	7.9
Version and bringing down a leg ...	101	6.0
Caesarean section	54	5.5

From this it will be seen that the lowest mortality is from vaginal plugging; but it must be remembered that this method is sufficient only in the treatment of the milder cases of the lateral type, especially those in which haemorrhage is controlled with the onset of labour. The next lowest is from Caesarean section, the method used in cases of the central type.

The outlook for the child is uniformly bad; a large number are stillborn, and many die shortly after birth. The causes of death are asphyxia from placenta separation, haemorrhage from laceration of the placenta, pressure on the cord, and prematurity. The figure from the series of Queen Charlotte's Hospital is 59 per cent. Taking the different methods individually we get:

Spontaneous delivery	43.5 per cent.
Vaginal plugging	58.5 "
De Ribes's bag	57.0 "
Version and bringing down a leg ...	78.0 "
Caesarean section	42.6 "

Version and bringing down a leg, which was decided upon in this series 101 times—nearly twice as often as any other method—gives the appalling foetal mortality of 78 per cent. It appears from this large series of cases, which may be taken as fairly representative of present-day results, that in the commonest type of placenta praevia, under up-to-date treatment, we get a maternal mortality of 6 per cent. and a foetal mortality of 78 per cent.

I have given an outline of what appear to be the generally accepted views upon the treatment of this condition. These views, in spite of occasional sporadic and individual criticisms and many discussions, have been held for many years, and there has been very little improvement in results. The general feeling among obstetricians is one of dissatisfaction. No one should be satisfied with a foetal mortality of nearly 80 per cent. I can think of no other condition in which this figure is even approached. It is true that the mother must always be the first consideration, but equally the child does or should matter. A treatment is required which lowers the foetal mortality and at the same time decreases, or at all events does not increase, the maternal mortality.

I should like to make a plea for the wider use of Caesarean section in those cases of placenta praevia which would otherwise require plugging, version, or a de Ribes's bag. It is certain that, provided the diagnosis be made sufficiently early, this method would considerably diminish the foetal mortality without detriment to the chances of the mother. Many men of repute have put forward the same plea, but without success.

Blair Bell² in 1920 said: "I am certain that Caesarean section is the proper treatment in a large majority of cases. . . . I am, indeed, convinced that Caesarean section affords no more danger to the mother than version and delivery per vias naturales. Those who still hold to version as the treatment of election must therefore justify their indifference to the fate of the child."

Herbert Spencer³ considered that Caesarean section was rarely indicated, and gave as his reasons that after version the mother could have children with safety, which was not the case after Caesarean section, and that the child owing

to its prematurity, would often succumb. This second objection can surely be dismissed at once; no one would advocate this treatment, except on very special grounds, in a case in which the child was so premature as to make its survival a matter of doubt.

Jellett,⁴ in 1925, made a vigorous reply to a plea for Caesarean section put forward by Watson and Miller.⁵ He cited a low maternal death rate, under 6 per cent., and referred to the fact that treatment had not altered for nearly thirty years, suggesting that this was due to the generally satisfactory results obtained. He completely ignored the child's claim for consideration.

Let us now see what are the disadvantages and dangers of Caesarean section. At the time of operation the condition of the patient must be taken into account, together with the risk of haemorrhage and sepsis, all of which are also serious considerations in any other method. If the diagnosis can be made sufficiently early there is less shock, less risk of haemorrhage or sepsis in Caesarean section than in any other form of treatment. It is, however, to the later effects that Spencer was referring when he said that the mother could not usually have subsequent children in safety. The general mortality of the operation performed under suitable conditions and not in extreme emergency is probably not higher than 2 or 3 per cent., so that from this point of view the maternal mortality would not be increased. The danger of the rupture of the uterine scar in subsequent pregnancies is the most grave objection to be considered. Eardley Holland, who in 1920 made a thorough investigation into this question, gives 4 per cent. as the frequency of rupture of the scar. Other figures are those of Munro Kerr⁶ 1.8 per cent., and Couvelaire⁷ 2 per cent. We can, however, take the conclusions come to by Eardley Holland⁸ upon the largest number of cases ever investigated in this connexion to prove that this risk can be reduced. The cause of ruptured scar is imperfect healing leading to a thin scar, in which muscular union has failed. Factors leading to this imperfect healing are infection of the uterine wound and unsuitable methods and material in suturing the uterine incision. Eardley Holland found that the incidence of rupture was far greater when catgut was used to suture the uterus than when the suture material was silk or silkworm-gut, and he advocates the regular use of the latter material.

The operation is not difficult, but it is too often carried out in an atmosphere of hurry. Remarks to the effect that the whole operation took only twelve minutes should be regarded as inviting criticism rather than congratulation. There is no need for any undue haste, especially after the child has been delivered; very rare indeed are the cases in which an extra few minutes will affect the patient adversely, and the utilization of those few minutes in obtaining good contraction of the uterus and careful, accurate suturing will be amply repaid by the results, both immediate and remote. In the light of modern knowledge, with improved methods and material, and with more regard to the technique of asepsis, the risk of rupture of the uterine scar can surely be very considerably reduced.

CONCLUSIONS.

1. The question of foetal mortality in placenta praevia is worthy of serious consideration.
2. Wider use of Caesarean section can reduce this mortality without increasing the risk to the mother.
3. This method has never been tried upon a sufficient number of suitably selected cases for a correct estimate of its value to be made.
4. The usual objections to this method of treatment can be largely discounted when the operation is performed by the modern technique and under suitable conditions.

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