A British Medical Association Lecture ON MINOR ORTHOPAEDICS OF THE FEET IN GENERAL PRACTICE.

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THIS address includes the consideration of a number of conditions apparently so simple that some may feel that there is nothing new to be said about them; but I have noticed that minor orthopaedic disabilities are remarkably common, that among the work of a young consultant they form a considerable proportion of his material, and since they come to the institution and the consultant, I infer that they are a source of trouble and anxiety to the man in general practice. When I add that many of these conditions are among the most difficult to treat and to cure, I have justified, I hope, the choice of my subject. I propose to illustrate what I have to say by short abstracts from case notes, and, so far as possible, to demonstrate the conditions to which I refer.

INGROWING TOENAIL.

My first patient is a woman, and the reason of her visit is the presence of a painful ulcer on the lateral nail border of the great toe. It seems a small thing, but to my patient, who has been seriously affected by the dancing craze, it is a disaster. With Cowper she would no doubt exclaim:

"O may I live exempted . . .
From pangs arthritic that invest the toe
Of libertine excess."

As a matter of fact, she was suffering from an ingrowing toenail, one of the most painful and distressing of the minor maladies of the feet.

So perfect are the provisions which Nature has made to guard against this disaster that the sufferer must have flagrantly destroyed one or more before Nemesis overtook her. If you examine the nail-fold (Fig. 1) you will find that these provisions are two—the edge of the nail is curled upon itself so that a convex surface is opposed to the skin surface, and, as though that were insufficient, the skin in contact with the nail-edge is of a more horny texture than that around—the result of the deposit of

FIG. 1.—The toenail on coronal section. Note the infolding of the nail-edge, and the special epithelium with which it makes contact.

FIG. 2.—Cutting a toenail. The nail should be cut at right angles to its long axis—not in a curved manner.

a considerable amount of eleidin granules in its cells. These safeguards are present in both foot and hand, but, owing to the relatively greater pressure which the foot-nails have to bear, they are more efficiently developed in the latter situation.

An ingrowing toenail results from one or both of two errors: either the nail is cut convexly so that the protective infolding of its edge is destroyed, or the special stratified epithelium is removed, and its safeguard thus eliminated. My patient had been guilty of both errors. She had been cutting her nails convexly, and at the same time, in order to improve the local appearance, she had been using a preparation containing salicylic acid, which

she had been brushing over the nail-fold, and so removing the valuable horny layer. Is it any wonder that, as her nail grew, its now sharpened and unfolded edge, coming into contact with a delicate and unprotected epithelium, produced at the point of contact a most painful and intractable ulcer? (Fig. 2.)

Treatment of Ingrowing Toenail.

What was to be done? To remove the toenail is rather a desperate remedy; it is certainly a very painful one. It may involve weeks of crippling, and should only be resorted to when all other measures have failed. Cutting away that portion of the nail which impinges upon the ulcer is the procedure perhaps most frequently adopted, and, if it is accompanied by careful packing of the ulcer surface with an antiseptic gauze or wool, it may ultimately prove successful; but it has the risk that the natural infolding of the nail may not re-appear, in which event ulceration is sooner or later bound to recur.

FIG. 3.—The method of tinfoil application in the treatment of ingrowing toenail.

In my experience there are two simple and efficient remedies, neither of which is perhaps sufficiently known. The nail-fold may be protected by restoring the convex nail-edge, which is done by wrapping around the offending nail-edge a small oval-shaped piece of soft tinfoil, so arranged that a fraction of it lies on the under surface, the remainder on the nail surface. It is fastened in place by a drop of sterile glue or strong collodion. A fragment of Stent wax is sometimes used instead of the tinfoil, but it is brittle and apt to break. While the protection is in place the ulcer is lightly packed with a spirit solution of one of the aniline dyes, this being used because it increases the cornification of the epithelium and so stimulates the formation of the protective layer. (Fig. 3.) The second simple remedy is sometimes known as Webb's wire, which acts by maintaining a constant separation between nail-fold and nail-edge, and I can vouch for its efficacy in curing the early stage of this troublesome ailment.

HAMMER-TOE.

My second patient presents herself because of the common and troublesome condition of hammer-toe. It has affected the second toe, as it usually does, because it is the longest of the outer four, and is liable to be displaced and cramped if any lateral displacement occurs in the great toe (Fig. 4). In this patient's case the deformity is well marked; in other words, there is pronounced flexion of the proximal intraphalangeal joint; it is not congenital, and a glance at her shoes shows the cause in the badly shaped and centrally pointed type of sole. It is a hopeless task, I am afraid, to expostulate with women on this score; the majority of them fully realize the risks, but feel, in the words of the old Scottish proverb, "As weel be oot of the world as oot o' the fashion."

FIG. 4.—A hammer-toe deformity affecting the second toe of the right foot.

Treatment of Hammer-toe.

I suggest to the patient that a simple minor operation will prove the most satisfactory, and in the long run the most rapid method of cure. But operation she will not hear of, and conservative measures must therefore be adopted. What are they to be? and what prospects do they offer of improvement or cure? Answering the latter question first, there can be no doubt that, if the case is an early one, and if efficient conservative measures are adopted and persevered in, good results are obtained. What are the efficient conservative measures? My own choice is in favour of what is termed the "cradle method."

It is carried out by means of two narrow strips of sticking-plaster, and is sufficiently illustrated in the diagram. (Fig. 5.) This procedure has great advantages: it is simple and comfortable, but, above all, the improvement which it induces is progressive, for with every step the patient takes there is a stretching of the contracted tissue and an improvement in the position of the parts. By this simple means an operation is often obviated.

There are other conservative measures, but I do not think they are so good as the "cradle." There is the insole provided with an elastic loop into which the contracted toe is inserted. It is applied inside or outside the stocking, but if the second course is chosen the stocking must be knitted so that the affected toe occupies a single compartment. Another method is the use of a light aluminium splint strapped underneath the toe and extending from its tip to the level of the metatarso-phalangeal joint. Both of these methods, however, are, in my experience, uncomfortable, and by no means so efficient as the cradle method.

If operation is adopted it is simplicity itself—a transverse incision on the dorsum of the flexor joint, excision of a wedge carrying the articular surfaces and reposition of the toe in a straight attitude, the shortened tendon being divided by tenotomy. Thereafter (and this is an important detail which is often neglected) the toe must be splinted so that ankylosis occurs at the point of excision, the splintage being provided by a narrow strip of aluminium strapped to the under surface of the toe.

As the result of the hammer-toe this patient has two troublesome corns. They are at the points of maximum pressure—on the convexity of the interphalangeal flexion deformity and on the tip of the terminal phalanx immediately below the nail. They will in all likelihood disappear when the error in position is corrected, but, in case they do not, they will yield to an application of 10 or 15 per cent. salicylic collodion, or they may be pared and excavated with a sharp knife and a covering of newskin applied. The last detail is important, for attention to it after removal of the corn will often prevent recurrence of the trouble.

HALLUX VALGUS: ITS CAUSE.

My third case is an example of an exceedingly common error. It is the hallux valgus deformity of the first metatarso-phalangeal joint, the great toe being deflected outwards so that it lies over or under the second toe (Fig. 6). The patient is a woman, and after recounting the pain and discomfort from which she is suffering because of the pressure of her shoe upon the inflamed bursa or bunion overlying the prominent head of the first metatarsal bone, she inquires as to the cause of the condition. It has been said that an undue activity of growth in the epiphysis at the base of the first metatarsal bone explains the occurrence of a certain proportion of cases. This may be so, but in the majority the cause is flat-foot, with which a hallux valgus of any degree is almost invariably accompanied. The sequence of events is probably as follows: The foot adopts an attitude of valgus error, and there come into play two influences which lead to the development of the hallux valgus deformity.

FIG. 6.—A hallux valgus deformity of the great toe.

First, as the valgus error becomes established an attempt is made to restore the balance by bringing into play the short muscles of the sole. Into the fibular side at the base of the proximal phalanx of the great toe three muscles are inserted, the two adductors (oblique and transverse) and half the flexor brevis. Their influence is to pull the toe into a valgus attitude. The abductor might have opposed this influence, but it is already weakened by the flat-foot error, and the

result is the gradual development of hallux valgus. The second influence is in relation to the shoe. As the flat-foot develops the inner portion of the shoe—the golosh and the sole waist—stretches and weakens, the foot arch falls, and the valgus error of the foot is more fully established, but the toes are fixed in the anterior part of the sole, and therefore, as the inner side of the foot falls inwards the great toe is deviated outwards, and the hallux valgus is thus more fully established. I have dealt with this question in some detail because it has an important bearing upon the treatment of the condition, and I am anxious to establish the truth of the statement that a hallux valgus does not usually develop without the accompaniment of a flat-foot error.

Treatment of Hallux Valgus.

What can I do to relieve this unfortunate patient? As it happens, the condition is not sufficiently advanced to demand operative intervention, and I accordingly concentrate my attention on conservative measures. I recommend certain alterations in the shoe, and the wearing of a remedial appliance while the patient is resting in bed. The alterations of the shoe are important, for not only do they exert a curative effect upon an early case, but they afford enormous relief to the discomfort and suffering of the individual. Here are the instructions. The shoe must be reasonably straight along its inner side. Where the prominent head of the first metatarsal would naturally impinge upon the boot upper this must be softened or even cut out to allow the insertion of a specially thin piece of material. It is wrong to allow the continuance of pressure upon the tender prominence, as this will only increase the development of the bursa and accentuate the deformity. The golosh must be strengthened by inserting a strip of strong leather from the heel across the boot or shoe waist to behind the head of the first metatarsal bone, and support is given to the longitudinal arch of the foot by inserting and cementing to the sole a rubber instep pad. These details are, of course, designed to improve the flat-foot error. Perhaps the most helpful manoeuvre of all, however, from the patient's point of view, is the attachment to the under surface of the sole of a metatarsal bar half an inch broad and a quarter of an inch in depth. It is placed, like the bars of a football boot, across the sole, immediately behind the metatarso-phalangeal joint, and it gives the most wonderful measure of relief, because it takes the body weight off the affected and painful joint.

Many other suggestions of boot alteration have been put forward, but they are not of great practical value. One (the attachment of a stud to the upper surface of the sole so that it projects between the first and second toes) may at first sight appear attractive, but those who have tried to coax the delinquent toe into its stall have realized how tantalizing and wellnigh impossible a task it is; and if they have by any chance achieved the seemingly impossible they have realized how great is the discomfort which results on attempting to walk. If any additional manoeuvre is of value, it is the provision of a specially woven stocking made like a mitten, with a special compartment for the great toe. I have heard the late Professor John Chiene recommend this procedure, and it has a certain practical value.

The time to adopt more active corrective measures is when the patient is bootless and resting, and there is upon the market an efficient appliance designed for this purpose. A light firm splint extends along the inner side of the great toe and medial border of the foot. It is secured to the toe by means of a broad elastic webbing loop, and the distal portion is fastened to the metatarsus by a broad strap and buckle. In applying the splint the toe is first inserted into the elastic loop, and the correction is then produced by placing the remainder of the splint in line with the side of the foot and securing it there by its strap and buckle.

With the question of operative intervention, should it become necessary, I do not propose to deal beyond saying that any procedure which may result in shortening the length of the longitudinal arch is bad in so far as it must weaken the foot. For this reason the

head of the metatarsal bone should not be removed. It may be sufficient to remove the prominence from the inner side of the metatarsal head, but, if something further is required to secure correction, it is better that it should concern the base of the first phalanx than the head of the metatarsus.

HALLUX RIGIDUS.

My fourth problem is a peculiarly troublesome one. The patient is a keen walker—in fact, walking is his chief exercise and recreation. You can imagine his distress when he finds that his activities are becoming seriously crippled owing to stiffness and pain in the joint of the great toe of his right foot. He has, in fact, a well-marked hallux rigidus, and it is impossible to secure any degree of dorsiflexion in the metatarso-phalangeal joint of the toe.

It may be asked why such a seemingly simple error should be so crippling in its effects. We find the answer when we analyse the process of walking. As a stride is taken the heel and the outer side of the foot make contact with the ground; the pressure is momentary, for, as the body passes forwards over the centre point of the foot the weight is transferred to the forepart of the foot, and more particularly to the prominent heads of the first and fifth metatarsal bones. As the body continues to move forwards and preparations are made for the next stride, the heel is raised off the ground, the weight is borne by the forepart of the foot immediately behind the toes, while all the toes, but particularly the great toe, flex at the metatarso-phalangeal joints, and the actual impulse which carries the body forward for the succeeding stride is, in part at least, afforded by the flexed great toe levering the body forward against the fulcrum of the ground. It is evident now how disastrous must be the consequence if the metatarso-phalangeal joint of the great toe is painful or in any measure fixed.

Etiology of Hallux Rigidus.

Invariably there comes the question, How has this arisen? Injury can be excluded in this case, though it is evident that there are instances in which a hallux rigidus may follow injury to the joint or the neighbouring bones. There has been a history of rheumatism, and this may play some part in the secondary changes of the part, but the real explanation is to be found in the statics of the foot behind the region of the joint. In the case under discussion there had been a severe influenzal illness some months preceding the development of the foot error. Walking and standing were resumed with limb muscles of a poor tone, and as a result a longitudinal flat-foot of a somewhat acute type developed. At once the line of gravity altered, and instead of passing between the heads of the second and third metatarsals it passed medially towards the line of the first metatarsal head. Excessive weight-bearing was the result, and the joint thereby affected (the first metatarso-phalangeal) suffered. The cartilage became thinned, the approximated bony surfaces were deformed and flattened, there were signs of osteo-arthritis in the shape of lipping of the joint edge, and periarticular fibrosis. The acquisition of a rigid joint was only a matter of time. In certain patients a still more distressing stage may develop, for the pain of the stiffening joint is responded to by contraction of the flexor brevis hallucis, and if this is permitted to continue it will result in a great toe fixed in plantar flexion—a hallux malleus—one of the most painful and crippling of foot errors.

It is to an underlying flat-foot that the majority of cases of hallux rigidus owe their origin, and it obvious how important is an appreciation of this point when the question of treatment comes to be considered.

Treatment of Hallux Rigidus.

What of the treatment? It is none too easy, and, paradoxically enough, in certain cases the most fruitful line of treatment is to secure complete fixation of the affected joint, for with this result pain at least disappears.

Here are some suggestions which may prove helpful. It is evident that correction of any coincident or pre-existing flat-foot is essential, and the usual steps are accordingly taken: the inside of the boot sole is raised by one-eighth

of an inch, an efficient longitudinal arch support is fitted, the golosh is strengthened, the musculature of the foot is improved by exercises and massage, and it may be that the conjunction of these various measures, in so far as they restore the statics of the foot, will relieve the hallux rigidus. Raising the heel of the boot is sometimes helpful; it seems to diminish the pain, and it maintains the toe-joint in such a position of slight dorsiflexion as to increase the comfort of walking, even if fixation should occur.

It has been recommended that the joint should be freely moved under an anaesthetic and fixed in plaster in a dorsiflexed position for a few days, thereafter ensuring a course of free, active movements. My experience with this procedure has been disappointing, for it has seemed that in a certain proportion of cases it resulted in increased discomfort. I am coming to the conclusion that a better conservative measure is to encourage fixation in the toe, a condition secured in some measure by incorporating in the boot sole, immediately underneath the loose inner sole, a strip of thin steel or duralumin extending from the middle of the instep to the interphalangeal joint of the toe. It has been my experience, however, that conservative treatment is unsatisfactory, and that there is little prospect of improvement until operative intervention has been carried out.

Of the various operative procedures the best is that which entails removal of the base of the proximal phalanx and the tacking of a flap of fascia derived from the medial aspect of the toe over the raw surface of the bone. It is certainly unwise to remove the head of the metatarsal bone, for, if this is done to an extent required to correct the joint error, the stability of the longitudinal arch, and therefore of the foot, is seriously interfered with.

"MARCH FRACTURE."

My fifth case is of interest from the point of view of recognition of an injury which is easily overlooked. The patient had been on a walking tour carrying a heavy pack, and on the last day of his tour put in a walk of unusual length over rough ground. While he was on the last mile of his journey he experienced a sudden pain on the inner aspect of the foot immediately behind the heads of the first and second metatarsal bones. He imagined he had sprained the part; walking became a very painful affair, and shortly after the front portion of his foot became considerably swollen.

When he came under my care the signs were those of severe sprain with local tenderness behind the second metatarsal head; but an x-ray examination revealed the presence of what is termed a "march fracture"—a fracture of the second metatarsal bone at that narrow portion which lies immediately behind the head (Fig. 7). The second and third metatarsals are the bones most liable to be affected, and it is supposed that the liability is related to the blood supply. Repeated spasmodic contraction of the interosseous muscles interferes with the distal blood supply of the foot, so that there is an atrophy of the second and third metatarsals at their phalangeal extremities. The necks of these bones are naturally slender structures, and the influence upon the blood supply further increases the fragility, so that one or other yields under a strain which in ordinary circumstances would have been harmless.

Once recognized, the treatment was easy. Fixation in plaster for three weeks was the plan adopted, but the importance of the case lies in the recognition of the possibility that in certain circumstances a fracture may occur in the course of such a simple exercise as walking.

"DANCING FRACTURE."

A somewhat similar experience illustrates my next case. The patient was dancing when she experienced on the outer side of her right foot a sharp pain, which she attributed to a kick from her partner. As the days went by the pain persisted and swelling appeared. What does

FIG. 7.—A "march fracture" sustained at the neck of the second metatarsal bone.

the radiogram reveal? There is a fracture at the base of the fifth metatarsal bone. (Fig. 8.) It is a mere chip off the base, and it has been produced, not by any direct violence, but by a sudden eversion of the foot and the pull of the peroneus brevis muscle. It is an example of what is appropriately called a "dancing fracture."

Here again the treatment consists in fixation of the foot until the fragment has reunited, and the interest is there-

FIG. 8.—"Dancer's fracture" of the base of the fifth metatarsal bone, sustained by sudden eversion of the foot.

fore not so much one of treatment as of the recognition of the fact that a fracture could have occurred in this somewhat indirect and oblique fashion.

KÖHLER'S DISEASE.

Tarsal scaphoiditis, or Köhler's disease, is the subject of the next case. (Fig. 9.) A boy of 7 complains of discomfort on the inner border of the right foot, and there is an evident limp in walking. Examination reveals a swelling, apparently bony in source and occupying the position of the tarsal scaphoid bone. There was an indefinite history of a slight injury some months previously, which may or may not have a bearing upon this later development.

The condition gives rise to anxiety, and in the majority of cases fears are entertained that the condition is tuberculous. We have the comforting reflection that, whether specific treatment is adopted or not, the error passes on to spontaneous cure, leaving no trace of its existence except perhaps a predisposition to the development of flat-foot.

We know very little about Köhler's disease. It is in part a mystery why it should pick out the scaphoid. Three explanations have been put forward: (1) that the scaphoid is the last bone in the foot to ossify; (2) that, being the keystone of the arch, it is concerned with a great deal of weight-bearing; and (3) that it has a double or bilobed nucleus. While these may be predisposing influences in localizing the disease, we are by no means clear as to what constitutes the change. It is on a parallel with apophysitis of the heel bone, the Osgood-Schlatter's disease of the upper epiphysis of the tibia, and an unnamed condition

FIG. 9.—Köhler's disease or tarsal scaphoiditis. The ossification of the scaphoid is reduced to a small central nucleus. The actual size of the bone is not appreciably diminished, but the cortical areas are decalcified.

of the crest of the ileum, similar in appearance and behaviour. The view generally held is that the condition proceeds from an obscure but distinctive infection, which, while not inducing pus formation, alters the texture of the bone and produces the irregular calcification distinctive of the condition. In some curious way it appears to pick out an epiphysis to which a tendon is attached.

No special treatment is required. Fixation of the foot may be an advantage, but it is not essential, and I think that the affection improves more readily if events are allowed to take their course.

SESAMOID BONES.

Accessory bones of the foot are sometimes a source of trouble and anxiety. An example of this is afforded by the following case. A man, aged 37, jumped from the top of a bank to the ground, a distance of three to four feet. There was a jar to the joint, and some pain around the ankle ensued. The condition was treated as a sprain, and no x-ray examination was at first carried out. Later, the symptoms proving intractable, an x-ray photograph was taken, but the rule of always x-raying both the affected and the healthy foot was neglected. The radiogram showed a segment of bone lying behind the astragalus, looking as though there had been a fracture of a small fragment from its posterior surface. But another radiogram, on this occasion of both feet, showed that the condition was bilateral. It was, in fact, an example of the os trigonum, a curious accessory bone of the foot which lies immediately posterior to the astragalus, and may easily be mistaken for the fragment of a fracture, particularly if there is a history of a compression injury to the bone. (Fig. 10.)

The existence of these accessory bones (sesamoids they actually are) should always be kept in mind. The most important examples are the ones I have just described—the os tibiale externum, and the peroneal sesamoid.

FIG. 10.—The os trigonum situated at the posterior border of the astragalus and giving an appearance liable to be confused with a fracture of the posterior extremity of the bone.

PATHOLOGICAL CONDITIONS OF THE HEEL.

There are certain conditions of the heel which are sometimes sources of difficulty in diagnosis. Let me briefly refer to them with illustrative cases.

Calcaneal Spur.

The first case is that of a man of 42, stout and heavy in build. He is a rheumatic subject, and this point is important in explaining the pathological condition. His complaint is intense pain on the under surface of the heel. It is chiefly noticeable when he puts weight upon the part, and may be agonizing in its intensity. On local examination there is little of importance to be seen, but pressure with a blunt point produces pain at one spot. An x-ray photograph established the condition as one of calcaneus spur or spine. (Fig. 11.)

The origin of the condition is disputed, but it is generally believed to follow a slight tearing of the periosteum on the under surface of the os calcis resulting from a dragging on the attachment of the flexor brevis digitorum muscle. Other factors probably operate—for example, undue friability of the tissue—but the real origin is apparently a local periosteal tear in an individual whose periosteum

FIG. 11.—Calcaneus spur developing in a man aged 46, and causing severe pain on the under aspect of the heel.

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

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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.