Bone and Joint Diseases

Problems in congenital dislocation of the hip

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Congenital dislocation of the hip in infancy

When congenital dislocation of the hip (CDH) is first recognised late in children over 1 year old the results of treatment are far from perfect. Even of those treated with apparent success half can be expected to have a painful hip by the age of 30.[1] The introduction of routine screening of the newborn by von Rosen,[2] Barlow,[3] and Coleman[4] raised the hope that treatment begun at birth would produce much better or even perfect results. This hope has indeed been fulfilled in that many children now born with a dislocated hip respond to a short period of splinting in infancy by developing a joint which in later childhood is clinically and radiologically indistinguishable from normal. Yet there remain difficulties, doubts, and disappointments, some of which I will examine briefly.

DIFFICULTIES IN DIAGNOSIS

The diagnostic sign at birth is elicited by separating the infant's flexed thighs and noting the jump and thud as the femoral head slips back into its socket in the midrange of abduction. In this position the upper end of the femur can be waggled to and fro in relation to the pelvis. For the test to be reliable the child must be warm, fed, and relaxed, and should be lying on a firm, flat surface. One of the examiner's hands grips the pelvis between pubis and sacrum, the other holds the upper end of the femur between thumb in front and middle finger behind, the knee being flexed in the palm. A light touch is called for: excessive medial thrust stabilises the hip and invalidates the test. It is possible to identify both the hip that is dislocated at rest but reduces with abduction and the hip that is reduced at rest but is dislocatable by backward pressure on the upper femur. Clinically unimportant lesser degrees of instability may be detected, while at the other extreme is the dislocated hip that fails to reduce on abduction. These irreducible hips are difficult to recognise for there is no jerk or thud on testing but hip abduction is restricted, commonly symmetrically as the dislocation is often bilateral. Irreducible CDH may be one of the several joint defects in arthrogryposis multiplex congenita. It also occurs in association with oligohydramnios.

A relatively high-pitched click may be elicited on manipulation of many normal hips in the newborn. It probably arises from the ligamentum teres or the psoas tendon[5] and is of no clinical importance. Limitation of hip abduction must always give rise to grave suspicion of CDH but it is occasionally seen as a benign, isolated, usually unilateral condition that resolves spontaneously over the first year of life. Radiographs will confirm the presence of frank dislocation but they are of no value in excluding potential dislocations.[6] The diagnosis of hip instability in the newborn rests firmly on careful clinical examination; examination that must be routinely repeated two or three times in the first few weeks.

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MANAGEMENT IN INFANTS

Most unstable hips respond to splinting in abduction by the rapid disappearance of all clinical abnormality. Splinting is usually advised for two to three months. For many of the children so managed, however, the treatment is probably quite unnecessary. The incidence of CDH as diagnosed late has in Britain in the past been about 1·5 per 1000 children. Surveys of the newborn have shown a much higher incidence.[7-11] Furthermore, hip instability rapidly becomes less conspicuous in the first week of life, confirming the strong tendency to spontaneous stabilisation that explains the infrequency of CDH in older children.

Perhaps as many as four out of five infants with CDH would recover without treatment. It is not only undesirable to treat the child and worry the parents without good cause but there is evidence that splinting in abduction is not entirely free from risk of damage to the femoral head epiphysis.[9 12-14] The problem is as yet unresolved for there is no reliable method of identifying at birth those hips that will stabilise without treatment, yet delay in treating the others is harmful. When splinting was applied only to those hips unstable at 3 weeks, half were still abnormal at 6 weeks.[9] When splinting was delayed more than four weeks it was then needed for up to 11 months.[15] In practice, a hip that is dislocated in the position of rest should, unless irreducible, always be immediately treated in an abduction splint. The risks arising if treatment is omitted far outweigh the distress and dangers of splinting, such as they are. With the splint applied it is prudent to obtain radiographs to confirm that the hip is still not frankly dislocated. The hip that is dislocatable but reduces spontaneously at rest probably need not be immobilised but must be followed with great care.

IRREDUCIBLE HIP

The irreducible hip in arthrogryposis is very resistant to treatment and reduction, and, if achieved, the latter is often at the price of increased hip stiffness. Without treatment these hips are relatively stable to weight-bearing, and reduction offers little functional advantage. Resistant CDH of this type is probably best left alone.

When the dislocation is not accompanied by other joint lesions and closed reduction cannot be achieved even after adductor tenotomy the problem may be approached by deferring treatment until the child is 4, 6, or even 12 months old, when the methods appropriate for older children become applicable.

These hips are also particularly difficult, and some permanent loss of motion is all too common.

FAILURE TO STABILISE

A dislocated hip in a newborn baby splinted in abduction is usually clinically stable within a few days but exceptions occur, especially in children with a family history of CDH or with pronounced joint laxity. The hip may remain dislocatable for many weeks or even several months. Careful clinical assessment of progress in all patients is therefore essential. Persistent instability needs continued treatment in abduction. Even in favourable cases radiographs should routinely be obtained one month after the removal of the splint, when the legs will lie comfortably parallel and in neutral rotation. The films should be repeated at 8 months and at 1 year and carefully examined for any sign of acetabular dysplasia or recurrent subluxation. Those hips that are clinically and radiologically normal at 1 year are very unlikely to develop any later hip disorder.[16]

CDH in older children

In spite of routine screening at birth children are still presenting with CDH when a limp is noticed as walking begins. Although several writers have reported a dramatic fall in the incidence of late-diagnosis CDH,[17 18] others have noticed no decline,[7 13 19] even with an apparently high detection rate at birth.[9] These studies are impeded by the difficulties of surveying a truly closed population, although in these days of central notification of handicapped children a national survey should not be too difficult to arrange.

Cases presenting late represent either technical failure of the examination at birth or true late dislocations developing perhaps after standing has begun. Late dislocation might arise from a shallow acetabulum of genetic origin. There is some evidence in this direction, for acetabular dysplasia is relatively more common in the parents of children with late-diagnosis CDH than in the parents of children with a dislocation diagnosed at birth.[18]

DIAGNOSIS IN THE OLDER CHILD

The classical story is of a limp in a child starting to walk rather later than normal. The classical sign is limitation of abduction of the flexed hip, although its absence does not exclude a dislocation. In unilateral cases the affected leg is short. When standing on the bad leg the opposite buttock drops (Trendelenburg's sign) and there is a simultaneous lurch of the trunk towards the affected side, more conspicuous in the adult than child. In these older children the radiological appearances are diagnostic and *x*-ray films should always be requested when there is the least suspicion of CDH.

TREATMENT IN OLDER CHILDREN

The femoral head has to be replaced in its socket and held there until stability has been achieved by acetabular growth or by operation. Although manipulative reduction by a manoeuvre similar to that practised on the newborn still has occasional support,[14] the slower method of traction and gradual abduction is generally preferred as it is associated with a much reduced risk of damage to the femoral head epiphysis.[21] Open operation is indicated when reduction is obstructed by intervening soft tissues, although the identification of such an obstruction may sometimes be a matter of difficulty or even dispute. In particular, interest has centred on the fibrocartilaginous rim of the acetabulum, the labrum, or limbus, which may obstruct from developmental error or through infolding by pressure from the dislocated femoral head. The soft tissues can be outlined by arthrography.

Some obstructions are more apparent than real. The femoral head may hesitate at the mouth of the acetabulum for a month or so before sinking deeply home. Longer delay is not acceptable. Without concentric reduction the acetabulum cannot be expected to develop normally. If there is persistent doubt about the presence of an obstruction the joint has to be explored. A limited exposure is sufficient for simple excision of an inturned limbus. In children over 3 years old a wide exploration is usually needed as reduction may be prevented not only by the limbus but by the capsule or ligamentum teres or by soft tissue in the acetabulum.[22]

ACETABULAR REDEVELOPMENT

The subsequent stability of the hip depends a little on the disappearance of capsular laxity but mostly on the redevelopment of the acetabular roof. Some of the greatest problems in the management of CDH arise from the unpredictability of acetabular development. If concentric reduction is achieved and maintained and if there is no damage to the blood supply of the femoral head satisfactory acetabular growth may reasonably be hoped for,[23] although in analysing this problem an unhelpful circular argument may all too easily arise. Just as a shallow acetabulum causes subluxation so subluxation impairs acetabular growth. It may be difficult to say which was the original sin.

While awaiting growth of the acetabulum reduction may be maintained by splinting. The "frog" plaster holds the hips in 90° abduction and 90° flexion. It undesirably prevents rotation of the femoral heads in the hip sockets and, we are learning, it threatens the blood supply to the femoral head.[20] It may be modified to avoid these criticisms or a metal and leather hip abduction splint used that allows some hip motion yet holds reduction almost as securely.

Splinting may need to continue for a year or more. Alternatively, the femoral head may be stabilised in the acetabulum by full internal rotation and only 30° abduction, as is achieved by the Batchelor plaster. In older children the femoral neck points much more forwards than usual in relation to the lower part of the leg, the anteversion sometimes approaching 90°. Internal rotation of the leg brings the femoral head back into its socket, although prolonged immobilisation in this position may itself cause further femoral torsion. The most appropriate method for a particular hip is decided by clinical and *x*-ray examination in the two positions, the trend being to reserve the frog plaster for the younger child.[20]

ROTATION OSTEOTOMY OF THE FEMUR

If reduction is stable with the leg in full internal rotation it is simple to divide the femur in the subtrochanteric region and externally rotate the lower fragment so as to bring the leg to the neutral position. Once the osteotomy is united the hip will maintain its stability free of all splints. This technique can dramatically shorten the duration of treatment.[24] Uncorrected anteversion causes subluxation and retards growth of the acetabulum. Rotation osteotomy is often indicated in older children. When the femoral neck is more vertically disposed than normal a varus correction may be introduced at the same time.

PELVIC OSTEOTOMY

The socket of the acetabulum may be tilted outwards, downwards, and forwards by a transverse osteotomy of the pelvic bone a little above the hip joint. This operation immediately improves the cover of the femoral head in the weight-bearing position, improving stability in the position of function.[25] Both femoral and pelvic osteotomy reduce the need for prolonged immobilisation. They encourage early return to normal function

and hence make greatest use of skeletal growth potential. Pelvic osteotomy is of no value except after central reduction of the hip. Opinions differ on the precise indications[14 26] but generally it is most applicable to late or complicated cases.

PERSISTENT ACETABULAR DYSPLASIA

Shallowness of the acetabulum too pronounced for correction to be expected from normal growth may be genetic but more often it occurs when late or ineffective treatment has missed the growth potential of early childhood. Such dysplasia accounts for most of the failures of present treatment.

It is these shallow hips that hurt in early adult life. Salvage is sometimes possible by surgery, the roof of the acetabulum being enhanced by an osteotomy or bony shelf.[27-31] These operations will rarely produce a normal radiographic appearance but they may improve stability, prevent shortening, and delay painful arthritis.

ISCHAEMIA OF THE FEMORAL HEAD

The second major cause of late failure is deformation of the femoral head from transitory ischaemia, a disaster nearly always attributable to the treatment. Gentle techniques reduce the risk, while it is increased when treatment is started late, by manipulative reduction, and by the use of the full frog position.[32] Open reduction offers less threat to the epiphysis than persistence with forceful closed methods.

The effects of the circulatory disturbance range from a passing irregularity of the *x*-ray appearances to complete infarction and collapse similar to the changes in severe Perthes's disease. Containment of the femoral head within the acetabulum during the active phase may do something to mitigate the damage.

Congenital hip dislocation in adolescents and adults

In unilateral dislocation reduction is certainly worth attempting up to the age of 6 and also perhaps in older children who present with a well-formed acetabulum. Beyond that age reduction is not likely to succeed because of the intrinsic difficulties and the unsatisfactory state of the acetabulum. Up to the age of 10 or 12 the acetabulum may be deepened surgically to receive the capsule-covered femoral head, a capsular arthroplasty that improves stability at the price of some loss of motion.[33] The operation facilitates later arthrodesis or prosthetic replacement of the hip. Bilateral capsular arthroplasty is not very helpful because of the hip stiffness.

Children with bilateral CDH presenting over 6 years old are probably best left untreated. Untreated CDH in the adult is rarely very painful but when pain is a problem arthrodesis can give a strong, durable, pain-free joint.[34] Fusion cannot be applied to bilateral cases. Replacement arthroplasty cannot at present relieve the problem because of the difficulty in providing adequate bony support for the prosthetic acetabulum.

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ONE HUNDRED YEARS AGO With regard to the *digestive organs*, there can be no doubt that the functional disturbances are much more frequent in females. I endeavoured to point out many of the causes for this in my last lecture. Neuroses of all parts abound: dyspepsia, gastrodynia, vomiting, spasmodic contraction of the intestines, colic, consciousness of the peristaltic action, imperfect function rendering them liable to constipation, impacted faeces, etc, tending to haemorrhoids.

The majority of these troubles in women are the outcome of a general depression of the vital force, or the effect of reflex irritation from other parts, or most commonly dependent on both, each of which reacts on the other. Hence to treat these cases as local disorders, as, for instance, the dyspepsia by stomachic medicine, without also attending to the causes, is unscientific; so also to endeavour to relieve the constipation by simple purgatives, and the colic by antispasmodics only.

Women, as a rule, rather underfeed themselves habitually, or eat unnourishing food; and thus gradually arrive to a state of general atresia, more or less marked; and this is a fruitful source of functional disturbance. There are many reasons for this: carelessness, want of healthful exercise to give appetite; reflex irritations giving rise to more or less constant nausea. A common cause exists in the fact that, having to look after her own food, having but little desire for it, or having nausea, she does not take trouble to get it; or, in our English mode of living, having to carve for a large family, she does not help herself till the food is cold and not inviting. It is fortunate, then, if she do not seek to replace the solid food by stimulants. I have known very many cases of alcoholism produced by the constant nausea consequent on uterine disturbances. One case occurs to me, where a young married woman had adopted this habit from the constant and intense nausea and vomiting during pregnancy, and from the same thing upon every menstrual period. This nausea was most distressing, with utter loathing of food and prostration upon the slightest uterine disturbance, and she found that stimulants relieved it.

In men, these functional disturbances are more rare; but, amongst those engaged in the restless and anxious business of the world, they are generally of the forms most common in women. However, a considerable number of men, also some women, suffer from the effects of gross feeding and from the too free use of stimulants, coupled with want of exercise; the treatment of these latter, therefore, with general tonics is not so much indicated, as the reduction to simple food and healthful exercise, with such correction of symptoms as the case may require. (*British Medical Journal*, 1877.)