PROBLEMS IN THE EARLY RECOGNITION OF HIP DYSPLASIA

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Ten children who had clinically stable hips at birth were radiographed at one month because they had factors predisposing to hip dislocation. In all cases one or both hips gave rise to a suspicion of dysplasia, though clinical abnormalities were slow to appear. Four of these hips subsequently dislocated. We believe that infants with late presentation of acetabular dysplasia and clinical abnormality belong to a different aetiological group from those with neonatal instability due to ligamentous laxity. The significance of this differentiation is that some infants presenting late have only recently dislocated, and the diagnosis has not necessarily been "missed" at neonatal examination.

The routine examination of the hips of newborn babies has been an established practice in the United Kingdom for many years, but the late presentation of dislocated and dysplastic hips still occurs (Mitchell 1972; Williamson 1972; MacKenzie and Wilson 1981; Tredwell and Bell 1981). It is uncertain in these cases whether the diagnosis was missed at birth, or whether late changes lead to dysplasia and dislocation in a once normal hip.

Walker (1971) reported seven children, normal to examination at birth, who presented later with dislocation. Tredwell and Bell (1981), from their series of 34480 newborn babies, reported five infants who had been clinically normal at birth and presented later with acetabular dysplasia and adduction contracture. Wynnedavies (1970) noted differences between groups of infants diagnosed early as having dislocation and those presenting later. She showed that the close relatives of babies with neonatal dislocation had a high incidence of joint laxity, while the families of late-presenting patients had a high incidence of acetabular dysplasia. It is our belief that there are two overlapping aetiological types of hip dislocation, one group with joint laxity and another with acetabular dysplasia; both have a genetic background. There is as yet little firm evidence to support this concept.

In this paper we report 10 infants who had clinically stable hips at birth and subsequently developed evidence of acetabular dysplasia, some of them even proceeding to complete dislocation.

MATERIAL AND METHODS

All the infants reported in this paper were examined shortly after birth by junior medical staff and again examined by the senior author (GW) after a few days. No hip instability was demonstrated in any baby, but all were kept under review because of indications such as: a positive family history, breech presentation or delivery, the presence of a calcaneovalgus foot, or a hip click at the first examination.

In this group of patients none had the definite clunk of instability at the screening examination. When the infants were reviewed at about one month, all the hips were clinically normal, but radiography showed some suggestion of dysplasia. Review continued and some of the hips remained clinically normal for many months, despite continuing and sometimes increasing radiographic evidence of abnormality. All infants eventually required active treatment for one or both hips.

The interpretation of early radiographs is controversial. Bertol, Macnicol and Mitchell (1982) described a method which they believe allows consistent prediction, but it is applicable only to neonatal radiographs. An acetabular angle in excess of 20° is probably abnormal in an older child, but the standards of normality are less reliable in the very young (Lloyd-Roberts 1978) and 30° is probably a more realistic figure. Shenton's line also may be of value in assessment. Unfortunately all such measurements are inaccurate in the presence of pelvic rotation and truly symmetrical films are difficult to obtain without repeated examination and excessive irradiation. Many of the radiographs presented in the case reports are of inadequate quality for precise measurements and often there is only an indefinable impression that a hip is substandard.
**Case 1.** This baby girl had a possible minor click in the RIGHT hip at birth but clinical examination by GW a few days later was normal. At six weeks both hips were still clinically normal but the radiograph (Fig. 1) showed an increased acetabular angle and a broken Shenton's line on the LEFT.

At four months she remained clinically normal but the film still suggested dysplasia of the LEFT hip (Fig. 2) although the pelvis was rotated. Clinical examination at six months showed 15° loss of abduction in flexion on the LEFT and the radiograph (Fig. 3) revealed a dislocated LEFT hip.

This infant's hips were normal to clinical examination at a few days, at one month and at four months; but one was dislocated two months later.

**Case 2.** This baby girl was born by breech delivery, but clinical examination at six days was normal. The hips remained normal at one month but the radiograph suggested dysplasia (Fig. 4). The LEFT femur appeared to stand away from the pelvis and the acetabular angle may have been increased. The quality of the film was poor but the radiographic signs were sufficient to cause concern.

On re-examination at four months a 10° adduction contracture had developed on the LEFT. The radiograph (Fig. 5) showed increased evidence of dysplasia. The LEFT hip was dislocated and was shown to be unstable during the application of an abduction plaster under anaesthesia.
Case 3. This baby girl had a special examination at 11 days because her sister had a congenitally dislocated hip. The hips were found to be clinically normal. On review at one month the hips remained clinically normal but the radiograph (Fig. 6), although rotated, suggested mild dysplasia on the LEFT side. At four months the child had 20° loss of abduction in flexion on the LEFT and the film (Fig. 7) showed dysplasia with dislocation. This was confirmed by instability on examination under anaesthesia.

Case 4. This baby girl had a possible click at birth, but both hips were normal to examination at two days. At one month they remained clinically normal but the radiograph (Fig. 8) caused concern about the RIGHT hip and suspicion of changes on the LEFT. At the age of four months the child remained clinically normal but the hips were considered to be radiologically abnormal (Fig. 9), even when allowance was made for the slight pelvic rotation.

Case 5. This baby girl, not initially seen by us, was considered to have a possible click at birth, but the case notes did not specify on which side. On review at two weeks clinical examination of the hips was normal. The hips remained clinically normal at four months but the radiograph (Fig. 10), despite rotation, suggested that all was not well with the LEFT hip. At seven months the child was referred to Queen Mary's Hospital for Children with 10° loss of abduction in flexion of the LEFT hip. The film (Fig. 11) showed dysplasia of the LEFT hip with dislocation.
Case 6. This baby girl was screened at birth, but not examined by the senior author until she was five weeks of age. Her hips had been apparently normal at birth and she was referred because of a calcaneovalgus deformity of the RIGHT foot.

At five weeks both hips were clinically normal but the radiograph showed an unsatisfactory RIGHT hip (Fig. 12). The hips remained clinically normal at four months but there was a suggestion of dysplasia on the RIGHT (Fig. 13). At six months both hips had lost 20° of abduction in flexion and the radiograph (Fig. 14) still showed mild dysplasia, though this was not as severe as the change in clinical signs might have suggested.

Case 7. The seventh female in this series had a calcaneovalgus deformity of the RIGHT foot. Clinical examination of the hips at one week and at six weeks was normal. The radiograph (Fig. 15) at six weeks, which was reasonably well centred, showed that both acetabula were shelving and that Shenton's line was broken on the LEFT.

By four months a 10° adduction contracture had developed on the LEFT and the radiograph (Fig. 16) confirmed dysplasia. The patient was treated in an abduction harness and there was an excellent result at five years (Fig. 17).
Case 8. This baby was specially examined because her sister had a congenital dislocation of the hip. The patient’s hips were clinically normal at 10 days. Clinical examination was again normal at one month, but the radiograph (Fig. 18) suggested that the RIGHT hip could be dysplastic. At four months the hips were still clinically normal but the radiograph (Fig. 19) remained marginally abnormal on the RIGHT side.

Case 9. The only baby boy in this series had a possible click in the LEFT hip at birth, but at three days no abnormality was found. At one month clinical examination was still normal. The radiograph (Fig. 20) was regarded at that time as normal and the patient was discharged. In retrospect, the RIGHT hip rouses suspicion despite pelvic rotation and the windswept position of the legs. The patient was seen again at 17 months with a limp and 50° loss of abduction in flexion of the RIGHT hip. The radiograph (Fig. 21) showed that the LEFT hip, which was originally suspect, was normal, and the RIGHT hip was dislocated.

Case 10. This baby girl had a possible click on the LEFT side at birth, but both hips were clinically normal at three days.

She remained clinically normal at six weeks but the radiograph (Fig. 22) showed grossly abnormal acetabular angles of 44° and possible breaks in Shenton’s lines. Treatment did not await the development of clinical signs but was commenced immediately.
DISCUSSION

Reviews of neonatal screening programmes often refer to infants who are diagnosed late as "missed dislocations". This may sometimes be true, but there is a growing consensus of opinion that not all cases have the same aetiology and natural history. Those diagnosed early have a high incidence of ligamentous laxity in the family, whereas the families of late presenters have a high incidence of acetabular dysplasia (Wynne-Davies 1970). Both types appear to have some genetic determination. Other evidence is circumstantial or controversial. Tredwell and Bell (1981) refer to five children who presented late with acetabular dysplasia and adduction contracture, none of whom had dislocated hips.

We present 10 children who had various factors predisposing to dislocation, but whose hips were stable at birth. Early radiological examination led to some suspicion of abnormality, but clinical signs did not develop for several months. Four hips eventually dislocated. We suspect that, but for other grounds for continuing observation, the hip problems of these infants would not have been recognised until they were much older. We believe that clinical examination for stability in the neonatal period does not, on its own, provide adequate screening.

It could be suggested that the decision to treat these patients should depend upon radiological rather than clinical indications. The difficulty of obtaining good radiographs and the problem of their interpretation may make it desirable to await the presence of positive clinical signs before treatment is started.

Even when both clinical and radiological signs are positive it is not possible to be certain that the hips will deteriorate, possibly to the point of dislocation. Our final history (Case 11) illustrates this problem. A nine-month-old girl was referred with 20° loss of abduction in flexion of the left hip. The radiograph showed dysplasia of this hip (Fig. 23). In the process of referral, she was lost to follow-up and not traced for seven months. At 16 months her hips were clinically unchanged, but the radiograph showed significant improvement despite lack of treatment (Fig. 24). Thus, there is evidence that although some dysplastic hips may develop late dislocation, others can develop normally. It is therefore important to distinguish these two types to avoid unnecessary treatment.

Conclusions. Dysplastic hips in babies and infants may escape early clinical detection and yet develop dislocation. Radiographs may arouse suspicion even when the hips are clinically normal. Late presentation of abnormality or dislocation is probably seen in a mixed group comprising both missed cases of true congenital dislocation associated with ligamentous laxity, and late dislocation secondary to acetabular dysplasia. All infants with risk factors should have repeated clinical examination and mandatory radiographs. Hips which are stable at birth will NOT necessarily develop normally and, in the risk factor group, repeated examination is essential. After the neonatal period loss of abduction in flexion is the most important clinical sign. It is not yet possible to determine the prognosis of radiologically dysplastic hips in infancy. Some will deteriorate and therefore require treatment; many will recover spontaneously.

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REFERENCES