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Late diagnosis in congenital dislocation of the hip

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In 1966–1975, congenital dislocation of the hip was diagnosed after the neonatal period in 115 children in Uusimaa county in southern Finland; the incidence was 0.76 per thousand liveborns. No decreasing tendency could be seen during the time of the investigation. In most children, the diagnosis was made during the first medical examination at the child welfare clinic at the average age of 3 months. The number of children diagnosed at walking age seemed to be decreasing. The numbers of boys and bilateral affections were smaller in this group than among cases diagnosed during the neonatal period.

Dislocation was suspected in 23 per cent of the children even before the diagnosis was made. The reasons for the delay are given and discussed. In 1981, 66 per cent of the children were symptomless and no radiographic signs could be seen. Sixteen per cent of the children had minor residual signs with no need for follow-up, and in 18 per cent the outcome was still unclear.

Before the development of modern diagnostic methods, congenital dislocation of the hip (CDH) was usually not detected until walking age. The main sympton was limping. At that time, "early" diagnosis meant one made before walking age and the borderline was clear. Nowadays, the boundary between "early" and "late" diagnosis seems to be quite arbitrary and to depend only on the individual investigator (Heikkilä 1984). In most Scandinavian studies, the limit has been the age of 1 month (neonatal age).

The true nature of the late-diagnosis CDH is still unclear. The pioneers of early diagnosis and treatment were generally of the opinion that the condition was congenital and that all cases ought to be detected soon after birth (Andrén 1961). On the other hand, it has recently been suggested that the dislocation may not develop until after birth (Siguda 1980). Ilfeld & Westin (1980) contended that late-diagnosis CDH is a separate clinical entity. Galasko et al. (1980) stated that there was no evidence that CDH could appear after birth. Mendes & Roffman (1980) held the view that CDH is not only a congenital but also a postnatal phenomenon.

There can be several reasons for the appearance of the late-diagnosis cases.

- The hips were not examined soon after birth (David et al. 1983).
- The wrong technique was used in the examination, there was lack of experience, or attention was distracted by other things (James 1972).
- The dislocation test did not work (Williamson 1972).
- The dislocation was not present at birth but developed later (Bjerkreim 1974).

The creation of an organisation capable of detecting all CDH cases soon after birth has been a great problem. The effectiveness of early diagnosis can be considered as one parameter of medical standards.

The object of the present study was to investigate the following topics: 1. The incidence of late-diagnosis CDH. 2. The characteristics of

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patients at birth compared with those of patients diagnosed at the neonatal age. 3. The age at which the diagnosis was made. 4. Reasons for the delay in diagnosis. 5. Treatment. 6. Complications. 7. Results.

Patients and methods

The incidence of CDH in Uusimaa county in southern Finland was investigated during the years 1966 through 1975 (Heikkilä 1984). The diagnosis was considered "late", if it was made after the neonatal period. All the patients were treated in one of three hospitals: University Children's Hospital, Aurora Municipal Hospital or the Orthopaedic Hospital of the Invalid Foundation, all located in Helsinki. All available information was extracted from the hospital records and all radiographs were examined up to 1981. Patients whose control visits were completed were recontacted and called for further control if any symptoms were present. Ninety-one per cent of the patients could be contacted.

The result was considered good if the patient had neither clinical symptoms nor radiological signs.

Results

Incidence and birth characteristics

During the period of the present survey the total number of live-births in Uusimaa county was 151 924. All newborns were examined by a paediatrician. This examination should include the hips. The total number of patients with CDH was 1035. In 115 infants (11 per cent), the diagnosis was made after the neonatal period: 0.76 per thousand live-borns. Eleven of the patients were boys and 104 were girls (Table 1). Sixty-three girls and six boys were first-borns. Sixteen girls and three boys were born in breech presentation, giving a total of 17 per cent.

A positive family history was found in eight patients and associated calcaneovalgus feet in 20 patients. The left side was affected in 46, the right side in 60, and both sides in nine infants. The mean birth weight was 3442 g in boys and 3338 g in girls.

Table 1. The annual incidence and sex distribution in late-diagnosed CDH

Year	Live-borns no.	Girls no.	Boys no.	Per thousand live-borns	Per cent of total CDH
1966	16 679	18	1	1.14	13
1967	16 748	4	0	0.24	3
1968	16 142	10	1	0.68	13
1969	14 511	11	2	0.90	14
1970	14 465	9	0	0.62	9
1971	14 216	7	0	0.49	6
1972	13 896	10	2	0.86	10
1973	13 667	6	1	0.51	10
1974	15 488	15	2	1.10	16
1975	16 112	14	2	0.99	19
Total	151 924	104	11	0.76	11

Table 2. Reasons for the delay after the first suspicion of CDH

	No.
Registrar considered the hips normal	8
Confidence in a negative radiograph	6
No measures taken in spite of suspicion	5
Welfare clinic decided only on follow-up	3
Consultant considered the hips normal	2
Parents gave up proposed treatment	1
Maternity hospital proposed only follow-up	1
Parents abroad	1
Total	27

Detection

A dislocation of the hip was suspected in 27 infants (23 per cent) before the diagnosis was made. In 15 patients, the suspicion arose at the maternity hospital and in eight patients at the child welfare clinic. A private paediatrician suspected CDH twice, and the day nursery and a registrar in paediatric surgery both once (Table 2).

Ten of the patients had been admitted to the hospital for some other reason, but CDH was not diagnosed. In addition, six children had visited a paediatrician and three a surgeon at the outpatient department for some other reason, but CDH had remained undiagnosed. Table 3 presents the institutions where the suspicion of CDH led to further measures and, in addition, the symptom that attracted attention. One dislocation was discovered by accident during urography.

Table 3. Institution where the suspicion of CDH arose and the symptom which aroused attention

	Home	Day nursery	Welfare clinic	Hospital	Private	Total
Positive Ortolani sign	0	0	21	4	3	28
Limited abduction	4	0	20	4	0	28
Asymmetric folds	4	1	11	0	0	16
Uncommon position	11	0	5	0	0	16
Limping	12	0	2	0	0	14
Shortened femur	3	0	7	2	0	12
By accident	0	0	0	1	0	1
Total	34	1	66	11	3	115

Table 4. Age at the beginning of the treatment of CDH

Age months	Girls no.	Boys no.
1	7	2
2	10	1
3	21	7
4	17	0
5	10	1
6	6	
7	4	
8	1	
9	0	
10	2	
11	0	
12	2	
13–	14	
Total	104	11

Age

The mean age of the patients at the beginning of treatment was 6.3 months, corresponding to the delay in making the diagnosis (Table 4). During the first 5-year period, 1966–1970, ten of the 56 patients were older than 1 year when the diagnosis was made. During the latter period, 1971–1975, only four of the 59 patients were older than 1 year.

Treatment

Eleven patients were treated only with the same abduction pillow, which at that time was used in the neonatal group. Their diagnosis was made at 10.2 (6–15) weeks. The duration of the pillowing was 16 (12–22) weeks. All these patients healed well without complications and the final result was good.

Five children were treated primarily in a plaster cast and the remaining 99 patients with traction before casting. The length of immobilisation in the plaster cast was 22 (8–37) weeks. After removal of the plaster, a Denis Browne abduction splint was used on 88 patients, on average for 12 weeks. Traction plus casting was unsuccessful in six cases, and operative reduction was needed.

Results and complications

Total avascular necrosis of the epiphysis of the femoral head developed in 26 girls and two boys. Partial necrosis developed in six girls. In the evaluation of the alterations, the criteria of Salter et al. (1969) and Gage & Winter (1972) were used.

In 1981, the final result in 76 cases (66 per cent) was considered both clinically and radiographically good. Some residual symptoms or signs were found in 18 patients, but further control visits were considered unnecessary. Two of these children complained of pain during excercise. Hip rotations were deficient in two patients. Other signs were radiographic: a broad and short femoral neck was found in nine cases, acetabular dysplasia in six, varus deformity in five, valgus deformity in three and structural irregularity in one case. In all, there were 24 radiographic abnormalities in 14 patients.

Discussion

In the enthusiasm generated by the modern methods of examination, it was thought that

the whole problem of late-diagnosis CDH could be eradicated. The results have been excellent in Malmö, Sweden, where delayed cases were found in only 0.07 per thousand live-borns (Fredensborg 1976), and in Edinburgh, where the rate was 0.13 per thousand (Mitchell 1972). Less encouraging results have also been reported: 1.11 per thousand (MacKenzie & Wilson 1981), 1.14 per thousand (Williamson 1972), and 2.2 per thousand (Bjerkreim 1974). Palmén (1980) reported an incidence of 0.55 per thousand live-borns for Sweden as a whole.

Back in the days when CDH was diagnosed at walking age, it was estimated that the CDH rate in Finland was about 1.0 per thousand live-borns (Laurent 1954). The total incidence of late-diagnosis CDH in the present investigation was 0.76 per thousand. Provided that CDH exists at birth and that the estimate of 1.0 per thousand live-borns for persistent dislocation is reliable, this means that only one quarter of the cases that were to develop persistent dislocation were detected soon after birth (37 out of 152). To heal these 37 patients, 920 were treated for instability at birth.

The annual range in the present study was wide and no decreasing tendency could be seen. The percentage of delayed cases in relation to neonatal cases did not show a diminishing tendency, either. Possible explanations for this are: 1. The training of those carrying out the first examination, the paediatricians, has not made progress, and/or 2. Certain CDH cases do not exist at birth but develop later. The first explanation seems more plausible. In our opinion the examination should be concentrated in fewer hands, if possible: "Lack of regular practice is responsible for many missed cases" (Dunn & O'Riordan 1981).

An encouraging observation made in the present study was that the number of patients diagnosed at walking age was quite small and seemed to be diminishing. The role of the children's welfare clinics in this respect must have been decisive. The same observation has also been made by Cyvin (1977).

The number of boys and bilateral dislocations in the late-diagnosis group was small compared with the neonatal group, where 21 per cent of the patients were boys and 36 per cent had bilateral affection (Heikkilä 1984). The differences were significant ($p < 0.01$). This indicates that the severity of the condition in the initially bilateral cases is not similar on both sides. The better side heals spontaneously during the delay. Likewise, boys are less severely affected than girls, and a greater percentage of the former heal spontaneously. Palmén (1980) made the same observation, whereas Bjerkreim & Årseth (1978) and Cyvin (1977) reported a larger number of boys in their late-diagnosis patients: 20 and 36 per cent, respectively.

The results did not differ significantly from the neonatal group as regards first-borns, breech-borns, positive family history or the birth-weight of the boys. This is in agreement with other studies, except Bjerkreim's report (1974) in which breech-borns accounted for only 7 per cent of his late-diagnosis material. The mean birth-weight of the girls differed from the neonate girls. Cyvin (1977) took the view that this difference is due to the difference in the length of the gestational period between the neonate and the late-diagnosis girls.

In contrast to the neonate girls, no seasonal variation could be found in the present study. Associated calcaneovalgus feet were found in this group more often than among the neonates. This observation has also been made by Paterson (1975).

The mean age at diagnosis in the present study was low compared with many others, e.g. 27 months reported by David et al. (1983); the peak occurred at the age of 3 months in both boys and girls. This, again, indicates that the child welfare clinic system functions satisfactorily with the first medical examination taking place at 3 months. The main symptom was limited abduction of the hip. This is in agreement with other studies. In one fourth of the patients, the suspicion of CDH had arisen at home, but since the parents did not know about CDH and its symptoms, their complaint was often quite indefinite: "peculiar position of the lower extremity or the trunk", etc.

In one fourth of the cases in this study, the hip defect was suspected but, for one reason or another, there was a delay in making the diagnosis. The most important reasons for the delay that could be eliminated were: 1. Trusting

in a negative radiograph. 2. No measurements in spite of suspicion. 3. Follow-up without treatment.

Conclusions and recommendations

- Modern methods have not eliminated the problem of late-diagnosis CDH.
- The training of paediatricians and surgeons treating patients with CDH is extremely important.
- The hips must be examined with adequate techniques at every visit to the welfare clinic or hospital.
- Every suspicion of CDH must be taken seriously. This includes the parents' complaints of some peculiarity in their child's lower extremities.
- Non-operative treatment is usually successful. The prognosis is good in the majority of cases.

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