Acta Orthop Scand 55, 125–129, 1984

Congenital dislocation of the hip in Finland

An epidemiologic analysis of 1035 cases

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The incidence of congenital dislocation of the hip (CDH) and some birth characteristics of the population in Uusimaa county in southern Finland were investigated during the years 1966 through 1975. A total of 1035 babies with CDH was born during the time under review. This was 0.68 per cent of liveborns in the area. In 920 babies, the diagnosis was made during the first month of life, corresponding to 0.61 per cent of liveborns and 89 per cent of all children with CDH. The annual variation was great. The monthly variation of CDH in girls was significant, with a peak in June–July, differing from other investigations. Contrary to results of several other studies, the birth weight of the affected babies was normal. The sex distribution, number of first-born babies, side of the dislocation and associated calcaneovalgus foot were in accordance with findings in most other investigations.

Key words: birth characteristics; congenital dislocation of the hip; incidence; neonatal.

In Scandinavia, systematic hip examination in newborns was started by Palmén in 1950; his first report was published in 1953. In Finland, the method was described by Laurent in 1954.

Before the adoption of the examination and treatment of newborns, the diagnosis of CDH was not usually made until walking age. In the materials published at that time, the incidence of CDH was about the same in all Scandinavian countries: in Finland it was 1.0 per mille (Laurent 1953), in Norway 1.2 per mille (Getz 1955) and in Sweden 0.9 per mille (Severin 1956).

The results concerning the incidence of CDH after the adoption of early diagnosis and treatment vary considerably. The time lag between birth and the first examination seems to be important (Barlow 1966). The criteria for CDH vary in different studies, and some materials include patients with a dislocation secondary to other diseases. A very unclearly defined condition is hip dysplasia. The borderline between normal and abnormal is difficult to define in young infants, and the normal range is wide. Even in a normal child the size of the ossified nucleus of the femoral head may differ from one side to the other (Pettersson & Theander 1979).

The purpose of the present study was to investigate the following topics concerning CDH: total and neonatal incidence, yearly and monthly variations, family history, sex distribution, side of the dislocation, presentation at birth, birth order, birth weight and incidence of associated calcaneovalgus feet.

Patients and methods

The region covered by the investigation, the Uusimaa county, is a clearly defined area, for which the number of inhabitants and the number of births are available from the official annual statistics of the Central Statistical Office of Finland. In 1966, the total population of Finland was 4.5 million and that of Uusimaa 0.9 million (20 per cent). In 1975, the total population was 4.7 million and that of Uusimaa 1.1 million (23 per cent). The material was collected from all hospitals including maternity wards. In this district there were no home deliveries. Only patients resident in Uusimaa were included.

Almost without exception, the first hip examination was carried out in hospital by a pediatrician. All infants suspected of having CDH were sent to the University Children's Hospital or to the Aurora Municipal Hospital, both located in Helsinki. Some children with late-diagnosed CDH were treated in the

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All information available on the CDH patients born in 1966–1975 was collected. To include the late-diagnosed cases as well, the records were searched up to 1980. The investigation included all children with a dislocation or a subluxation of the hip. Patients with an uncertain diagnosis, those with a limited abduction without CDH, and patients whose hip disorder was part of a neurological condition such as spina bifida, or a common disorder like arthrogryposis or congenital muscular dystrophy were excluded.

The diagnosis was considered "late" if it was made after the age of 1 month.

Results

Incidence. The number of live-borns in Uusimaa during the 10-year period 1966–1975 was 151 924. The total number of patients with CDH was 1035 or 0.68 per cent of the live-borns (Figure 1). The annual range was 74–144 (0.54–0.86 per cent). In 920 infants or 0.61 per cent of live-borns and 88.9 per cent of the total number of CDH cases, the diagnosis was made during the first month of life. The annual variation in this group was 67–124 (0.49–0.75 per cent of live-borns).

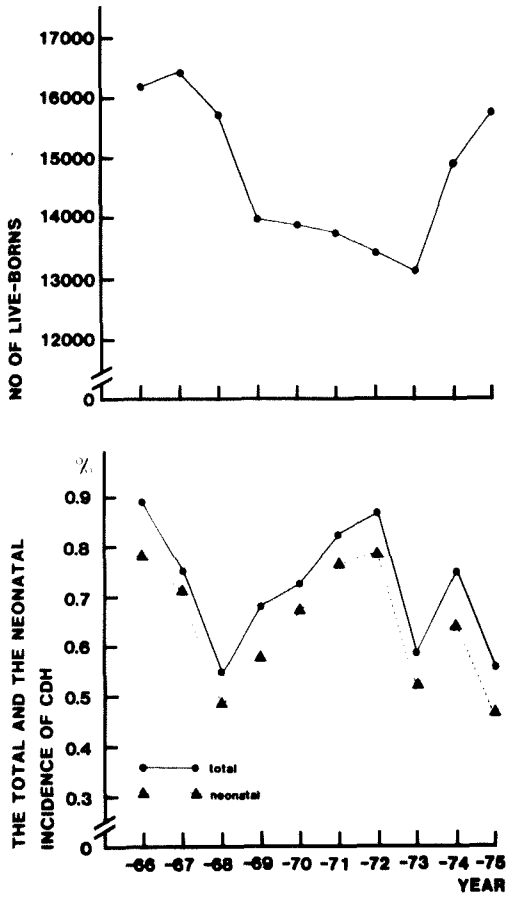

Figure 1. The annual incidence of total and neonatal CDH and the annual variation of live-borns.

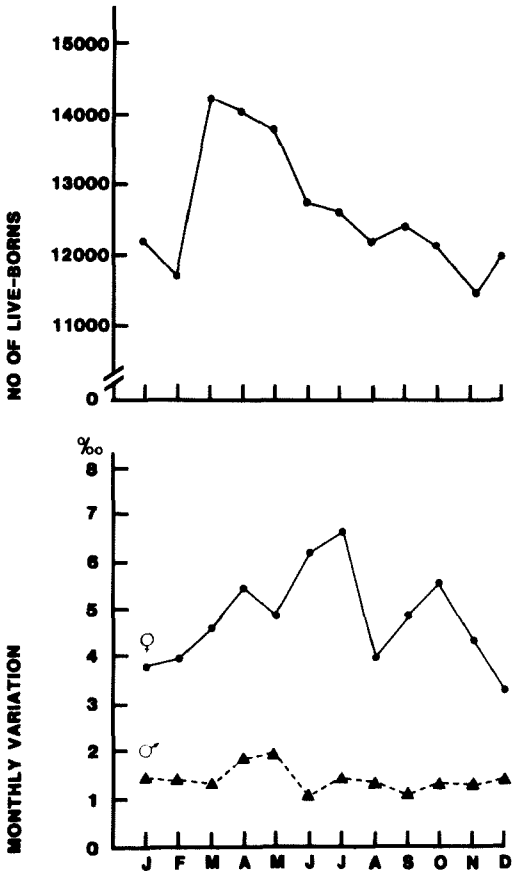

Figure 2. The monthly variation of live-borns and CDH patients during 1966–1975.

Seasonal variation. The highest birth rates during 1966–1975 were in March–April. Most of the CDH patients were born in June–July (Figure 2) with this peak being significant in neonate girls but not in boys.

Heredity. A positive family history was found in 5.6 per cent, with an annual range of 1.4–10.3 per cent.

Table 1. The annual number and sex distribution of the CDH patients

Year	Boys (no.)	Girls (no.)	Total (no.)
1966	19	125	144
1967	28	90	118
1968	21	63	84
1969	15	78	93
1970	18	82	100
1971	24	87	111
1972	26	90	116
1973	15	59	74
1974	24	86	110
1975	18	67	85
Total	208	827	1035

Sex. The number of girls was about four times higher than that of boys (Table 1).

Side. In the whole material there were 225 dislocations on the right side, 468 on the left side and 342 bilateral dislocations. Of the neonate children, 179 dislocations were on the right side and 408 on the left side, while 333 were bilateral.

Presentation. In the total material, 197 infants were born in breech presentation with an annual range of 13.6–27.0 per cent. In the neonatal group there were 178 breech-born babies. The normal rate of breech deliveries in Finland is 3.5 per cent.

Birth order. There was a total of 655 first-born babies with an annual range of 48–83 (58–68 per cent). In the neonatal group the corresponding number was 585. The proportion of second-born children in this material was 26 per cent, and that of third-born children 9 per cent. During the period under review the proportion of first deliveries in Uusimaa was 55 per cent, of second deliveries 31 per cent, and of third deliveries 12 per cent. The differences are significant.

Birth weight. The mean birth weight in the total material was 3582 g with an annual range of 3398 g–3672 g. In neonate girls the range was 3342–3355 g and the mean 3479 g. In neonate boys the annual variation was 3364 g–3819 g and the mean 3607 g.

Associated calcaneovalgus foot. The number of calcaneovalgus feet was analyzed because of its common occurrence in connection with CDH. The total number was 81 (7.8 per cent). In the neonatal group the number was 61.

Discussion

The great variation in the frequency of CDH in different studies may be caused by several factors. The experience of the examiner helps to detect even the difficult cases but overdiagnosis is common (Fredensborg 1976a). The standard of the examiners varies to some extent. In our experience many babies falling within Finlay group A 3 (Finlay et al. 1967) are recommended for treatment. These children have normal hips, but in abduction a "click" of ligamentous origin can be heard. Such patients have certainly been included in various materials, but it is difficult to estimate their number.

The frequency of CDH in the present material is lower than in most Scandinavian studies, where it varies between 8.0 per mille and 19 per mille (Bjerkreim 1974, Fredensborg 1976b, Parvinen 1972, Almby & Rehnberg 1977, Cyvin 1977). In England, Jones (1977) reported an incidence of only 2.6 per mille. In his material 50 per cent of the babies were born at home or in nursing homes. In Scotland, MacKenzie & Wilson (1981) had a high figure, 28.4 per mille, in spite of waiting until 1 month's age before starting the treatment. The frequency figures presented by several authors do not necessarily represent the region since deliveries may take place in several hospitals and maybe also at home. In addition, smaller hospitals may treat some CDH patients themselves, and teaching hospitals may receive patients from outside the region.

The somewhat lower incidence in this investigation may be due to other factors as well: for instance, hip dysplasias were excluded. The mean age at which the diagnosis was made in this study, 6.8 days, is relatively high. In the material from south-western Finland (Parvinen 1972) only 10 per cent of the patients were examined after the age of 6 days.

The present study shows a significant annual variation in the frequency of CDH. No accept-

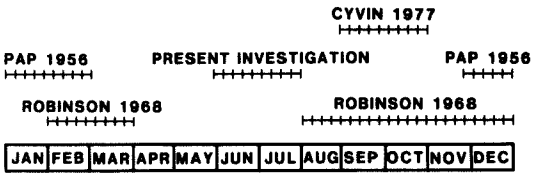

Figure 3. Monthly peaks of CDH in some investigations.

able explanation could be found. Very few other authors have counted the annual frequency of CDH in relation to the number of live-borns. In Cyvin's (1977) material a similarly wide variation, 13.3–24.1 per mille, was found.

Seasonal variation in the occurrence of CDH has been reported in several countries, but the results are somewhat contradictory (Figure 3). In Japan and Hungary, more CDH patients than expected were born in the winter months (Nagura 1955, Pap 1956). Robinson (1968) demonstrated two peaks, the first in February–March and the other in August–December. Cyvin (1977) found a higher incidence of CDH in neonate girls born in September–October; no corresponding difference could be demonstrated in boys. On the other hand, seasonal variation was found by Bjerkreim (1974) in patients with late-diagnosed CDH, and by Andrén & Palmén (1963) in both neonatal and late-diagnosed groups. It can be concluded from the various studies that a peak in the incidence of CDH has been shown in almost every month of the year.

Many authors have shown a genetic predisposition to CDH (Wilkinson & Carter 1960, Carter & Wilkinson 1964, Wynne-Davies 1970). Bjerkreim (1974) found a positive family history about as often as it was found in the present investigation. Cyvin's (1977) figures are considerably higher: 18 per cent in boys and 20 per cent in girls. In Dunn's (1976) material from Bristol, a positive family history was found in only 3 per cent of the CDH patients. The percentage in the present study is probably too small. It seems that when the history was taken this question was often forgotten.

The results concerning the patient's sex and the side of the dislocation are very similar to those obtained in other studies, as is the relatively high percentage of breech deliveries, which agrees with the results of other authors.

In most studies CDH has been found in first-born babies more often than expected. In the Finnish material (Parvinen 1972) first-born children represented 49 per cent of the total number of CDH patients, while the normal rate was 44 per cent. In Norway, the respective figures were 50 per cent and 40 per cent (Cyvin 1977), and in Sweden 57–69 per cent and 45 per cent (Fredensborg 1976a). Place et al. (1978) did not find any correlation between CDH and birth order or birth weight.

The average birth weight in this study is the same as that of the normal Finnish population (Ojajärvi 1982). In the two Norwegian materials (Bjerkreim 1974, Cyvin 1977), the birth weight of the girls in the neonatal group was significantly higher than that of normal girls or girls with late-diagnosed CDH.

CDH has often been associated with other anomalies, especially foot deformities. Some investigators have found a connection with club foot while others have not. Connections with calcaneovalgus feet or flat feet have been reported but it has not always been made clear which of them the researcher means. In Parvinen's Finnish material, 15 patients out of 150 (13.3 per cent) had pes planovalgus in a follow-up examination. In Paterson's (1976) Australian material, the frequency of pes calcaneovalgus was 25 per cent. In the present material the incidence was somewhat lower.

When the different criteria are taken into account, the results of the present study are in agreement with most other studies. However, some disagreement was found as to birth weight and monthly variation.

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