

CONGENITAL TALIPES IN MALAYSIAN NEONATES : INCIDENCE, PATTERN AND ASSOCIATED FACTORS

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ABSTRACT

A study was carried out on 8,369 neonates delivered in the Maternity Hospital, Kuala Lumpur over a period of four months. Forty-nine neonates (5.6 per 1000 livebirths) had congenital talipes. The incidence of congenital talipes equinovarus (CTEV) was 4.5 per 1000 livebirths while that of congenital talipes calcaneovalgus (CTCV) was 1.3 per 1000 livebirths. 6/11 (54.5%) of the CTCV was unilateral, the ratio of right to left feet involvement being 1:1. Only 12/38 (31.5%) of the CTEV were unilateral, the ratio of right to left feet involvement being 1:2. Congenital talipes was significantly more common in the low birthweight neonates ($p < 0.001$). However, the condition was not significantly more common in neonates with breech presentation nor in those born to primigravida mothers. Our data suggested that multifactorial genetic background as the most likely underlying cause of congenital talipes in Malaysian neonates.

Keywords: Congenital talipes, epidemiology, Malaysian neonates.

SINGAPORE MED J 1990; Vol 31: 539-542

INTRODUCTION

Congenital talipes is a common congenital anomaly in the neonate (1). The reported incidence of congenital talipes equinovarus (CTEV) ranged from 0.39 to 7.0 per 1000 livebirths and that of congenital talipes calcaneovalgus (CTCV) was 0.5 to 1.2 per 1000 livebirths (2-7). The clinical importance of this group of condition lies in the fact that with early detection and adequate treatment, handicap can often be minimised (3,5,8).

The incidence of congenital talipes in Malaysian neonates was reported to be 1.63 per 1000 livebirths (9) and 1.26 per 1000 livebirths in two studies (10). However, in both these studies, no data were given on the types of patients affected nor the pattern of talipes involved.

The objectives of the present study were to determine the incidence of congenital talipes in a group of Malaysian neonates born in the Maternity Hospital, Kuala Lumpur, according to birthweight, race, sex, and modes of delivery in the affected neonates and to identify the common factors which predisposed them to the development of this condition.

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METHODOLOGY

The study was carried out in the Maternity Hospital, Kuala Lumpur over a four month period between 1 Jan 1988 to 30 Apr 1988. All neonates who were found to have abnormalities of the feet during routine screening examination by doctors were referred to one of us for re-examination. Neonates with congenital abnormalities of the feet were included in the study. The mothers of the affected babies were interviewed and their antenatal records were reviewed. A diagnosis of congenital talipes equinovarus was made when both the forefoot and hindfoot of any baby were in equinus and varus. This condition was distinguished from metatarsus varus in which the forefoot was in varus but the hindfoot was in neutral or valgus position. Congenital talipes calcaneovalgus was diagnosed to be present when the heel of the baby was in calcaneus and the forefoot was dorsiflexed and everted with limitation in plantar flexion (7,11). The deformity was considered to be "postural" when it could be over-corrected with manipulation and "structural" when it could not be over-corrected. Any other associated abnormalities present in the babies were also documented.

The Chi-square test was used for calculation of statistical significance of categorical variables. Yates' correction was applied when about one-fifth of the cells had expected values less than 5 or any cell an expected value of less than one. P values of less than 0.05 were considered significant.

RESULTS

There were 8,369 livebirths in the hospital during the study period. Forty-nine neonates (5.6 per 1000 livebirths) were found to have congenital talipes. No neonate was detected to have metatarsus varus. The incidence of congenital talipes equinovarus (CTEV) was 4.5 per 1000 livebirths while that of congenital talipes calcaneovalgus

(CTCV) was 1.3 per 1000 livebirths. 6/11 (54.5%) of the CTCV was unilateral, the ratio of right to left feet involvement being 1:1 (Table I). On the other hand, only 12/38 (31.5%) of the CTEV were unilateral, the ratio of right to left feet involvement being 1:2. Most of the CTEV (34/38 or 89.5%) and CTCV (9/11 or 81.8%) were of the postural type. The male to female ratio of the neonates was 1:1 for CTEV and 3:8 for CTCV.

Table I.

Laterality of Congenital Talipes in Malaysian Neonates Born in the Maternity Hospital, Kuala Lumpur, 1 Jan- 30 Apr 1988.

Type of Talipes	Unilateral	Bilateral	Total
Calcaneovalgus			
postural	4	5	9
structural	2	0	2
Equinovarus			
postural	11	23	34
structural	1	3	4
Total	18	31	49

Congenital talipes was significantly more common in the low birthweight (LBW) neonates of less than 2500 grams (Table II) ($X^2 = 15.65$, $df = 1$; $p < 0.001$). The Chinese had a higher incidence of CTEV than the other two races although the difference was not statistically significant ($X^2 = 1.14$, $df = 2$; $p > 0.5$). On the other hand, the Malays had a significantly lower incidence of CTCV ($X^2 = 6.70$, $df = 2$; $0.05 > p > 0.01$) than the Chinese and Indians (Table III). Table IV shows the different modes of delivery of the affected neonates. The incidence of CTEV was higher in neonates with breech presentation (4/285 neonates or 14.0 per 1000 livebirths with breech presentation) than neonates with vertex presentation (34/8084 neonates or 4.2 per 1000 livebirths with vertex presentation). However, this difference was not statistically significant ($X^2 = 3.83$ with Yates' correction, $df = 1$; $p = 0.05$).

Most of the neonates with CTEV (33/38 or 86.8%) and CTCV (7/11 or 63.6%) were born at term. Only a small number (3/38 or 7.9%) of CTEV and 3/11 or 27.2% of CTCV were born preterm between 32 to 36 completed weeks of gestation. 2/38 (5.3%) of the CTEV and 1/11 (9.1%) of the CTCV were born post-term at 42 completed weeks or more.

CTEV was present in 14/2181 neonates (6.4 per 1000 livebirths) and CTCV in 4/2181 neonates (1.8 per 1000 livebirths) whose mothers were primigravida. The occurrence of CTEV and CTCV was 24/6188 (3.9 per 1000 livebirths) and 7/6188 (1.1 per 1000 livebirths) respectively in neonates whose mothers were multigravida. Statistically, there was no difference in incidence of congenital talipes in neonates born to primigravida or multigravida mothers ($X^2 = 2.35$ with Yates' correction, $df = 1$; $p = 0.13$). None of the affected neonates during the study period had any family history of congenital feet

Table II.

Incidence of Congenital Talipes according to birthweight distribution in neonates born in the Maternity Hospital, Kuala Lumpur between 1 Jan - 30 Apr 1988.

Birthweight (grams)	Total no. of livebirths	CTEV* no. ()#	CTCV+ no. ()#
<1000	25	0	0
1000-1499	53	1 (19.9)	0
1500-1999	156	3 (19.2)	4 (25.6)
2000-2499	625	6 (9.6)	0
2500-2999	2527	9 (3.6)	2 (0.8)
3000-3499	3395	10 (2.9)	5 (1.5)
3500-3999	1336	8 (6.0)	0
>4000	252	1 (4.0)	0

* CTEV - Congenital Talipes Equinovarus
 + CTCV - Congenital Talipes Calcaneovalgus
 # () - rates expressed as per 1000 livebirths in each birthweight category

Table III.

Incidence of Congenital Talipes according to Ethnic Origin in neonates born in the Maternity Hospital Kuala Lumpur, between 1 Jan - 30 Apr 1988.

Ethnic origin	Total no. of livebirths	CTEV* no. ()#	CTCV+ no. ()#
Malay	5010	23 (4.6)	3 (0.6)
Chinese	1802	11 (6.1)	4 (2.2)
Indian	1166	4 (3.4)	4 (3.4)
Others	391	0 (0.0)	0 (0.0)

* CTEV - Congenital Talipes Equinovarus
 + CTCV - Congenital Talipes Calcaneovalgus
 # () - rates expressed as per 1000 livebirths in each ethnic group.

abnormalities or consanguinity. History of oligohydramnios was present in only 1/38 (2.6%) of the affected neonates with CTEV.

Associated congenital abnormalities were present in 6/38 (15.8%) of the neonates with CTEV and 4/11 (36.4%) of CTCV. In the six neonates with CTEV, there were two neonates with Down's syndrome, one with cleft palate, one with absence of right tibia, one with polydactyly, two with dysmorphic features. In the four neonates with CTCV, there were two neonates with Edward's syndrome, one with genu recurvatum, and one with truncus arteriosus.

Table IV.

Incidence of Congenital Talipes according to Mode of Delivery in neonates born in the Maternity Hospital, Kuala Lumpur, between 1 Jan - 30 Apr 1988.

Mode of Delivery	Total no. of livebirths	CTEV* no. ()#	CTCV+ no. ()#
SVD	6970	21 (3.0)	8 (1.1)
Forceps	293	5 (17.1)	0
Vacuum extraction	104	1 (9.6)	0
Breech delivery	198	3 (15.2)	0
LSCS	804	8 (9.9)	3 (3.7)

- * CTEV - Congenital talipes equinovarus
- + CTCV - Congenital talipes calcaneovalgus
- # () - rates expressed as per 1000 livebirths of each mode of delivery.
- SVD - Spontaneous vertex delivery
- LSCS - lower segment Caesarean section.

DISCUSSION

In our study, the incidence of congenital talipes equinovarus and calcaneovalgus in Malaysian neonates was much higher than that of the Caucasians and approximated that of the Polynesians (2-7). However, unlike the findings of others (7,12) who reported the incidence to be low (less than 1 per 1000 livebirths) in the Chinese, the incidence of talipes in Chinese neonates born in our hospital was high.

Our data also showed that the pattern of congenital talipes among Malaysian neonates was different from that of other reports in a number of ways. We found bilateral congenital talipes equinovarus to be more common in Malaysian neonates. In other populations, both bilateral and unilateral congenital talipes equinovarus were equally distributed (3,6,12,13). Left foot was more commonly involved in Malaysian neonates with unilateral involvement as opposed to right foot predominance reported elsewhere (13,14). Males were noted to be affected two to four times more often with congenital

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talipes equinovarus than females by various authors (2,3,5,6,8,13,14) while both sexes were equally affected in the Malaysian neonates.

We also found a high incidence of talipes equinovarus but not calcaneovalgus in neonates with breech presentation. This was contrary to those reported by others who found large proportion of neonates with any types of talipes to have breech presentation (15,16). Unlike the findings of Dunn (16,17), the incidence of talipes in our study was not significantly higher in Malaysian neonates born to primigravida mothers.

Numerous hypotheses have been put forward to explain the pathogenesis of congenital talipes. The difference in incidence of talipes according to race, sex, modes of delivery, birthweight and laterality in our series supports the hypothesis of multifactorial genetic background for talipes deformities (2,3). In Professor Dunn's studies, he suggested that oligohydramnios, breech presentation and primigravida uterus predisposed the foetus to intrauterine compression or molding with subsequent deformation (16,17,19,20). Our study, however, did not support this as there was no significant increase in the incidence of congenital talipes in neonates born with breech presentation or born to primigravida mothers.

Although the reported number of oligohydramnios was small in our affected babies, congenital talipes was more common in our neonates with low birthweight. One of the most common causes of low birthweight in neonates in the absence of intrauterine infection and chromosomal abnormalities was placental insufficiency. Placental insufficiency often cause oligohydramnios. It was possible that the diagnosis of minor degree of oligohydramnios could have been missed in our patients except in the severe cases. In view of the significantly high incidence of congenital talipes in the low birthweight neonates in this study, we cannot totally dismiss the role of "intrauterine molding" proposed by Professor Dunn in the pathogenesis of congenital talipes in our Malaysian neonates. Based on our data, we believe that the most likely cause of congenital talipes in Malaysian neonates is due mainly to multifactorial genetic background although intrauterine molding of the foetal feet cannot be ruled out as a possibility.

ACKNOWLEDGEMENT

We would like to thank Professor M N Mahmud, the Dean of Faculty of Medicine, National University of Malaysia for giving us permission to publish the data.

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