Incidence and Patterns of Clubfoot Deformity at Gajra Raja Medical College, Gwalior

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Abstract:
Background: Congenital Talipes Equinovarus (CTEV), also referred to as Clubfoot, occurs in 1 in 1000 live births and is one of the most common birth defects involving the musculoskeletal system. The objective of this study was to evaluate the incidence and pattern of presentation of this deformity at Gajra Raja Medical College, Gwalior.

Methods: A prospective study was carried out from June 2011 to March 2014 of all the clubfoot patients, presenting at the clubfoot clinic in the Department of Orthopaedics at Gajra Raja Medical College, Gwalior. The patterns of clubfoot with respect to gender, laterality, presence of other congenital anomalies and maternal obstetric history were recorded.

Results: The total number of patients with clubfoot deformity recorded was 98, and the estimated incidence of clubfoot in our study is 1 in 1210 live births, or 0.8 per 1000 live births. The male to female sex ratio was 1.7: 1. Fifty seven (58 %) of the patients had bilateral clubfeet. Among the rest of 41 patients with unilateral affection, the left side was involved in 22 (23 %) of the patients. Nineteen (19%) patients had other associated congenital anomalies. Arthrogryposis Multiplex Congenita and Neural tube defects were the commonest anomalies associated with clubfeet.

Interpretation: There is requirement of more studies in order to establish the true incidence and pattern of presentation of this deformity in our region.

Key Words: Clubfoot, congenital anomalies, CTEV.

Abbreviation
CTEV: Congenital Talipes Equinovarus.

Introduction
Congenital Talipes Equinovarus (CTEV), also referred to as clubfoot, occurs in 1 in 1000 live births¹ and is one of the most common birth defects involving the musculoskeletal system. It is recognizable at birth and is readily distinguishable from positional foot defects because the foot is rigid and does not correct with passive movement. In contrast to metatarsus adductus and calcaneovalgus foot anomalies, both positional in nature, there is less evidence to suggest that CTEV results from intrauterine crowding or positional effects¹.

CTEV can present in 2 forms. In severe syndromic CTEV, other malformations are present such as spina bifida, spinal muscular atrophy, sacral agenesis, or arthrogryposis. Associated features may also include joint laxity, congenital dislocation of the hip, tibial torsion, ray anomalies of the foot, and the absence of some tarsal bones. In previous series the prevalence of associated anomalies in patients with CTEV varied from 11 to 48%, depending on the population and method of study¹²³. In idiopathic CTEV—the more common form—the anomaly is isolated or may be associated with minor malformations. There may be a family history of foot anomalies.

The purpose of our study was to determine the overall incidence of Clubfoot deformity and its pattern of presentation with respect to gender, laterality, presence of other congenital anomalies and maternal obstetric history.

Material & Methods
All the patients of Clubfoot presenting at the clubfoot clinic in the Department of Orthopaedics at Gajra Raja Medical College, Gwalior from June 2011 to March 2014 were prospectively enrolled in this study. Institutional Review Board approval was obtained for this research and informed consent was obtained from parents. A Postgraduate resident recorded the details of the patients on the Clubfoot Proforma. The Case information
included age at presentation, gender, laterality, other associated congenital anomalies and maternal obstetric history, which included birth order, mode of delivery, gestational age.

Results

Incidence

The number of patients with Clubfoot deformity presenting to us during the study period was 98. The total number of live births during this study period was 1,18,654. This gave an estimated incidence of clubfoot of 1 in 1210 live births, or 0.8 per 1000 live births.

Patterns of Clubfeet deformity

Out of the total 98 patients, 62 (63 %) of patients with clubfoot were male and 36 (37 %) were female (Male Female ratio= 1.7: 1). 57 (58 %) out of the total 98 patients, had bilateral clubfeet. Among the rest of 41 (42 %) patients with unilateral affection, the right side was involved in 19 (19 %) and left side in 22 (23 %) of the patients.

Associated Congenital anomaly

79 (81 %) patients had primary idiopathic clubfoot, whereas the remaining 19 (19 %) patients had clubfoot deformity associated with other congenital anomalies. Arthrogryposis Multiplex Congenita and Neural tube defects were the commonest anomalies associated with clubfeet.

Table 1: Demographic data of patients with idiopathic and non-idiopathic CTEV

<table>
<thead>
<tr>
<th></th>
<th>Idiopathic</th>
<th>Non-idiopathic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Patients (%)</td>
<td>79 (81)</td>
<td>19 (19)</td>
</tr>
<tr>
<td>Male / Female</td>
<td>56/23</td>
<td>6/13</td>
</tr>
<tr>
<td>Bilateral (%)</td>
<td>45/79 (57)</td>
<td>12/19 (63)</td>
</tr>
<tr>
<td>Unilateral- Right (%)</td>
<td>15/79 (19)</td>
<td>4/19 (21)</td>
</tr>
<tr>
<td>Unilateral- Left (%)</td>
<td>19/79 (24)</td>
<td>3/19 (16)</td>
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</tbody>
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Table 2: Presence of Associated Congenital Anomalies

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Associated Congenital Anomaly</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Arthrogryposis Multiplex Congenita</td>
<td>5</td>
</tr>
<tr>
<td>2.</td>
<td>Neural Tube Defect</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>Bilateral Constriction Bands of Leg &amp; Syndactyly</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>Syndactyly</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Maldeveloped Feet &amp; 4 toes on Right Foot</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>Hexadactyly All 4 limbs</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>Genu Recurvatum</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>Tongue Tie Bilateral Webbing of Fingers</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>Imperforate Anus</td>
<td>1</td>
</tr>
<tr>
<td>10.</td>
<td>Cleft Palate &amp; Facial Nerve Palsy</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure I. Non-idiopathic CTEV associated with Arthrogryposis Multiplex Congenita
Figure II. Non-idiopathic CTEV associated with Neural Tube Defect

Figure III. Non-idiopathic CTEV associated with Constriction Band Syndrome

Birth order
The birth order of the child is shown below in the chart.

Mode of Delivery
Among the 98 patients with clubfeet, 87 were normal delivery, 11 delivered by Caesarean Section.
**Gestation Period**

5 out of 98 patients with clubfeet were preterm, 2 had idiopathic clubfeet and 3 had clubfeet associated with other congenital anomalies. 92 children with clubfeet were born at term, whereas one patient was post-term and associated with microcephalus & autism.

**Discussion**

The overall incidence of clubfeet deformity in our study is 0.8 per 1000 live births. Studies among black South Africans showed that the incidence of congenital clubfoot is between 1.5 per 1000 and 3.5 per 1000 live births\(^4\)\(^5\). Amongst Caucasian populations the incidence of congenital clubfoot is between 0.64 and 2.5 per 1000 live births\(^6\)\(^7\).

The deformity was most often bilateral, and if unilateral, more often involved the left side. Previous studies have found the preponderance of right over left side (Grunnett et al 2008\(^8\), Dobbs et al 2009\(^9\), Parker et al 2009\(^10\)). Moreover, our study confirmed that boys are more frequently involved as compared to girls, which also supports previous studies (Byron-Scott et al 2005\(^11\), Carey et al 2005\(^12\), Dickinson et al 2008\(^13\)).

Patients with clubfoot associated with other congenital anomalies comprise for 19% of all cases. The most common congenital anomaly associated with clubfoot deformity includes arthrogryposis and neural tube defects.

**Conclusion**

Although the vast majority of patients with CTEV are idiopathic, in our tertiary clinic, 19% were non-idiopathic. Non-idiopathic CTEV is associated with a long list of associated congenital anomalies, majority of which include arthrogryposis multiplex congenital, neural tube defect and constriction band syndrome. More studies in order to establish the true incidence and pattern of presentation of this deformity in our region is recommended.

**References**


