

Original Article

Characteristics of CTEV patients at Orthopedic and Traumatology outpatient clinic in Datu Beru General Hospital Takengon Central Aceh period August 2018-July 2022

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ABSTRACT

Background: Congenital Talipes Equinovarus (CTEV) is a congenital disorder commonly occurring in newborns. The word talipes equinovarus comes from Latin: *tali* mean ankle, *pes* means foot, *equino* means plantar flexion, and *varus* means midline deviation. CTEV cases occur 1-2: 1000 live births, cases in males are more frequent than in females and can occur unilateral or bilateral. Bilateral conditions occur in half of the total number of cases. The aim of this study is that, in the future, especially parents know about this disorder so there will be no misinformation.

Methods: This study uses a descriptive research method with a cross-sectional design that aims to determine the characteristics of CTEV patients at the Orthopedic and Traumatology Outpatient Clinic in Datu Beru General Hospital Takengon Central Aceh for August 2018-July 2022. Sampling was carried out by non-probability sampling and using the purposive sampling technique. This is a non-random sampling technique with specific considerations from the researcher (inclusion and exclusion criteria).

Results: The number of births in Central Aceh Regency from August 2018-July 2022 amounted to 15,206. The incidence of CTEV in that period was 22 cases with a ratio of 1.4: 1000 live births.

Conclusion: Males 15 cases (53.6%) and females 13 cases (46.4%). The age of patient's brought by parents was mostly 1-6 months, with as many as 12 cases (42.9%). Bilateral conditions were 13 cases (46.4%), and 15 (53.6%) were unilateral. On average, patients with CTEV were corrected 5.2 times using the Ponseti method.

Keywords: Clubfoot; Congenital talipes equinovarus; CTEV; Human and medicine

INTRODUCTION

Congenital Talipes Equinovarus (CTEV) or clubfoot is a congenital disorder in newborns. The word talipes equinovarus comes from Latin: *tali* mean ankle (ankle), *pes* means foot, *equino* means plantar flexion, and *varus* means midline deviation. This disorder occurs 1-2 per thousand live births, where cases in boys are more common than in girls and can occur in one leg (unilateral) or both legs (bilateral). Bilateral conditions can occur in half or 50% of cases.^{1,2}

Deformity in CTEV is often understood by the abbreviation CAVE (*cavus*, *adductus*, *varus*, *equinus*), CTEV can occur alone without

being based on other abnormalities or as part of a syndrome. About 20% of cases of CTEV are associated with congenital abnormalities such as spina bifida, arthrogryposis, dwarfism, cerebral palsy, and other neuromuscular disorders. The etiology of CTEV is not fully known (idiopathic). However, genetic factors play a significant role in the etiopathogenesis of idiopathic and syndromic CTEV. A family history of CTEV can increase the risk of this disorder by about 1:35 cases and about 1:3 (33%) if the twins are identical.³⁻⁶

In Europe, during the period 1995-2011, 5,458 of the total infants and fetuses reported 18 cases of CTEV, including 5,056 (93%) live



births, 106 (2%) fetal deaths after 20 weeks of gestation, and 296 (5%) TOPFA (Termination of Pregnancy due to Fetal Anomaly) these results give a total prevalence of CTEV in Europe of 1.13 per 1000 births. Among live births, 3,262 were male (65%), and 1,788 were female (35%), giving a ratio of 1.8:1.⁷ Study at Dr. Soetomo General Hospital Surabaya in 2017 showed the incidence of congenital fetal anomaly was 4.3%. Most congenital fetal anomalies had multiple anomalies (39 cases; 67%). The two most common types of congenital fetal anomaly found are CTEV and Omphalocele.⁸

CTEV is more common in low- or middle-income countries, with about 80% of club-foot cases occurring. From the data obtained in Swabi, the capital of the Swabi region in the Khyber Pakhtunkhwa region of Pakistan, during one year, out of a total of 988 cases studied, there were 96 (9.7%) cases of CTEV, of which 56 (5.7%) were male, and 40 were female (4.04%). There were 65 (6.6%) cases of bilateral CTEV and 31 (3.13%) cases of unilateral CTEV.¹

The results of another study from the African continent, specifically in Northern Ghana, totaled 112 cases of CTEV from January 2015 to December 2016, resulting in a prevalence rate of 0.9 per 1000 live births. Comparison of the number of cases between men and women was 2:1 with bilateral conditions 73 cases (65.1%) and unilateral conditions 39 cases (34.9%). From these results, we can conclude that there is no significant difference between the Northern Ghana region with other states in Africa and the world.⁹

According to the *Global Report on Birth Defects* released by the March of Dimes Birth Defects Foundation in 2006, the prevalence of infants with congenital abnormalities in Indonesia is 59.3 per 1,000 live births. When compared to countries in Southeast Asia, Indonesia is still a country with a high prevalence of babies with congenital abnormalities. The Ministry of Health has conducted sentinel surveillance of congen-

ital abnormalities in 28 hospitals in 18 provinces since September 2014, including Dr. Zainoel Abidin Banda Aceh. The results of surveillance for the period September 2014 - March 2018 showed there were 956 cases of congenital abnormalities that met the criteria; of the eight types of congenital abnormalities, the reported cases of CTEV were the most, followed by other disorders such as orofacial cleft defect/cleft lip and palate abnormalities, neural tube defects, abdominal wall defects, atresia ani, hypospadias, epispadias, conjoined twins, and microcephaly.¹⁰

To determine the mild, moderate, and severe cases of CTEV, we can use the *Pirani score* with a scoring system allocating 0, 0.5, or 1.0 for each of the six clinical features, namely: *Curved lateral border*, *Medial foot crease*, *Talar head coverage*, *Posterior crease*, *Rigid equinus*, and *Empty heel*. The maximum score is 6, with a minimum score of 0. The higher the scores, the more severe the CTEV condition experienced.¹¹

Treatment of this disorder can be done conservatively or operatively, where conservative measures should be carried out in the first two weeks after birth using a cast that is corrected periodically every week (Ponseti method) with an average of five corrections; after complete correction, the shape of the foot must be maintained using a foot abduction brace (FAB) to prevent the foot from returning to its original shape for three full months or about 23 hours a day, then used during naps and nights only until the age of four years. Surgery is rarely performed in the early stages of correcting this congenital anomaly. The percentage of this surgery has decreased from 80% to only 5% after the Ponseti method.¹²

This study aims to find out the prevalence of CTEV cases in Central Aceh Regency and to provide information about CTEV cases at the Orthopedic and Traumatology Outpatient Clinic in Datu Beru General Hospital Takengon Central Aceh, so that, in the future, the community, especially parents, will know and understand



the condition of this disorder so that there is no misinformation and they can immediately bring the patient or their children to get treatment for a better life in the future.

MATERIAL AND METHODS

This study uses a descriptive research method with a cross-sectional design which aims to determine the characteristics of CTEV (Congenital Talipes Equinovarus) patients at the Orthopedic and Traumatology Outpatient Clinic in Datu Beru General Hospital Takengon Central Aceh for the period August 2018 - July 2022, where data collection was in the form of medical record numbers from the registration book in the Orthopedic and Traumatology Poly section; further data searches were carried out in the form of in-patient and outpatient status at the RM building according to the medical record number; the data taken are name, sex, place, and date of birth, date of the first visit to the poly, type of involvement, number of corrections, address, and telephone number. Data were then acquired in the form of birth rates in Aceh Tengah Regency, which consists of 14 sub-districts, from August 2018 - July 2022, and obtained from the Health Office of Central Aceh Regency. Datu Beru General Hospital was chosen as the research site because it is a referral hospital for the entire area of Central Aceh Regency.

This research was carried out for approximately one month from when the researchers determined the research title, compiled a research proposal, collected data, and made a report on the research results, which took place from July to August 2022. Sampling in this study was carried out by non-probability sampling and using a purposive sampling technique. This is a non-random sampling technique with specific considerations from the researcher (determining inclusion and exclusion criteria) so that later it can display more representative data. The sample inclusion criteria in this study were: (1) the

patient who came for the first time to the Orthopedic and Traumatology Outpatient Clinic in Datu Beru General Hospital Takengon Aceh and was diagnosed with CTEV by a doctor, (2) the patient was registered born in Aceh Tengah District. Meanwhile, the exclusion criteria included (1) patients with a diagnosis of CTEV who came for the second time to the Orthopedic and Traumatology Outpatient Clinic in Datu Beru General Hospital Takengon Central Aceh for re-control or cast correction, (2) patients not born in Aceh Tengah District.

The data used in this study are secondary data obtained from the medical records of patients who visited the Orthopedic and Traumatology Outpatient Clinic in Datu Beru General Hospital Takengon Central Aceh for the period August 2018-July 2022, diagnosed by an orthopedic and traumatology specialist.

RESULTS

The number of births in Central Aceh Regency from August 2018-July 2022 amounted to 15,206, the incidence of newborns with CTEV in that period was 22 cases with a ratio of 1.4: 1000 live birth rates with the characteristics of patients from the data collected during the period August 2018-July 2022 at the Orthopedic and Traumatology Outpatient Clinic in Datu Beru General Hospital which was included in the inclusion criteria, a total of 28 new cases of CTEV was obtained with a description of the characteristics of visiting patients seen by sex and age for the first time visiting as given in Table 1 and 2, based on the type of involvement and the number of corrections using the Ponseti method as in Table 3 and 4.

Table 1. Distribution of CTEV Frequency by Sex

Sex	Frequency	Percentage (%)
Male	15	53.6
Female	13	46.4
Total	28	100



Table 2. Distribution of CTEV frequency by age at first visit

Age	Frequency	Percentage (%)
0-14 days	5	17.9
15-28 days	2	7.1
1-6 months	12	42.9
7-12 months	2	7.1
1 year	3	10.7
2 years	2	7.1
3 years	1	3.6
4 years	1	3.6
Total	28	100

Table 4. Distribution of CTEV frequency based on total corrections using the Ponseti method

Correction Total (Ponseti Method)	Frequency	Percentage (%)
1	1	5
4	1	5
5	10	50
6	6	35
8	1	5
Total	19	100

DISCUSSION

Based on the frequency distribution of CTEV characteristics by sex in Table 1., the incidence of CTEV in males is more than in females, with males being 15 cases or about 53.6% while in females being 13 cases or around 46.4% of the total number of cases recorded at the Outpatient Clinic from August 2018 to July 2022 with a total of 28 cases. This is according to what was stated in the *Textbook of Disorders and Injuries of the Musculoskeletal System 3rd Edition*, that the incidence of CTEV is two times more common in males than in females.² From the results of other studies in Italy in the 2013-2017 period, the same thing was also shown in the case of CTEV with more cases in boys than in girls with a 2:1 ratio.¹³

In Table 2, the distribution of CTEV frequency based on age at the first visit to the Orthopedic and Traumatology Outpatient Clinic in Datu Beru General Hospital was

Table 3. Distribution of CTEV frequency by type of involvement

Involvement	Frequency	Percentage (%)
Bilateral CTEV	13	46.4
R CTEV	8	28.6
L CTEV	7	25
Total	28	100

Table 5. Distribution of the average number of corrections in CTEV by age group

Age	Frequency	Average Number of Correction
0-28 days	5	4.2
2-3 months	4	5
4-5 months	2	5
6 months	1	5
9 months	2	7
1-2 years	4	5.7
3 years	1	6
Total	19	5.2

found in patients aged 0-14 days as many as five cases or about 17.9%, at the age of 15-28 days as many as two cases or about 7.1%, at the age of 1-6 months as many as 12 cases or about 42.9%, at the age of 7-12 months as many as 2 cases or about 7.1%, at the age of one year as many as three cases or about 10.7 %, at the age of two years as many as two cases or about 7.1% and at the age of three and four years each one case or about 3.6% of the total cases. From the data obtained, most patients came for the first visit at the age of 1-6 months, as many as 12 cases, while at the age of 0-14 days only five cases, whereby the management of patients with CTEV is better done as early as possible in the first two weeks after birth.¹²

According to information obtained from parents of children with CTEV, on average, parents have never known about the abnormality experienced by their child, so at the golden age period (0-14 days), parents more often take their children for treatment to traditional healers and undergo several treatments until they finally pass the golden period.



After there was no change at all in the shape of the child's feet, then the parents took their child to the hospital. According to a study conducted at Haji Adam Malik Hospital Medan, patients with low paternal education were 3.5 times more likely to have their first visit at the age of >1 year than those with higher education. Similarly, patients with low education in their mothers had a 3,212 times greater chance of having a first visit > 1 year than those with higher education. In addition, patients with low paternal income tend to wait at least a year to see a doctor compared to those with high income.¹⁴ Of the total 28 CTEV patients recorded at Orthopedic and Traumatology Outpatient Clinic in Datu Beru General Hospital, two cases (0.56%) were CTEV followed by other disorders, namely spina bifida and Down syndrome, and 26 other cases were idiopathic; other literature states that around 80% of cases occur as idiopathic type. The remaining 20% is associated with other anomaly conditions (syndromic).^{3,4,15}

From the data in Table 2, it is found that cases at the age of three and four years is one person each, which at this age is considered late in treatment (Neglected CTEV). Study at Saiful Anwar General Hospital Malang East Java in 2019 found there were six cases of CTEV patients over the age of two years. The factors underlying the delay in CTEV treatment are socioeconomic factors, medical problems, intentional factors, and misinformation.¹⁶

Based on the type of involvement in CTEV cases in Table 3, it was found that the number of cases with both sides experiencing CTEV (bilateral) was 13 cases, or about 46.4%. In comparison, in cases of CTEV that occurred only on one side (unilateral), as many as 15 cases or about 53.6% of the total abnormalities occurred on the right side, eight cases, and the left side seven cases. The data are taken from *Textbook of Disorders and Injuries of the Musculoskeletal System 3rd Edi-*

tion, which states that the number of bilateral cases that occur in CTEV cases is half of the total cases 2. This is slightly different from what is stated in *Apley & Solomon's System of Orthopaedics and Trauma 10th Edition*, which says that bilateral cases occur in one-third of the total CTEV cases.¹²

From the results of data collection for the period August 2018-July 2022 in Table 4, the number of new CTEV cases at the Orthopedic and Traumatology Outpatient Clinic in Datu Beru General Hospital Takengon Central Aceh was 28 cases. Twenty patients have completed treatment, 19 with conservative measures (Ponseti method) with an age range of 0-3 years, one with surgery at the age of four years, and eight cases are still in the treatment process. The distribution of CTEV frequency based on the number of corrections using the Ponseti method is quite varied, ranging one to eight corrections. From the data obtained, most of the patients were corrected five times with a total of 10 cases or about 50% of the total 19 cases of CTEV that had completed conservative measures, which meant that the average patient was corrected 5.2 times. This data are from the *Textbook of Disorders and Injuries of the Musculoskeletal System 3rd Edition*, which states that corrected CTEV patients usually require an average of five times the use of a cast and then use FAB.²

We can see in Table 5 that the average number of corrections in the 0-28 day age group is five patients with an average of 4.2 times corrections; in the 2-3 month age group, there are four patients with an average of five corrections; in the 4-5 month age group as many as two patients with an average of five corrections; in the six month age group one patient with a total of five corrections; in the nine-month age group two patients with an average of seven corrections; in the 1-2 years age group as many as four pa-



tients with an average of 5.7 times correction; and in the 3-years age group as many as one patient with a total of six corrections. Other data from the research results of Dhaka Medical College & Hospital, Dhaka, Bangladesh, during the period March 2015–November 2016, show a total of 26 cases of CTEV with an age range of 1 to 5 years requiring three to 15 times correction with an average value of seven times.¹⁷ From these results, we can conclude that, with increasing age, there is also an increase in the number of corrections. That is why the treatment of a clubfoot deformity should begin in the first week of life to take advantage of the favorable viscoelastic properties of the connective tissue forming the ligaments, joint capsules, and tendons.¹⁸

CONCLUSION

From the results of the study, the following conclusions were obtained: the number of births in Central Aceh Regency per August 2018-July 2022 amounted to 15,206, the incidence of newborns with CTEV in that period was 22 cases with a ratio of 1.4: 1000 live birth rates, with the characteristics of patients who visited the Orthopedic and Traumatology Outpatient Clinic in that period showing total cases were male as many as 15 cases (53.6%), more than the 13 female cases (46.4%). The patient is most often brought by their parents after 1-6 months as many as 12 cases (42.9%) whereas the child should be taken to hospital and conservative measures taken at the age of about 0-14 days after birth, which is only five cases (17.9 %). Bilateral conditions occurred in half of the total cases, as many as 13 cases (46.4%), and unilateral conditions in 15 cases (53.6%), of which abnormalities occurred in the right leg in eight cases and the left foot in seven cases. On average, patients with CTEV cases were corrected 5.2 times using the Ponseti method.

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