



EFFECT OF COVID 19 PANDEMIC ON RECURRENCE RATE AMONG CHILDREN HAVING IDIOPATHIC CTEV AFTER TREATMENT BY PONSSETI CASTING METHOD : A PROSPECTIVE STUDY

Orthopaedics

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ABSTRACT

Background: The pandemic of COVID-19 had its effect on orthopedic practice related to its treatment. The use of steroids during the pandemic has raised the cases of avascular necrosis. There has been a surge of avascular necrosis of hip and also cases of COVID-19 fingers due to digital intravascular thrombosis in patients treated with corticosteroid during COVID-19. Hence, our study was planned to see the effect of COVID-19 pandemic on recurrence rate among children's having idiopathic CTEV and treated by the Ponseti casting method mostly due to loss of follow up and break in cast protocol due to lockdown. **Method:** In this study, prospectively data was collected that included the children's of idiopathic CTEV treated by Ponseti casting, previously showing signs of recurrence of any component of CTEV in their feet. The follow-up from June 2020 to September 2021 was compared with the follow-up recurrence rate of children coming from November 18 to February 2020. **Results:** Out of 100 children who full fill inclusion and exclusion criteria and came for follow-up between June 2020 to September 2021, 36 showed recurrence- among which 26 cases came during first peak of COVID-19 (1st April 2020 to 31st Jan 2021) and 10 cases came during second peak (1st March 2021 to 30th June 2021). There were 36 cases of idiopathic club foot treated by Ponseti casting showing recurrence compared to 71 recurrence cases of all types of club foot cases (syndromic and surgically corrected) giving an institutional follow-up rate of recurrent cases of 50.7% [(36/71)x100]. compare to institutional follow-up rate of children from (Nov 2018 to Feb 2020) 9.14% [16/175*100]. **Conclusion:** There is an increase in recurrent cases of primary idiopathic club foot treated by Ponseti casting which is evident by comparison with the previous year's institutional follow-up recurrence rate basically due to loss to follow-up and break in casting protocol secondary to lockdown.

KEYWORDS

INTRODUCTION-

SARS coronavirus pandemic shows its manifestation in every fraternity of medicine. Early reports from Chinese hospitals found higher rates of ischemic stroke in patients with more severe disease¹, and several sites in the northeastern United States reported an anecdotal increase in ischemic strokes among young, otherwise healthy patients with COVID-19². ENT surgeons have to face its effect in form of mucormycosis.

In India, the COVID-19 pandemic, especially the second wave, led to an upsurge in mucormycosis cases among patients with COVID-19 (COVID-19-associated mucormycosis, CAM). Indian media, based on statements by members of the Indian government, reported 11,717 CAM cases on May 25³, 28,252 CAM cases on June 7⁴, 45,274 CAM cases (including 4332 deaths) on July 20⁵, and 51,775 CAM cases on November 29, 2021^{6,7}. Orthopedics was no longer an exception and had various effects of COVID-19, like an increase in cases of avascular necrosis of hip, for which thromboembolic phenomena caused by COVID-19 is culprit or is the steroid treatment for treating ARDS symptoms of COVID-19 is culprit is a matter of debate. Following the COVID-19 diagnosis, Agarwala *et al.*⁸ discovered a mean time of 58 days (range 45–67 days) for the development of AVN. According to Agarwala *et al.*⁸, the sensitivity to developing AVN is increased owing to the COVID-19 virus, and a lower cumulative dosage of steroids is required. Similarly blackening of distal finger pulps of multiple fingers of hand and feet were seen in patients as a sequelae of COVID-19 (COVID toes).

Chilblain-like lesions, often called 'COVID toe,' are cold-induced skin conditions characterized by erythematous or violaceous discolourations. These lesions are frequently accompanied by symptoms such as itching, swelling, discomfort, burning, blistering, or ulceration⁹ over tip of fingers and pulp of toes. and is a fascinating and mysterious dermatological sequelae of COVID-19. The etiology is rooted in theories centred around two receptors: ACE and IFN-1. Using its spike protein, COVID-19 can bind to the ACE receptor found on eccrine sweat glands, the basal layer of the epidermis, and dermal blood vessels. Consequently, the effects may be primarily localized to the hands and feet, as these areas house the body's highest concentration of sweat glands.

Likewise with the help of this study, we tried to find out whether there

is any effect of COVID-19 pandemic and lockdown on the recurrence rate of CTEV cases primarily due to breakage in their cast protocol and proper follow up for bracing mostly because of lockdown. Recurrence in CTEV is defined as the coming back of any component of CTEV, namely equinus, hind foot varus, we see the relation between recurrence and ankle dorsiflexion, external rotation, number of casts and recurrence and mean Pirani score and recurrence relation.

MATERIAL AND METHOD

Ethical approval was granted by the scientific research committee of Saint Stephan hospital, New Delhi via Ref no-SSHEC/sept-20/001 annexure attached.

Study Design

Our study is a comparative study in which we compare the institutional follow-up rate of recurrence among children of idiopathic club foot treated by Ponseti casting. two groups of children are made one in pre COVID-19 period from (November 2018 to February 2020) GROUP A and another group of children with recurrent club foot is made in COVID-19 period from (June 2020 to September 2021) GROUP B.

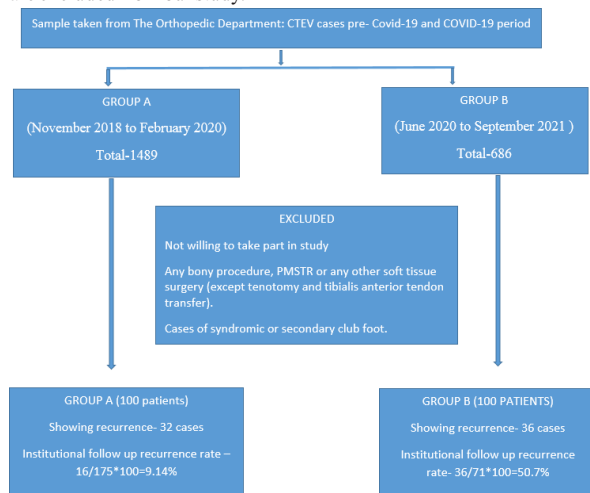
We collected the data of children's recurrence in pre COVID-19 period (November 2018 to February 2020) from the institutional register retrospectively and made note of the deformity that recurred in each case. The data of children showing recurrence in COVID-19 period is collected prospectively by examining them. 100 children are selected based on inclusion and exclusion criteria for examination in prospective GROUP B. The children in prospective GROUP B are examined for their pirani score, degree of external rotation, dorsiflexion, dynamic supination, and cavus by (planter arch index).

100 children were selected from the institutional follow-up register from (November 2018 to February 2020) GROUP A as per inclusion and exclusion criteria and children showing recurrence are noted along with most recurrent deformity.

Patient Selection

All children of idiopathic club foot treated in this hospital and are willing to take part in study and Children who have had tibialis anterior tendon transfer and tenotomy as surgery are included in study. Cases of syndromic or secondary club foot or Patients who had surgery of soft tissue release or surgery for any bony procedure other than tibialis

tendon transfer and tenotomy and Those unwilling to take part in study are excluded from our study.



The institutional follow-up rate is calculated by dividing the recurrence rate of included patients by all the patients showing recurrence (syndromic, secondary club foot cases and those treated by PMSTR or any other bony procedure) and multiplying it by 100.

Dynamic supination is noted by observing the child's gait while he walks away and observing great toe lifting from the ground and foot going in supination due to tibialis anterior over activity. Pirani scoring is done in terms of mid-foot and hind foot scores. Degree of dorsiflexion is noted by goniometer after flexing hip and knee and bringing ankle to neutral, Position of patient- Hip and knee joint are flexed at 90 degrees. Now externally rotate the foot and measure the angle of the 2nd toe with a vertical reference line drawn at the level of tibial tuberosity with the centre of the goniometer over the centre of the plantar surface of the heel degree of external rotation is measured by this method.

RESULTS

In our study, GROUP A had 75 cases were males whereas 25 cases were females compared to GROUP B having 70 males and 30 females. Most of the children (41 out of hundred, 41%) belong to the 2-5 year age group and 3 children were more than 5 years in GROUP A whereas (55 out of hundred 55%) belong to the 2 to 5 year age group in GROUP B. five children were more than 5 years in age. GROUP A has 76 bilateral cases and 24 unilateral cases compared to 70 bilateral and 30 unilateral cases in GROUP B, GROUP A has 16 recurrent cases of primary idiopathic club foot and 84 non-recurrent cases whereas GROUP B has 36 recurrent cases and 64 non-recurrent cases. The mean pre-treatment Pirani score among recurrent cases in GROUP A is 5.4 and 5.5 in GROUP B whereas it is 5.5 and 5.3 among non-recurrent cases respectively. Recurrence did not correlate with the pretreatment Pirani score. Feet has a high Pirani score at presentation, correct well and has no direct bearing on recurrence. and it is statistically non-significant with p value 0.309. patients showing recurrence in GROUP A have a mean number of casts 7 compared to 6 in GROUP B recurrent cases whereas non-recurrent cases in these groups have 5 casts respectively. Patients who needed more casts had more chance of recurrence and it is statistically significant with p value <0.001. out of 16 recurrent cases in GROUP A 15 cases do not have TA tenotomy compared to 32 patients out of 36 recurrent cases in GROUP B showing that children in which tenotomy was not done mostly recurred and is statistically significant with p value <0.05. There was a mean external rotation of 10 degrees and 12 degrees in recurrent cases in GROUP A and GROUP B compared to 17 and 16 degrees in non-recurrent cases respectively. Clubfeet having less degree of external rotation had recurred more. it is statistically significant with p value <0.01 (data at a time when the patient present to us). The most common deformity was equinovarus and least recurred deformity was cavovarus and equinus varus is present in hind foot and is similar in both groups. Mean Dorsiflexion in recurrent cases is 13 and 12 degree in GROUP A and B compared to 19 and 18.5 in non-recurrent cases respectively showing recurrence has significant association with less dorsiflexion and it is statistically significant with p-value of <0.01. Lastly, we compare the institutional follow-up rate of recurrence among children of primary idiopathic club foot by dividing primary

idiopathic recurrent cases with all the cases (syndromic, secondary club foot treated by PMSTR or any other bony procedure) and came for follow-up during time frame of GROUP A and GROUP B respectively

Getting an institutional follow-up rate of recurrent cases was 9.14% in GROUP A and 50.7% in GROUP B. Out of 100 children whom full inclusion and exclusion criteria and came for follow-up between June 2020 to September 2021 GROUP B. 36 children showed recurrence of which 26 cases came during the first peak of COVID-19 (1st April 2020 to 31st Jan 2021) and 10 cases came during second peak (1st March 2021 to 30th June 2021).

DISCUSSION

The Ponseti technique has been available for more than 50 years, the goal of this study is to establish the correlation between recurrence and various factors like the degree of external rotation, degree of dorsiflexion, mean no. of casts, mean Pirani score, tenotomy done or not and to study the effect of covid and lock down on increase in recurrence rate among children treated by ponseti casting.

41% of children in GROUP A and 55% of children in GROUP B are in the age group 2-5 years showing that most children showing recurrence are in this age group this finding of ours is similar to findings seen by **M. Changulani et al¹⁰** who treated 66 patients with 100 idiopathic clubfeet using the Ponseti method and reported the mean age at presentation of 12 weeks or three months (1 to 60 weeks). In this study, children were in the age group of 5.5 years to 15 years of age with most children 30% in the 5-6 year age group. The Number of bilateral cases is higher in both the groups compared to unilateral cases and this finding is similar to study done by **Changulani et al.¹⁰** on contrary there are studies in which several unilateral club foot patients are more like **R Malhotra et al.¹¹** who found bilateral club foot less as compared to unilateral club foot. In a study by R Malhotra et al 166 cases (46.67%) had a bilateral clubfoot and 190 cases (53.33%) had unilateral clubfoot (106 right-sided and 84 left-sided). Mean pre-treatment pirani score in our study in both groups among recurrent and non-recurrent cases is more than 5. In a study conducted by **Mohammad Ali Taharirian et al¹²** found the mean initial Pirani score as 5.5, and the incidence of relapse as 8.4%. In their study mean initial Pirani score had a significant association with recurrence which was contrary to our study. Recurrent cases in GROUP A and B have more no of casts compared to non-recurrent cases and this finding is similar to studies done by The mean total number of casts applied in our study was 6 while in study by **R Malhotra et al¹¹** the mean total number of casts were applied up to the final follow up to correct the deformity was 6.9 which was similar to our study. Also, contrasting results for the cast were observed in studies by **Changulani et al¹⁰**. In the study conducted by **Caroline M Tougas et al¹³** it was found that in the patient who showed no relapse, a minimum 20 degrees of ankle dorsiflexion in corrected club foot was maintained through age 3 years and a minimum of 15 degrees was maintained through age 5 years which is similar to our study in which patients having 19 mean degrees of dorsiflexion through the age of 5 years show no recurrence whereas patients having dorsiflexion of less than 14-degree show recurrence. 36 recurrences in the duration of June 2020 to September 2021 among 100 cases in our study. 71 recurrence cases in the duration of June 2020 to September 2021 among all club foot cases visited in our club foot clinic of this institution. Follow up rate of recurrence cases in our study was 50.7% [(36/71)x100]. A similar study on whether the number of pediatric patients with congenital clubfoot treated with the Ponseti method decreased during the Covid-19 pandemic or not in a rural area was conducted by **akan Ozbay, Serder toy et al¹⁴**. They also find a decline in the follow-up of club foot cases. Compared to the institutional follow-up rate of patients in the non-COVID period that is GROUP A which is 9.14% this increase can be explained by loss to follow-up for casting and non-compliance to casting protocol by patient attender due to lockdown.

CONCLUSION-

Ponseti's treatment method is considered the standard method for the management of idiopathic club foot, it has better short-term as well as long-term outcomes. Achieving good dorsiflexion 15 degrees by primary or even redo TA Tenotomy is important to prevent late recurrence. Equinus is the most common component of deformity and recurrences, emphasising the role of TA Tenotomy in achieving long-term good results. A high Pirani score at presentation corrects well and is not associated with recurrence external rotation of more than 15 degrees is necessary to prevent a recurrence, children with more cast

show more recurrence. An institutional follow-up rate of recurrent CTEV patients is 50.7% during the COVID era compared to 9.14 in the previous year and this increase is due to the effects of COVID and its lockdown.

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