Assessing the Association Forehead Sweating & Suck Rest Suck Cycle Infants with Congenital Heart Disease among Infants of Hilly Areas of Himachal Pradesh

Abstract: Background: An important area concerning morbidity among infants with congenital heart defects (CHD) is related to feeding problems like suck rest suck cycle and Forehead sweating during feeding. (diaphoresis) The aim of the study is to find association between Forehead sweating and suck rest suck cycle with Congenital Heart Disease(CHD) in newborns/infants. Material & Methods: This was a cross-sectional observational study included children age between 0 to 1 year with suspected heart disease came to outdoor and indoor services of Department of Pediatrics IGMC, Shimla from July 2018 to June 2019. Results: In our study there were 102 participants in total. Out of them 57 participants were ≤1 month of age i.e. 57(55.90 % of total), 29(28.4%) between 2-6 months, 16(15.7%) between 7-12 months. There were 55 males and 47 females. In the present study, Suck rest suck cycle was present in 32(31.4%) and Forehead sweating in 33(32.4%), out of 102 study participants. In the present study, out of 79 study participants having underlying CHD, among them 31(39.2%) patients had history of forehead sweating. Odd ratio was 5.01 with CI(1.25-20.16) with a P value of 0.005 which is highly significant. In 30(38.0%) patients out of 79 study participants having underlying CHD, there was history of suck rest suck cycle while feeding. Odd ratio was 4.8 with CI (1.9-19.5) with a P value of 0.010, which is significant. Conclusion: The study reveals the close association between Forehead sweating and suck rest suck cycle with Congenital Heart Disease(CHD). Both these symptoms should be considered as significant parameters in the diagnosis of CHD in children age less than one year living at high altitude.

Keywords: Forehead sweating, suck rest suck cycle, Congenital Heart Disease, Neonates, High Altitude.

INTRODUCTION

Congenital heart disease in babies is one of the most common types of birth defects, which happens due to abnormal development of the heart in the womb. The reported incidence is 1 per 100 live births irrespective of economic and geographic variations. While most heart defects can be easily diagnosed by the ultrasound scan during pregnancy, others are diagnosed after the baby is born. Serious heart defects present early in infancy may not be picked up until a child is older. The baby can remain undiagnosed for a long time if a thorough check-up hasn’t been conducted post-birth.

A child, who is not gaining weight after proper feeding, may be suffering from an underlying heart condition. Normally, a mother produces enough milk for a child’s consumption. If the child’s weight is not increasing in spite of having adequate breast milk or formula feeds, he/she may be unable to take adequate amount or lose energy due to rapid breathing. Such babies tend to get tired and stop feeding, followed by hunger, also popularly known as “suck rest suck cycle”.

Usually a normal baby sucks breast milk for 10 to 20 minutes continuously. Sucking is an energy burning process. But in congenital heart disease the baby is exhausted due to decreased oxygen supply. The energy will not be sufficient as it is consumed to do normal cardiac work and breathing. So the baby takes some rest in between and sucks again. Baby may suck for 2 minutes, then take rest for 5 minutes and suck again for 2 minutes. So it is called suck-rest-suck cycle. Babies with Congenital heart disease are also likely to be sweaty excessively during feeding specially on forehead. (diaphoresis)

There is paucity of studies investigating association between Forehead sweating and suck rest suck cycle with congenital heart disease. Thus, the present study, conducted in a tertiary care center, attempted to find association between Forehead sweating and suck rest suck cycle with Congenital Heart Disease(CHD) in newborns/infants.
Aims and Objectives

The aim of the study is to find association between Forehead sweating and suck rest suck cycle with Congenital Heart Disease (CHD) in newborns/infants.

MATERIAL AND METHODS

Type of study: Cross-sectional observational study

Study population: Children age between 0 to 1 year with suspected heart disease

Study period: 1 year (July 2018 to June 2019)

Setup for study: Tertiary care set up.

Source: Outdoor and indoor services of department of pediatrics IGMC, Shimla.

Ethical approval: This study was conducted after approval from ethical committee of IGMC, Shimla.

Data collection: After taking pre informed consent for this study from parents or guardians, the data related to age, gender, altitude of residence was collected.

Confirmation of CHD: Presence of CHD was confirmed based on echo-cardiographic evidence of CHD. All children suspected to have CHD based on initial symptoms underwent echocardiography examination using echo machine model I E 33 of Philips medical system Pvt. Ltd. using pediatric and neonatal probe by consultant cardiologist. The 2D echo images were obtained and reviewed real time from subcostal, apical 4 chambers, parasternal long and short axis and suprasternal views supplemented with color flow imaging. Pulse and continuous wave doppler interrogation as appropriate. The presence of CHD on echocardiography was taken as the CHD present.

Data Analysis

The data was reported as frequency and percentages for categorical variables and mean ± sd for continuous variable with normal distribution. The diagnostic performance was tested by calculating sensitivity, specificity, positive and negative predictive value using two by two tables. Two sided p value of <0.05 was taken as the statistically significant. The data was analyzed using Epi Info version 7 software.

RESULTS

In our study there were 102 participants in total. Out of them 57 participants were ≤1 month of age i.e. 57(55.90 % of total, 29(28.4%) between 2-6 months, 16(15.7%) between 7-12 months. There were 55 males and 47 females. Most of the participants i.e. 41(40.2%) were residents of altitude ranging between 2000-3000 meters. In the present study, Suck rest suck cycle was present in 32(31.4%) and Forehead sweating in 33(32.4%), out of 102 study participants (Table 1).

In the present study, out of 79 study participants having underlying CHD, among them 31(39.2%) patients had history of forehead sweating. Odd ratio was 5.01 with CI(1.25-20.16) with a P value of 0.005 which is highly significant. In 30(38.0%) patients out of 79 study participants having underlying CHD, there was history of suck rest suck cycle while feeding. Odd ratio was 4.8 with CI (1.9-19.5) with a P value of 0.010, which is significant. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of Forehead Sweating in diagnosing CHD is 39.24 %, 91.3%, 93.94 % and 30.43% respectively. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of Suck rest cycle in diagnosing CHD is 37.97 %, 91.3%, 93.75 % and 30.00% respectively.

Table 1. Socio-Demographic Characteristics of the Study Participants

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Category</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-demographics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (in months)</td>
<td>≤1 month</td>
<td>29(28.4%)</td>
<td>28(27.4%)</td>
<td>57(55.9%)</td>
</tr>
<tr>
<td></td>
<td>2-6 months</td>
<td>16(15.6%)</td>
<td>13(12.7%)</td>
<td>29(28.4%)</td>
</tr>
<tr>
<td></td>
<td>7-12 months</td>
<td>10(9.8%)</td>
<td>6(5.8%)</td>
<td>16(15.7%)</td>
</tr>
<tr>
<td>Mean age</td>
<td>2.86±3.53 months</td>
<td>14(13.7%)</td>
<td>10(9.8%)</td>
<td>24(23.5%)</td>
</tr>
<tr>
<td>Altitude(m)</td>
<td>≤1000</td>
<td>22(21.5%)</td>
<td>19(18.6%)</td>
<td>41(40.2%)</td>
</tr>
<tr>
<td></td>
<td>1000-2000</td>
<td>22(21.5%)</td>
<td>18(17.6%)</td>
<td>37(36.3%)</td>
</tr>
<tr>
<td></td>
<td>&gt;2000</td>
<td>19(18.6%)</td>
<td>18(17.6%)</td>
<td>37(36.3%)</td>
</tr>
<tr>
<td>Clinical feature</td>
<td>Suck rest suck cycle</td>
<td>22(21.5%)</td>
<td>11(10.7%)</td>
<td>33(32.4%)</td>
</tr>
<tr>
<td></td>
<td>Forehead sweating</td>
<td>22(21.5%)</td>
<td>11(10.7%)</td>
<td>33(32.4%)</td>
</tr>
</tbody>
</table>

Table 2. Diagnostic Performance of Forehead Sweating and Suck Rest Suck Cycle in Diagnosing CHD

<table>
<thead>
<tr>
<th>CHD</th>
<th>Absent N(%)</th>
<th>Present N(%)</th>
<th>Total N(%)</th>
<th>Odds ratio (95% CI)</th>
<th>P value</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
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</thead>
<tbody>
<tr>
<td>Forehead Sweating</td>
<td>Yes</td>
<td>2(8.7)</td>
<td>31(39.2)</td>
<td>33(32.4)</td>
<td>5.01</td>
<td>0.005</td>
<td>91.3</td>
<td>93.94</td>
<td>30.43</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>21(91.3)</td>
<td>48(60.8)</td>
<td>69(67.6)</td>
<td>1.25-20.16</td>
<td>0.010</td>
<td>37.97</td>
<td>91.30</td>
<td>93.75</td>
</tr>
<tr>
<td>Suck rest Cycle</td>
<td>Yes</td>
<td>2(8.7)</td>
<td>30(38.0)</td>
<td>32(31.4)</td>
<td>4.8</td>
<td>0.010</td>
<td>37.97</td>
<td>91.30</td>
<td>93.75</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>21(91.3)</td>
<td>49(62.0)</td>
<td>70(68.6)</td>
<td>1.9-19.5</td>
<td>0.010</td>
<td>37.97</td>
<td>91.30</td>
<td>93.75</td>
</tr>
</tbody>
</table>
DISCUSSION

An important area concerning morbidity among infants with congenital heart defects (CHD) is related to feeding problems like forehead sweating and suck rest suck cycle where the child suckles for a short while, gets tired easily, rests for a while and again starts to suckle3,4.

Poor nutritional status resulting from inadequate feeding capabilities in neonates with CHD often leads to an imbalance of energy intake, thus resulting in growth failure  Due to compromised cardiopulmonary function, these infants may need a longer time to feed or may present with a lack of appetite and food refusal3,4.

The present hospital based cross-sectional observational study was conducted among patients aged 0-1 year for a period of one year from July 2018 to June 2019. The primary aim of the study was to find association between failure to thrive (FTT) and Congenital Heart Disease(CHD) in newborns/infants. In the current study, 102 patients coming to pediatric OPD or indoor were included on the basis of criteria of suspicion and clinical parameters to detect CHD5.

In the present study, 79(77.5%) patients (46 male and 33 female) were detected to have underlying congenital heart disease out of total 102 patients. Maximum 57(55.9%) patients were of ≤1 month of age group and among them 44 (77.19%) had underlying congenital heart disease. So therefore, it is essential to recognize congenital heart disease in the early stages as the deterioration is sudden and, most of the children with complex heart disease die at presentation or before any surgical intervention is made5.

In the present study, out of 79 study participants having underlying CHD, among them 31(39.2%) patients had history of forehead sweating. Odd ratio was 5.01 with CI (1.25-20.16) with a P value of 0.005 which is highly significant. In 30(38.0%) patients out of 79 study participants having underlying CHD, there was history of suck rest suck cycle while feeding. Odd ratio was 4.8 with CI (1.9-19.5) with a P value of 0.010, which is significant.

The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of Forehead Sweating in diagnosing CHD is 39.24 %, 91.3%, 93.94 % and 30.43% respectively. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of suck rest cycle in diagnosing CHD is 37.97 %, 91.3%, 93.75% and 30.00% respectively. It means that both forehead sweating and suck rest suck cycle are significant predictors of underlying CHD6.

The goal of feeding any baby is to have steady and continued weight gain. This holds true for babies with congenital heart disease (CHD), although appropriate weight gain may be more difficult. Babies with CHD often need more calories per day than babies with normal hearts, particularly if they are struggling with symptoms of congestive heart failure. This is because their bodies and hearts have to work harder to get blood and oxygen to all parts of their bodies. This causes them to burn more calories. Also, the act of eating can be difficult for babies with CHD. The coordinated suck, swallow and breathing process can be very tiring, causing them to burn more calories6.

CONCLUSION

The study reveals the close association between forehead sweating and suck rest suck cycle with Congenital Heart Disease as there was high specificity and positive predictive value (PPV) of both in diagnosing CHD. Both these symptoms should be considered as significant parameters in screening of CHD in children age less than one year living at high altitude.

REFERENCES

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