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Incidence of Congenital Heart Disease in Children with Recurrent Respiratory Tract Infection in Tertiary Hospital

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Abstract
Background: *Functions of the respiratory and cardiovascular systems have a close relationship. Congenital heart disease (CHD) affect the respiratory system and result in respiratory morbidities. Recurrent respiratory infection is one such morbidity.*
Aim: *To assess the incidence of CHD in patients presenting with recurrent lower respiratory tract infection (LRTI) and the incidence of different types of CHD in patients detected with congenital heart defects.*
Materials and Methods: *A total of 100 patients with recurrent LRTI were studied (N = 100), which included 60 males and 40 females. All the patients were subjected to clinical examination and were made to undergo chest X-ray, electrocardiography, and 2D echocardiography with color Doppler to detect CHD.*
Results: *Of the 100 patients, 43 patients (23 [53.4%] males and 20 [46.5%] females) with recurrent LRTI were found to have CHD.*
Conclusions: *The results reveal that CHD is a major cause for recurrent LRTI. Considering this, it would be prudent to screen all children presenting with recurrent LRTI for CHD.*
Keywords: *Congenital heart disease, Pulmonary hypertension, Pneumonia.*

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I. Introduction

Functions of the respiratory and cardiovascular systems have a close relationship. Congenital heart disease (CHD) affect the respiratory system and result in respiratory morbidities. Recurrent respiratory infection is one such morbidity. In the presence of congenital anomalies of the circulatory system, the ability of the heart to increase systemic and/or pulmonary blood flow is often limited; arterial partial pressure of oxygen may be decreased by shunt lesions, affecting oxygen delivery to the tissues. Often the circulatory derangement also places stress on the respiratory system itself, resulting in signs and symptoms that mimic primary respiratory disease. Recurrent lower RTI (LRTI) refers to 2 or more hospitalization in 6 months or 3 hospitalization for RTI in any time frame .[1-3] The etiology of RTI is numerous, infections (viral, bacterial) being the most common . However, underlying CHD may be the predisposing factor for recurrent RTI. Although, congenital defects in the small left-to-right shunts do have symptoms, such as recurrent LRTI and failure to thrive, during early childhood, screening this subset of patients for CHD is worthwhile. Early detection and appropriate management of CHDs can provide a child ample time for catch-up growth, reduce the morbidity and mortality risk associated with each episode of LRTI, significantly reduce the financial burden on the family, and prevent long-term morbidities. Early and accurate diagnosis of CHD in children presenting under the disguise of recurrent LRTI requires prompt, effective, and systematic approaches including detailed medical history collection and thorough clinical examination.

Aim

To assess the incidence of CHD in patients presenting with recurrent LRTI and the incidence of different types of CHD in patients detected with congenital heart defects.

II. Materials And Methods

This study was conducted at the Department of Pediatrics, RAJENDRA INSTIUTE OF MEDICAL SCIENCES (RANCHI, JHARKHAND, INDIA) between September 2014 and August 2015.

III. Inclusion Criteria

The patients were initially said to have recurrent LRTI based on the following Indian Academy Of Pediatrics '(IAP) criteria.

1. At least 2 episodes of pneumonia occurring in 1 year or 3 episodes of pneumonia occurring over any period of time
2. Between 2 different episodes of recurrent pneumonia the individual recovers completely but without radiologic improvement

Exclusion Criteria

1. Those unwilling to undergo chest X-ray, electrocardiography (ECG), and echocardiography (ECHO)
2. Those already operated for CHD
3. Known cases of bronchial asthma

Study Procedure

Detailed medical history of all the 100 patients was collected. All patients underwent thorough clinical examination followed by investigative workup .

Chest X-ray, ECG, and 2D ECHO with color Doppler were performed by a pediatrician and then the finding were confirmed by a cardiologist. Routine investigations such as hemoglobin (Hb) level, total count (TC), different count (DC), erythrocyte sedimentation rate (ESR) were also conducted.

IV. Results

A total of 100 patients with recurrent LRTI were studied (N = 100), which included 60 males and 40 females. Of the 100 patients, 43 patients (23 [53.4%] males and 20[46.5%] females) with recurrent LRTI were found to have CHD.

Tables 1 to 3 show the incidence of different types of CHDs in patients with recurrent LRTI detected with congenital heart defects.

Table 1. Type of CHD in patients with Recurrent LRTI

Type Of Chd	No. Of Patients	Percentage
Acyanotic	39	90.7
Cyanotic	4	9.3
Total	43	100

Table 2. Types of ACHD in patients with Recurrent LRTI

Type Of Achd	No. Of Patients	Percentage
Vsd	17	43.6
Asd	11	28.2
Pda	7	17.9
Vsd+Asd	3	7.7
Mvp	1	2.5
Total	39	100

Table 3. Types of CCHD in Patients with Recurrent LRTI

Types Of Cchd	No. Of Patients	Percentage
Tof	2	66.66
Single Ventricle	1	33.33
Total	3	100

Tables 4 & 5 show the age distribution of patients with recurrent LRTI and CHD respectively.

Table 4. Age distribution of patients with recurrent LRTI

AGE	Percentage
<1 y	27
1-5 y	45
6-10 y	21
>10 y	7

Table 5. Age distribution of patients with CHD

AGE	Percentage
<1 y	35
1-5 y	40
6-10 y	15
>10 y	10

V. Discussion

CHD is one of the underlying cause for recurrent LRTI, which when detected early and treated appropriately can prevent the child from developing irreversible and untreatable conditions such as pulmonary hypertension, Eisenmenger syndrome, thromboembolic phenomenon, and sudden death. In this study, the incidence of CHD among children was found to be 43%. This is significantly higher than its incidence among the general population (6-8%). This signifies that CHD is a major cause for recurrent LRTIs. Hence, it is important to identify children with recurrent LRTI and screen them for any underlying CHD using through physical and clinical examinations. Chandramouli[4], in his study on 2613 children < 24 months old with CHD, reported that bronchiolitis (LRTI) was the commonest cause of hospitalization (54.1%). Gupte et al[5] reported that CHDs are present in 36% patients with recurrent LRTI.

Type of CHD in patients with recurrent LRTI

Majority of children had acyanotic congenital heart disease (ACHD) (39/43). Similar results were reported in studies conducted by Shreshta et al,[6] and Suresh et al,[7] in India. Three cases were found to have CCHD, of which 2 cases had tetralogy of fallot (TOF). One child have single ventrical.

Age distribution

Most of the children with recurrent LRTI were aged between 1 and 5 years and most children with CHD were also in age group of 1 to 5 years. Thus the incidence of CHD is common in that age group with statistically significant (P=.03).

VI. Conclusion

The result show that the CHD is major cause for recurrent LRTIs. Considering this, it would be necessary to screen all children presenting with recurrent LRTI for CHD in clinical practice.

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