What Is the Role of *Chlamydia pneumonia* in Rhinosinusiits of Children?

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Abstract- Chlamydia pneumoniae is a common respiratory pathogen which is often found in our paediatric populations. Many patients with community-acquired pneumonia caused by C. pneumoniae have symptoms suggestive of sinusitis**.**the role of *C. pneumonia* in rhinosinusiits children (Meanage =4.3 ±2.5year). This case control study was done in the pediatric and ENT clinics of Hazrat Rasul Hospital in Tehran (2004-2005). This study based on diagnostic parametersfor rhinosinusitis cases and controls .Serum Specific antibodies (IgG & IgM) against Chlamydia. Pneumonia detected in 51 cases and 31 controls. Nasopharyngeal swabsfor detection the Chlamydia.p –DNA by PCR used in all cases and controls. Acute infection (IgM) obtained in 11%(6/51); previous immunity (IgG) in none(0/51) of rhinosinusitis cases.Acute infection (IgM) detected in 6.5% (2/31);previous immunity (IgG) in 13.3%(4/31) of controls and dependent to age (P=000). Acute infection(IgM)had not significant difference (P= 0.7) between cases and controls but previous infection(IgG) was significantly higher in controls (0.007).Active infection(DNA- PCR)not obatained in cases . Acute infection (IgM)in cases was twice higher than controls.None of cases had previous immunity to chlamydial infection (IgG). It was significantly lower thanhealthy controls (P =0.01). These serological results had different results in compare with its role in pneumonia study but it was closer to adenoid study (16%). Adenoid may act as a reservoir for bacteria causing sinusitis, lung and chronic ear infection.We recommend specific antibiotics for *C. pneumonia* in resistant sinusitis to usual drugs especially in cases accordance with adenoiditis and adenoid hypertrophy before surgery.

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Key words: Rhinosinusitis, ELISA test, PCR (poly merase chain reaction), Chlamydia pneumonia

Introduction

Paranasal sinuses are a common place for infection in children and adults.Sinusitis can occur as an acute, subacute, recurrent acute, or chronic clinical disease process in children (1-3). Early and effective antibiotic treatment is nessarry for reduction of infectious period and reduces of mucosal injuries and involvements of orbit or CNS (1,2).

Sinusitis most often manifests as a prolongation or complication of a viral upper respiratory tract infection. Upward of 5 to 13% of children may experience sinusitis, but precise incidence data are not available because many imaging techniques currently available are inappropriate procedures for a prospective pediatric survey (1-3).

Diagnosis of sinusitis can be made on the basis of a careful history and physical examination .Immaging studies reserved for confirmation of clinical impression or documentation of disease. Although fiberoptic rhinoscopy is used more frequently as an adjunct in adults for the evaluation and management of sinusitis, more studies need to be performed to document its clinical usefulness in children (4,5).

Rhinosinusitis is one of the most common cause of medical visit by pediatrician in our hospital (6). Previous studies in Tehran showed sinusitis is common in children.It concluded immunologic evaluation in children with sinusitis necessary especially in chronic or resistant ones (7).

Chlamydia pneumoniae is a common respiratory pathogen in our paediatric populations (8,9) Little is

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known about the true colonization rate and the localization of the bacteria in the respiratory tract (10-17). Although many patients with community-acquired pneumonia caused by C. pneumoniae have symptoms suggestive of sinusitis, isolation of the organism from the maxillary sinus of a patient with sinusiti sreported only in one (11).

Chlamydia pneumoniae isolated in 57% of pneumonia cases with mean age 3.7 years.Serologicaly acute chlymidial infection(IgM) was higher in pneumonia case sthan controls (P >0.001).

In other study in Rasul hospital Chlamydia p-DNA detected in adenoid tissueof 16% of adenoidectomized children (9). Main goal of this study is to determine the role of *C. pneumonia* in children with rhinosinusiits .

Patients and Methods

This case control study was carried out in the pediatric and ENT clinics of Hazrat Rasool Akram Hospital in Tehran (2004-2005)

Simple sampling was used for cases

Our study group consists of 81 children with rhinosinusitis and 31children without rhinosinusitis as our controls (healthy group). All case and control groups aged less than 14 years old.

Diagnostic parameters for rhinosinusitis was based on clinical and imaging diagnostic parameters for rhinosinusitis criteria (4).

This study was approved by the Ethical Committee in the ENT department, Rasul Hospital.

Inclusion and exclusion criteria

Rhinosinusitis cases selected From Upper Respiratory Tract Infection(URTI) by symptoms duration: symptoms in sinusitis persist more than 10 days so all patients with duration of symptoms last less than 10 days should consider as having URTI and exclude from the study. We excluded all cases with immunodeficiency abnormalities; patients had any antibiotic treatment especially Macrolides before blood sampling.

Our control group consists of children who were hospitalized for elective general surgery in the general surgery ward (i.e. appendicitis, hernia, etc.). These cases were age matched with rhinosinusitis cases.. They were visited by pediatrician before surgery .They selected as controls only if they had not rhinosinusitis and difficult infection after appropriate physical exams.We used their extra blood (which was taken for their routine blood tests before their respective surgery) for the serologic tests.

Initially a questionnaire was completed by an authorized physician for each case and control, followed by a complete clinical exams.Imaging studies including parsnasal sinus X-Ray and/or sinus CT scan done only for cases.

We performed.Nasopharyngeal swabs for Chlamydia.p - PCR in both cases and controls.

Blood samples (2 ml) of each child were centrifuged and transferred to our research laboratory. The serum was restored in -20°c temperature freezer until the serologic examination was performed. The centrifuged blood specimens were screened using an assay for Chlamydia.p IgM and IgG antibodies.

Serological test

The evaluation of specific Chlamydia.p IgG and IgM antibody were carried out with commercial kits (Chemicon, Germany) Both kits were used and the results were interpreted as suggested by the Manufacturer. Results were calculated qualitatively.

DNA extraction done for Nasopharyngeal swabs samples by gel eletrophoresis. Chlamydia. p- DNA detected in both case and control group by Chlamydia.p - DNA PCR kits (Chemicon Germany).

Statistical analysis

The Student's t test was used to determine significant differences in means for all continuous variables. Chi square values (CI 95%, P<0.05) were calculated for all categorical variables. All analyses were conducted using SPSS10 software.

Results

Demographic pattern: The age of the rhinosinusitis children (cases) was 1 -10 year, Mean=4.3 ±2.5year (Figure 1). 70% of children aged less than 5 years old. 58.7% of children were male; 41.7% were female.

Duration of rhinosinusitis in cases were; 46.4% less than 2weeks; 51.5% between 2-4weeks;2.1% more than 1 months. Site of sinus involvement in cases were: 10.4% pan sinusitis; 77.6% maxillary ; 9% frontal and 3% ethmoid sinuses.

PCR results

All results of DNA-Chlamydia by PCR were negative in cases and controls.

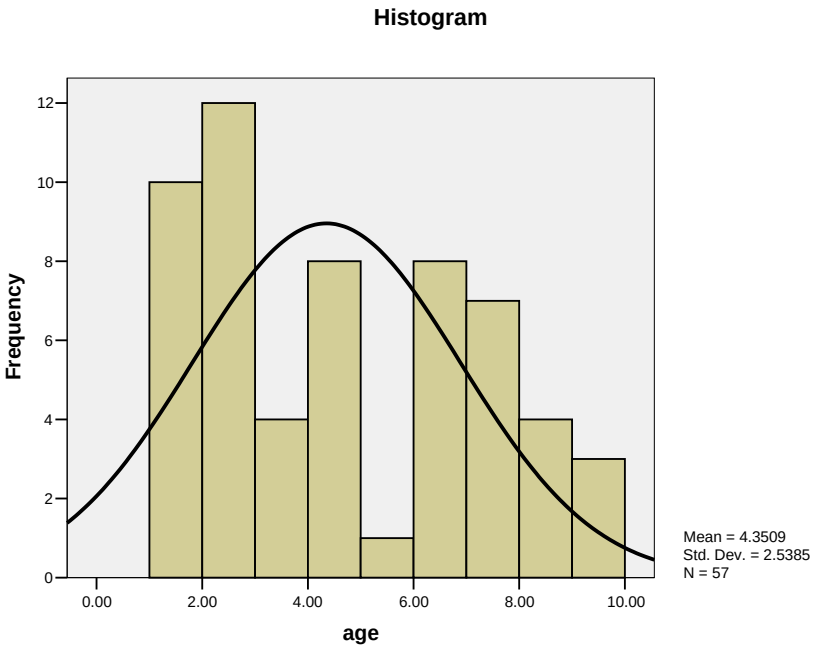

Figure 1. Age distribution(in years) in rhinosinusitis cases

Serologic results

Serologic results in rhinosinusitis children detected acute infection (IgM) in 11% (6/51) and previous immunity (IgG) in none (0/51) of them. Serologic results in control children detected acute Chlamydia infection (Chlamydia -IgM) in6.5%(2/31), previous immunity (IgG) in 13.3%(4/31) of them. Acute infection was not significant difference (CI 95%; *P*= 0.7) between case and control groups (Figure 2). Previous infection (Chlamydia-IgG) was significantly higher in the control group (*P* =0.016). Mean age of cases with acute chlamydia infection was not different with others. Previous immunity was dependent to age of patients (*P*=000) (Figure 3).

There were not correlation between acute or previous Chlamydia infection with sex;duration of symptoms and site of sinus involvement in rhinosinusitis children. Duration of rhinosinusitis symptom; site of sinus involvement.were not dependent to age of children.

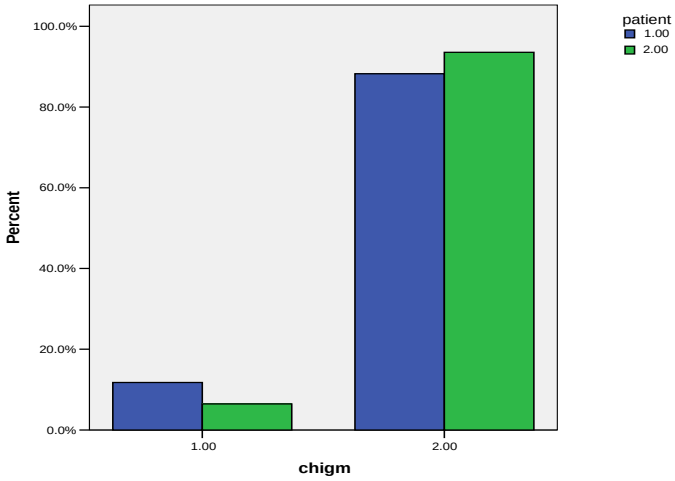

Figure 2. Acute Chlamydia infection (IgM) in cases and controls
Blue: cases ;Green: controls ./1=positive ;2=Negative "

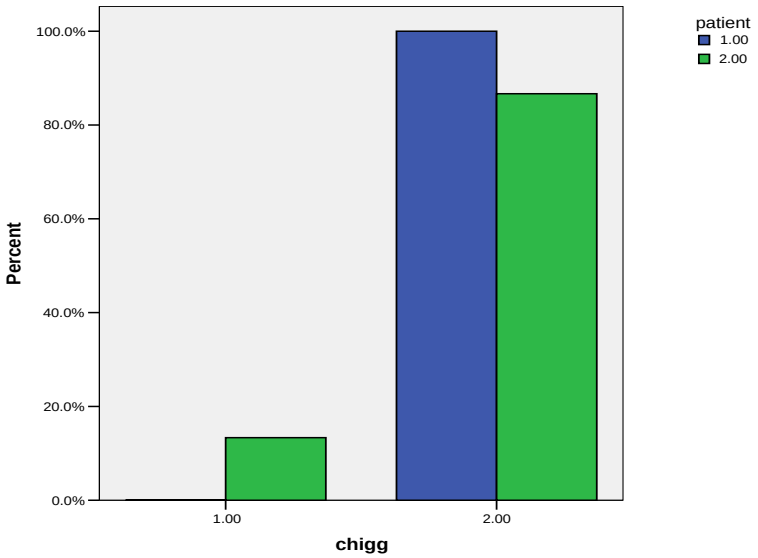

Figure 3. Previous immunity to Chlamydia infection (IgG) in cases and controls
Blue: cases ;Green: controls ./1=positive ;2=Negative

Discussion

Rhinosinusitis is one of the most common health care complaints in our country (7). In present study **,** rhinosinusitis symptoms lasts 2-4weeks in more than 90% of cases.Only in 2.1% of cases symptoms presents more than 1 months. Maxillary sinus (77.6%) is the most common involvement site. Mean age of rhinosinusitis cases was not differ in site of sinus involvement and duration of symptoms.

These results are similar to previous cross/ sectional study in sinusitis cases in Rasul hospital (2003-2004) (7). Mean age of children in both studies is 4year.Sex distribution is same.Maxilary sinuses was the most common site for infection Single Sphenoeid sinus involvement never seen in both studies (7).

Due to negative Chlamydia-DNA in sinus samples probably,Chlamydi.p has not any pathogenic role in rhinosinusitis of children. These results are near to Lee et all study. Atypical bacteria were not identified in patients with Rhinosinusitis despite highly effective PCR methods (11).

We detected Chlamydia-DNA in adenoid tissue of 16% adenoctomized children but not in any rhinosinusitis cases or healthy children.We concluded that .Chlamydia. p has a probable role in adenoid hyoertrophy in adenoidectomized children (9) .

Acute chlamydial infection (IgM) seen in 11% of rhinosinusitis cases which is twice in compare with healthy controls (6.5%). previous chlamydial infection (IgG) did not seen in any cases but in 13.3%(4/31) of control (P =0.01).

Previous immunity was dependent to age of patients (P=000).

Serological results in present study are closer to "adenoid study" (9).

Rate for acute Chlamydial infection (IgM) were higher in rhinosinusitis cases (6% vs 2% in of adenoeidectomized children). Previous chlamydia infection (IgG) were higher in adenoeidectomized children(11.8% vs 0% in rhinosinusitis cases). Higher rate for previous chlamydial infection in adenoid study are due to higher age of children (mean age 7.9 years in adenoeid vs 4.4 years in rhinosinusitis study). Previous Chlamydial infection in healthy children were higher than both rhinosinusitis and adenoeid cases (P=0.01).

Chlamydi pnemonia, had a prominent role in pneumonia in children with (mean age 3.8years) (8). Most of children were seropositive (Chlamydia- IgG) in 5 years old. Acute chlymidial infection(IgM) was significantly higher in pneumonia children (P>0.001). Previous Chlamydia infection (IgG) was same in pneumonia and healthy children (8). Those results(8) were closer to Volanenet etal study (18). We agree with Volanenet et al (18) that C. pneumoniae infections probably occur commonly already at an early age, and that the infections are often asymptomatic. Consecutive high IgG and IgA antibody concentrations at the ages of 7 and 8 y

indicate that persistent seropositivity for both antibodies may already develop in young children (18)

We did not detect Chlamydia-DNA in sinus sample of both rhinosinusitis cases and controls. These difference for Chlamydia-DNA detection between rhinosinusitis and adenoeid study may due to higher age of children in adenoid study (7.9 years vs 4.4year)

Chlamydia pneumoniae has been isolated from cholesteatoma tissue, middle-ear fluid of children with otitis media (12-15).

Normann et al conclude that C. pneumoniae is a common finding in the adenoids of children undergoing adenoidectomy (16). The adenoid, which has a central role in the development of secretory otitis media (SOM), may act as a reservoir for bacteria causing ear infection (17). In conclusion, we did not find DNA- Chlamydia. Pneumonia infection (PCR) in rhinosinusitis cases. Acute chlamydial infection (IgM) seen in 11% of rhinosinusitis cases which is twice higher than healthy controls.None of rhinosinusitits cases had. previous immunity to chlamydial infection (IgG) which is significantly lower than healthy controls (P =0.01).

Serologicaly results in rhinosinusitis caseswere lower than children with pneumoni but were near closer to adenoid study. We conclude that; *C. pneumoniae* colonized in adenoeid tissue of children. Adenoid may act as a reservoir for bacteria causing sinusitis, lung and chronic ear infection in future.We recommend specific antibiotics for *C. pneumoniae* in rhinosinusits cases accordance with adenoid hypertrophy before surgery. These included erythromycin or other new macrolids;azithromycin, clarythromycinor.

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