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Evaluation of role of passive smoking in severe bronchiolitis in childrens

Dr. Pankaj Kumar Kashyap[1], Dr. AK Jaiswal[2]
[1] Senior Resident, Upgraded Department of Pediatrics, Patna Medical College & Hospital, Patna, Bihar, India
[2] Professor & H.O.D, Upgraded Department of Pediatrics, Patna Medical College & Hospital, Patna, Bihar, India
[*] Corresponding Author: Dr. AK Jaiswal

Abstract
Passive smoking in the family is a major influence in the risk of lower respiratory infections in infants especially on bronchiolitis. Bronchiolitis is the most common lower respiratory tract infection that affects children in the first two years of life and the most common reason for hospitalization in this age group. Hence based on the above findings the present study was planned to assess the role of parental smoking in the development of severe bronchiolitis.
The study was planned in the Upgraded department of Pediatrics, Patna Medical College & Hospital, Patna. Total 100 children were enrolled in the study group. This is a case –control study. Out of 100 children, 50 children with severe bronchiolitis were divided in Group A as cases and 50 were divided in the Group B as control. Chest radiograph was done for the evidence of air trapping in both lungs.
Result: The mean age of patients was 7 (± 3.5) months. 32 (64%) patients were male and 18 (36%) were female. Male to female ratio was 1.7: 1. Most of the cases came from low socioeconomic background. More than half 56% of the cases were not exclusively breastfed. Thirty (60%) cases and eighteen (36%) controls were exposed to smoking. Result was highly significant (p = 0.005). Odds ratio was 2.5.
Conclusion: Exposure to parental smoking causes a statistically significant (p = 0.005, odds ratio 2.5) increase in the risk of developing severe bronchiolitis in first year of life.

Keywords: bronchiolitis, passive smoking, children's

Introduction
Bronchiolitis is a common lung infection in young children and infants. It Causes congestion in the smallest airways (bronchioles) of the lung. Typically, the peak time for bronchiolitis is during the winter months. Bronchiolitis starts out with symptoms of coughing, wheezing and respiratory distress preceded by runny nose with or without fever in young children below 2 years of age particularly between 2 and 6 months of age [1].
Bronchiolitis is usually the result of infection by respiratory syncytial virus (>50% of cases). Other agents include parainfluenza viruses, adenovirus, rhinovirus, and mycoplasma [2]. There is no evidence of bacterial cause for bronchiolitis and bronchiolitis is rarely followed by bacterial superinfection [2]. Based on severity of clinical features, bronchiolitis is classified into mild, moderate and severe [1]. Severe bronchiolitis is characterized by being unable to drink or take feed, severe respiratory distress (chest indrawing, nasal flaring, grunting, and cyanosis), and severe hypoxemia (restlessness, inconsolable cry, and SO_2<95%) [1].
About 10% to 30% of children under the age of five years are affected by bronchiolitis at some point in time. Worldwide 150 million cases occur annually; 10% of these are severe enough to require hospitalisation. 95% of all cases occur in developing country. There is no specific treatment of brochiolitis except for supportive treatment.
The diagnosis is typically made by clinical examination. Chest X-ray is sometimes useful to exclude bacterial pneumonia, but not indicated in routine cases. Preliminary studies have suggested that elevated procalcitonin levels may assist clinicians in determining the presence of bacterial co infection, which could prevent unnecessary antibiotic use and costs [7]. Testing for the specific viral cause can be done but not required on routine basis. RSV testing by direct immunofluorescence testing on nasopharyngeal aspirate had a sensitivity of 61% and specificity of 89% [6].
Risk factors include exposure to cigarette parental smoking, young age, male sex, use of wood burning stoves, non-wing crowded living conditions, not being breastfeed, and premature birth. Environmental tobacco smokes is an important and established risk factor for both susceptibility and severity of bronchiolitis.
Currently, there are 1.3 billion smokers in the world. In developed countries, about 35% of men and 22 % of women are daily smokers. In developing countries like India, there are approximately 120 million smokers. According to 2002 WHO estimate, 70% of adult males and 13-15% of adult females are smokers in India [8]. Passive smoking in the family is a major influence in the risk of lower respiratory infections in infants especially on bronchiolitis [9]. From different studies and observation, it is seen that parental smoking has significant effects in the incidence and severity of acute bronchiolitis. But very few studies are available in our country. Hence based on the above findings the present study was planned to assess the

role of parental smoking in the development of severe bronchiolitis.

Methodology

The study was planned in Upgraded department of pediatrics, Patna Medical College & Hospital, Patna from July 2015 to December 2016. It is a case control study. Its objective is to determine the role of passive smoking in the development of severe bronchiolitis.Total 50 children admitted in ward with severe bronchiolitis were enrolled as cases (group A) and 50 suitably matched healthy children as controls (group). Chest radiograph was done for the evidence of air trapping in both lungs. To differentiate bronchiolitis from pneumonia and asthma, we considered clinical features, white blood cell and differential counts, chest radiograph, and response to bronchodilator.

The approval of the institutional ethics committee was taken before starting the study. All the patients and their parents were informed consents. The aim and the objective of the present study were conveyed to them. The detailed history, clinical examination and relevant investigations were done to rule out any infective focus. Viral testing was not done.

Following was the inclusion and exclusion criteria for the present study.

Inclusion Criteria

- Patients with severe bronchiolitis and passive smoke exposure.

Exclusion Criteria

- Patients with asthmatic wheeze, bacterial pneumonia (proven by clinical, radiological and increased WBC count with neutophilia).

All patient treated with humidified oxygen, parenteral fluids, nebulised adrenaline and 3% NS and in some patient with indigenous CPAP also.

Results

The data from the two study groups, A and B were collected and compared as below. Total 100 childrens were enrolled in the study. The age of patients ranged from 2 to 36 months. Most frequent age group was 2 to 6 months (56%) followed by 7 to 12 months (34%), 13 to 24 months (8%) and 25 to 36 months (2%). 30 (60%) cases were Male and 20 (40%) were female. Male- female ratio was 1.5:1. Most of the cases came from low socioeconomic background. More than half of the cases were not exclusively breast fed. Baseline characteristics between case and controls didn't vary significantly regarding mean age, sex, socioeconomic status, breast feeding and use of wood burning stoves.

Among 50 cases 30 had history of exposure to parental smoking. All exposed cases (30) had history of paternal smoking and no cases of maternal smoking. Among 50 controls, 18 had history of exposure to parental smoking. The value was highly significant: value = 0.005, and odds ratio of 2.5. So parental passive smoking carried 2.5 times risk of developing severe bronchiolitis.

Table 1: Age & Sex Distribution

	Group A	Group B
Condition	**Cases of severe Bronchiolitis**	**Normal cases**
2 to 6 months	28	18
7 to 12 months	17	22
13 to 24 months	4	10
25 to 36 months	1	0
Total	50	50
Sex		
Girl	18	16
Boys	32	34
Total	50	50

Table 2: Different Parameters in Study groups

	Group A	Group B
Condition	**Cases of Bronchiolitis**	**Normal cases**
Family Economic Status		
Lower class	40	40
Middle class	10	10
Education Status		
Literate	15	20
Illiterate	35	30
Birth Weight		
Less than 2 kg	18	16
More than 2 kg	32	34
Passive Smoking		
Yes	30	18
No	20	32
Exclusively breastfed		
Yes	22	20
No	28	30

Discussion

The age of patient ranged from 2 to 36 months: most frequent age group was 2-6 months. Mean age was 7 (±3.5) months. This finding was quite consistent with several studies done earlier.

The Sex distribution of the patients (male: female; 1.78 : 1) was almost similar to the study of Bashar *et al*. [11] who found male to female ratio 1.8:1 whereas Kabir *et al*. Showed male to female ratio 2.7:1 [12]. Denicola found males 1.6 times more likely to be hospitalized with bronchiolitis than females, male to female ratio was 1.5:1, and death was 1.5 times more likely in males [13]. Semple *et al.* found male sex significantly associated with severity of the disease [14]. The reason seems to be anatomical nature that boys have shorter and narrower airways and are more likely to develop bronchial obstruction in case of RSV infection.

Jones *et al.* found in their meta-analysis that smoking by either parent or other household members increased the risk of bronchiolitis by odds ratio of 2.51 [8]. In the present study, all exposed cases of severe bronchiolitis (30 out of 50) had history of only paternal smoking and there was no history of maternal smoking or both. Jones *et al*. [9] found odds ratio 1.22 for paternal smoking and 1.62 for both parental smoking. Strachan and Cook [10] described a causal relationship between parental smoking and acute lower respiratory illness where odds ratios were 1.57 for smoking by both parent and 1.72 for maternal smoking. Schvartsman *et al*. [14] found that children

were more affected by maternal smoking than paternal one. Jurado *et al*. [15] described a greater influence of exposure to maternal smoking than paternal smoking in the development of respiratory symptoms in young children.

Conclusions

The data generated from present findings concludes that exposure to all types of passive smoke, in particular maternal smoking, causes a statistically significant (p = 0.005, odds ratio = 2.5) increase in the risk of infants developing severe bronchiolitis in the first two years of life, and provides further precision in the estimates of the magnitudes of those effects in relation to differences in the source and extent of passive smoking in the home. Passive smoking in the family home is a major influence on the risk in infants, and especially on bronchiolitis. Risk is particularly strong in relation to post-natal maternal smoking. Strategies to prevent passive smoke exposure in young children are an urgent public and child health priority.

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