DOI: 10.7860/JCDR/2015/12126.6309

Original Article

Paediatrics Section

The Incidence of Allergic Disorders in First Degree Relatives of Neonates with Transient Tachypnea of Neonate

MOJGAN SAFARI[1], BEHNAZ BASIRI[2], MEHDI GHAEENI[3]

ABSTRACT

Background: The role of maternal allergic disorders to increase the risk of Transient Tachypnea of Neonate (TTN) in neonates remained unclear. We determined the incidence of allergic disorders in first degree relatives of neonates suffered from TTN to clear role of these allergic disorders to predispose TTN in neonates.

Materials and Methods: In a cross-sectional study carried out at Fatemieh hospital between September 2010 and September 2011, all consecutive neonates with the diagnosis of TTN were included into the study. Those neonates were not treated after 5 days of hospitalization were excluded. Baseline information with regard to the history of allergic diseases among first degree relatives of neonates were charted from family members using a structured questionnaire at enrolment by interviewing and examination if required.

Results: The two groups were matched for baseline data including neonate gender, birth weight, and type of delivery. In the TTN group, one of first degree relatives (2.9%) suffered from bronchial asthma and two of them (5.7) had atopic dermatitis. In total, allergic diseases was revealed in 8.6% of first degree relatives of neonates with TTN. Besides, none of the first degree relatives of neonates in healthy neonates group experienced bronchial asthma or atopic dermatitis. Allergic rhinitis was not also found in the relatives of the two study neonates groups. Comparing incidence of allergic diseases in first degree relatives of neonates in TTN and healthy groups showed no significant difference (8.6% in TTN group versus 0.0% in healthy group, p = 0.076).

Conclusion: Our study showed that the incidence of allergic disorders in first degree relatives of neonates suffered from TTN is higher than healthy newborns, but these differences are not statistically significant.

Keywords: Atopic dermatitis, Bronchial asthma

INTRODUCTION

Transient Tachypnea of Neonate (TTN) was described for the first time by Avery in 1966 as transient defect of respiratory system in neonate due to delaying absorption of intra-alveolar fluid [1]. This event usually appeared early after birth and disappeared within 5 days after that time. This phenomenon can result in early inappropriate results in neonates, but because of quickly removing, the risk of its-related respiratory disorders and other long-term adverse outcome is low [1]. Meanwhile, preterm delivery, caesarean section, and male gender have been associated with increased risk of TTN occurrence in neonates [2].

In this context, the role of maternal allergic disorders to increase the risk of TTN in neonates remained unclear. Bronchial asthma that can be observed in 0.4% to 1.3% of pregnant women is the most common allergic disorder [3-5], affecting and complicating pregnancy that result in neonatal death, preterm birth, low birth weight, and preeclampsia [6-8]. Furthermore, the development of asthma is partly determined by genetic factors, which suggests that the familial predisposition of these allergic disorders is a possible risk factor for future respiratory disorders in next generations [9,10]. Although this subject has been evaluated in some previous studies, the effect of a first-degree family history of atopy instead of a first degree family history of asthma was more studied [11-13]. Also, in some studies, no multivariable adjustment was made for potential confounders [14] and in some others a control group of infants without a first-degree familial predisposition of asthma was lacking [15].

In this case-control study, we determined the incidence of allergic disorders in first degree relatives of neonates suffered from TTN to clear role of these allergic disorders to predispose TTN in neonates.

MATERIALS AND METHODS

In a cross-sectional study carried out at Fatemieh hospital between September 2010 and September 2011, all consecutive neonates with the diagnosis of TTN were included into the study. Those neonates were not treated after 5 days of hospitalization were excluded because all TTN subjects were expected to be treated within 5 days of admission and treatment schedule. The neonates without diagnosis of TTN considered as control. The study samples were selected and matched using pair (individual) matching method so that the two groups were matched in terms of birth weight, gestational age, type of delivery, sex of neonate, as well as maternal diabetes status.

The study was approved by the Research Ethics Committee of Hamadan University of Medical Sciences. Informed written consent was obtained from the parents of the children. Baseline information with regard to the history of allergic diseases among first degree relatives of neonates were charted from family members using a structured questionnaire at enrolment by interviewing. All first degree relatives answered a questionnaire designed to determine the presence of allergic diseases including bronchial asthma, atopic dermatitis, and allergic rhinitis. All suspected cases to allergic diseases were also examined by the specialist and their diagnosis was confirmed or the disease was ruled out. Bronchial asthma was diagnosed according to the American Thoracic Society definition of asthma, with symptoms of episodic wheezing, cough and shortness of breath responding to bronchodilators, and reversible airflow obstruction documented in at least one previous pulmonary function study [16]. Atopic dermatitis was considered in a patient with symptoms and signs of a itchy rash on the flexural area that had been present in the last 12 months [17]. Allergic rhinitis was also defined as having the symptoms of nasal congestion, an itchy

nose, sneezing and running nose without a cold in the past 12 months [18].

STATISTICAL ANALYSIS

Statistical significances of the differences between the groups were assessed by the χ^2 test for proportions. The Fisher exact test was used when the expected frequency for any cell was <5. Two-tailed tests were used in all analyses. P-value < 0.05 was regarded as statistically significant. The data were analys ed using SPSS software version16.0 (SPSS Inc, Chicago, IL).

RESULTS

The mean gestational age in both groups was 37.03 ± 1.84 weeks. Among studied neonates in the TTN and control group, 25 neonates (71.4%) were male and 28.6% were female. As presents in [Table/Fig-1], the two groups were matched for baseline data including neonate gender, birth weight, and type of delivery.

Characteristics	TTN neonates (n = 35)	Healthy neonates (n = 35)
Gestational age (wk)	37.03±1.84	37.03±1.84
Neonate gender		
Male	25 (71.4%)	25 (71.4%)
Female	10 (28.6%)	10 (28.6%)
Type of delivery		
Caesarean section	18 (51.4%)	18 (51.4%)
Vaginal delivery	17 (48.6%)	17 (48.6%)
Birth weight		
1900 – 2500 grams	8 (22.9%)	0 (0.0)
2550 – 3000 grams	13 (37.1%)	23 (65.7%)
3050 – 3550 grams	7 (20.0%)	12 (34.3%)
3550 – 4500 grams	7 (20.0%)	0 (0.0)

[Table/Fig-1]: Baseline information in TTN and healthy neonates

[Table/Fig-2] gives and compares the incidence for allergic diseases in first degree relatives of neonates. In the TTN group, one of first degree relatives (2.9%) suffered from bronchial asthma and two of them (5.7) had atopic dermatitis. In total, allergic diseases was revealed in 8.6% of first degree relatives of neonates with TTN. Besides, none of the first degree relatives of neonates in healthy neonates group experienced bronchial asthma or atopic dermatitis. Allergic rhinitis was not also found in the relatives of the two study neonates groups. Comparing incidence of allergic diseases in first degree relatives of neonates in TTN and healthy groups showed no significant difference (8.6% in TTN group versus 0.0% in healthy group, p = 0.076).

Characteristics	TTN neonates (n = 35)	Healthy neonates (n = 35)
Bronchial asthma	1 (2.9%)	0
Atopic dermatitis	2 (5.7%)	0
Allergic rhinitis	0	0
Total	3 (8.6%)	0

[Table/Fig-2]: Incidence of allergic diseases in first-degree relatives in TTN and healthy neonates

DISCUSSION

Main findings: In current study and though matching for the confounding effects of important variables, the overall incidence of allergic diseases among first degree relatives of neonates with TTN was similar to the children without TTN. We found an overall history of allergic diseases in first degree relatives of 8.6% of TTN group, while none of the healthy group had positive family history of these diseases. One of the main reasons for this similarity might be due to our small sample size as well as partial short study time period. Despite obtained similar history of allergic diseases in both TTN and healthy groups, our findings could indicate some evidences of low incidence rate of allergic diseases among family members of the affected children in our area, especially among healthy neonate population.

Interpretation of findings in relation to previously published work: The association between maternal allergic disorders particularly asthma and poor outcome of neonates have been studied in most previous studies. In a study by Demissie and his colleagues [6], infants of asthmatic mothers were more likely than infants of control mothers to exhibit TTN of the newborn with the relative risk of 1.7; however after adjusting for important confounding variables, respiratory distress syndrome and maternal asthma were not found to be associated. Similarly, Schatz et al., showed no relationships in the asthmatic cohort between the occurrence of TTN and maternal asthma severity [4]. They also could not show significant differences between asthmatic and matched control subjects in previously defined TTN risk factors, such as the occurrence of longer labours, failure to progress, caesarean sections, premature births, male sex, Apgar scores of less than 7 at 1 minute, or birth weight greater than 4 kg. According to these results, it can be concluded that the presence of the history of allergic diseases in first degree relatives cannot increase the risk of infant TTN or even its severity.

In the present study and for neutralizing the effects of baseline indicators as probable potential confounders, we selected the samples using matching selection method. Various studies could show that gestational age, maternal diseases, twinning, low birth weight, operative vaginal delivery, elective and emergency caesarean section and male sex were risk factors for TT [19]. In fact, the discrepancy between the TTN and healthy neonates groups regarding family history of allergic disorders in first degree relatives can be influenced by these risk factors for occurring TTN so that this claim has been also observed in some previous studies [6].

LIMITATIONS OF THIS STUDY

Potential limitations of the present study include: small sample size, retrospective case-control design and no population-based analysis. Against these limitations, the main strength of our study was using pair (individual) matching method to select patients and healthy group as well as excluding some major maternal confounders such as diabetes mellitus or smoking.

CONCLUSION

In summary, our study showed similar incidence of allergic disorders in first degree relatives of neonates suffered from TTN and healthy newborns.

ACKNOWLEDGEMENTS

This study was supported by Hamedan University of Medical Sciences.

REFERENCES

[1] Hjalmarson O. Epidemiology and classification of acute neonatal respiratory disorders. A prospective study. *Acta Paediatr Scand*. 1981;70:773-83.
[2] Bonafe L, Rubaltelli FF. The incidence of acute neonatal respiratory disorders in Padova County: an epidemiological survey. *Acta Paediatr*. 1996;85:1236-40.
[3] Weinstein AM, Dubin BD, Podleski WK, Farr RS. Asthma and pregnancy. *JAMA*. 1979;241:1161-65.
[4] Schatz M, Zeiger RS, Hoffman GP, Harden K, Korsythe A, Chilingar L, et al. Perinatal outcomes in the pregnancies of asthmatic women: a prospective controlled analysis. *Am J Respir Crit Care Med*. 1995;151:1170-74.
[5] Bahna SL, Bjerkedal T. The course and outcome of pregnancy in women with bronchial asthma. *Acta Allergol*. 1972;27:397-406.
[6] Demissie K, Breckenridge MB, Roads GG. Infant and maternal outcomes in the pregnancies of asthmatic women. *Am J Respir Crit Care Med*. 1998;158:1091-95.
[7] Kramer MS, Coates AL, Michoud MC, Dagenais S, Moshonas D, Davis GM, et al. Maternal asthma and idiopathic preterm labour. *Am J Epidemiol* 1995;142:1078-88.

[8] Wen SW, Demissie K, Liu S. Adverse outcomes in pregnancies of asthmatic women: results from a Canadian population. *Ann Epidemiol*. In press 2001.
[9] Haus M, Heese HD, Weinberg EG, Potter PC, Hall JM, Malherbe D. The influence of ethnicity, an atopic family history, and maternal ascariasis on cord blood serum IgE concentrations. *J Allergy Clin Immunol*. 1988;82:179–89.
[10] Michel FB, Bousquet J, Greillier P, Robinet-Levy M, Coulomb Y. Comparison of cord blood immunoglobulin E concentrations and maternal allergy for the prediction of atopic diseases in infancy. *J Allergy Clin Immunol*. 1980;65:422–30.
[11] Bergmann RL, Schulz J, G¨ unther S, et al. Determinants of cordblood IgE concentrations in 6401 German neonates. *Allergy*. 1995;50:65–71.
[12] Croner S, Kjellman N-IM, Erkisson B, Roth A. IgE screening in 1701 newborn infants and the development of atopic disease during infancy. *Arch Dis Child*. 1982;57:364–68.
[13] Magnusson CGM. Cord serum IgE in relation to family history and as predictor of atopic disease in early infancy. *Allergy.* 1988;43:241–51.
[14] Johnson CC, Ownby DR, Peterson EL. Parental history of atopic disease and concentration of cord blood IgE. *Clin Exp allergy*. 1996;26:624–29.
[15] Kaan A, Dimich-Ward H, Manfreda J, et al. Cord blood IgE: its determinants and prediction of development of asthma and other allergic disorders at 12 months. *Ann Allergy Asthma Immunol*. 2000;84:37–42.
[16] American Thoracic Society. Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease (COPD) and asthma. *Am Rev Respir Dis.* 1987;136:225–44.
[17] Emerson RM, Williams HC, Allen BR. Severity distribution of atopic dermatitis in the community and its relationship to secondary referral. *Br J Dermatol*. 1998;139(1):73-76.
[18] Asher MI, Keil U, Anderson HR, Beasley R, Crane J, Martinez F, et al. International study of asthma and allergies in childhood (ISAAC): rationale and methods. *European Respiratory Journal*. 1995;8:483–91.
[19] Dani C, Reali MF, Bertini G, Wiechmann L, Spagnolo A, Tangucci M, et al. Risk factors for the development of respiratory distress syndrome and transient tachypnoea in newborn infants. Italian Group of Neonatal Pneumology. *Eur Respir J*. 1999;14(1):155-59.

PARTICULARS OF CONTRIBUTORS:
1. Immunology and Allergy Ward, Besat Hospital, Hamedan University of Medical Sciences, Hamedan, Iran.
2. Neonate Ward, Fatemieh Hospital, Hamedan University of Medical Sciences, Hamedan, Iran.
3. Pediatric Ward, Besat Hospital, Hamedan University of Medical Sciences, Hamedan, Iran.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Mojgan Safari,
Pediatric Department, Immuology and Allergy Ward, Besat Hospital, Behesht Street, Hamedan, Iran.
E-mail: mo_sfr@yahoo.com

FINANCIAL OR OTHER COMPETING INTERESTS: The abstract of this article has been presented earlier in The Second International Congress of Immunology, Asthma and Allergy.

Date of Submission: **Nov 15, 2014**
Date of Peer Review: **Mar 19, 2015**
Date of Acceptance: **Apr 13, 2015**
Date of Publishing: **Aug 01, 2015**