Tanaffos(2002)1(1),50-54

©2002 NRITLD, *National Research Institute of Tuberculosis and Lung Disease,Iran*

Asthma in Pregnancy

Khalilzadeh S[1], Poroushani AH[1], Masjedi MR[2]

[1]Department of Pediatrics,[2]Department of Pulmonary Medicine,NRITLD, Shaheed Beheshti University of Medical Sciences and Health Services

ABSTRACT

Background: *Asthma is among the most prevalent disease that may lead to both maternal and fetal complications during pregnancy. Low birth weight and prematurity have been shown to be associated with asthma in some studies. This study was designed to determine the association of asthma and pregnancy.*

Materials and methods: *44 parturients with asthma exacerbation were eligible to be enrolled in this descriptive study. Variables including age, personal smoking, environmental tobacco smoke exposure, number of pregnancies, and maternal age at the time of pregnancy were all determined. Pulmonary function test (PFT) was performed before, after, and during the pregnancy; meanwhile, the fetal status was recorded.*

Results: *The mean age (± SD) of these women was 28.3 ± 5.8 years (range, 15-40). PFT has revealed asthma exacerbation during and after pregnancy in 36.4% and 15.9% of the participants respectively. Pregnancies were led to normal childbirth in 93.2%.*

Conclusion: *Multigravidity (≥3) was associated with postpartum symptom improvement. There was a significant correlation between maternal age of ≥30 and asthma exacerbation during and after the pregnancy.* ***(Tanaffos 2002;1(1):50-54)***

Keywords: *asthma, pregnancy,PFT*

INTRODUCTION

Asthma is the most frequent disease during pregnancy and it is also the most prevalent disease that lead to pregnancy complications. It complicates 1-4% of all pregnancies. Uncontrolled asthma is accompanied by severe maternal and fetal complications, while appropriate treatment could cease prematurity and low birth weight (LBW) (1,2).

The course of asthma durig pregnancy is variable and may improve or remain unchanged, available data indicate that approximately a third of asthmatic women experience worsening some time during pregnancy (1,3). In a study of 293 asthmatic pregnant women, George et al. observed that 3% of them experienced asthma exacerbation and one led to death due to status asthmaticus (4).

Perow et al. have found that in steroid-dependent asthmatic patients, the incidence of prematurity (55%) and LBW-infants (45%) were both increased comparing with the control group (14% and 14%). They also described an increased risk of gestational diabetes and cesarean delivery rate (1).The goal of the present study was to establish the association of pregnancy and asthma.

Correspondence to: Khalil-Zadeh S
Tel.:+98-21-2803550
E-mail address: soheilak@yahoo.com

MATERIALS AND METHODS

44 pregnant women were selected for this descriptive study through a sequential sampling. Variables including age, personal smoking, environmental tobacco smoke exposure, number of pregnancies, and maternal age at the time of pregnancy were all determined. Besides precise physical examinations, pulmonary function test was conducted to all the participants with Vitalograph (UK). Each time, three separate tests were achieved and the highest volumes of FEV_1 (forced expiratory volume), FVC (forced vital capacity), and PEF (peak expiratory flow) were recorded. An expert gynecologist assessed the fetal status during the pregnancy. The study population had been undertaken PFT before, after, and during the pregnancy. Then, they have been distributed in 3 groups of mild, moderate, and severe asthma in accordance with the American Thoracic Society (ATS) guidelines. Statistical analysis was achieved by Pearson, Chi square methods and SPSS software package.

RESULTS

The mean (±SD) age of the study population was 28.3 ± 5.8 years (range, 15-40); mean maternal age at the time of pregnancy was 29.8 ± 5.6 years (range, 16-40); and mean gravidity was 2.36 ± 1.43 (range, 1-6). 22.7% of the patients were passive smoker, whereas 2.3% and 4.5% were active and intermittent smokers respectively. There was no correlation between tobacco smoke exposure and asthma during the pregnancy and after that (p=0.274, and p=0.971 respectively). Multigravidity (≥3) was associated with postpartum symptom improvement (p=0.031); however, this significant relation was not found during the pregnancy (p=0.274).comparison of PFT performed before and during pregnancy revealed that, asthma was improved in 10 cases (22.7%); however it is remained unchanged in 18(40.9%) and exacerbated in 16(36.4%). The same comparison before and after the pregnancy has indicated that asthma was improved in 8(18.1%), exacerbated in 7(15.9%) and remained unchanged in 29(65.9%). (Table.1)

There was a significant correlation between maternal age of ≥30 years and asthma exacerbation during and after the pregnancy (p=0.024, and p=0.058 respectively). The pregnancy outcomes for these 44 asthmatic women were as follows: normal childbirth 93.2%, abortion 4.5%, and premature neonates 2.3%.

DISCUSSION

Pregnancy is associated with physiologic changes in the hormone level and respiratory function. Increase of basal metabolism results in hyperventilation and increased cardiac output. Additionally, changes in chest volume due to diaphragm elevation, increase in transverse diameter of chest, and increase of subcostal angle as well as hormonal changes have all influenced respiratory volumes during pregnancy (5,6).

In a pregnant woman, there is a 20% reduction in the forced residual capacity (FRC) and a proportionally smaller reduction (5%) in the total lung capacity (TLC). Residual volume (RV) decreased, whereas, increase in tidal volume (TV) and inspiratory capacity (IC) may be observed. Since FEV_1 and PEF remained unchanged during pregnancy, which could be used to follow up asthma management follow-up. Meanwhile, multigravidity and excessive weight-gain may be associated with decreased FEV_1 and FVC. (1,7)

Results revealed that 36.4% of the asthmatic women experienced worsening asthma at some time during pregnancy, although improvement was reported in 22.7%. Prior investigators have reported asthma improvement in 25-35% of the cases. According to the previous studies, 10% of all pregnant women were complicated by asthma exacerbation during the delivery. This was mainly occurred in severe cases of asthma or in steroid-dependent asthmatic patients. (1,8)

Table 1. Spirometery results of asthmatic women

PFT results	Severity of Asthma			
Phase*	mild	moderate	severe	normal
Before	23(52.3)	17(38.6)	4(9.1)	0
During	18(40.9)	17(38.6)	7(15.9)	2(4.5)
After	25(56.8)	10(22.7)	7(15.9)	2(4.5)

* regarding the pregnancy

Regarding the PFTs obtained after the pregnancy, asthma was improved in 18.1% of the cases and exacerbated in 15.9%.

Different factors may influence asthma during pregnancy such as allergens, sinusitis (reported in 1-2% of all pregnancies), smoking, gastroesophageal reflux (a third of asthmatic women experience this), and taking different drugs during the course of pregnancy. (9,10)

We have found a significant correlation between maternal age of 30 years and asthma exacerbation during and after the pregnancy. This simply indicates that maternal age could be considered as a risk factor for asthma.

Prior report in 1972 had implied that preeclampsia was more common among asthmatic women. Another study in 1988 had described pregnancy-induced hypertension in asthmatic women; however, other reports indicated that pregnancy-induced hypertension is a transient complication. Lao et al, also demonstrated an increased risk of LBW and cesarean section in asthmatic women, of course, this could be due to higher induction during the labor.

Recent studies have shown 20% of all pregnant women smoke. In the current study, 22.7% were passive smoker, whereas 2.3% and 4.5% were active and intermittent smokers respectively. There was no correlation between tobacco smoke exposure and asthma exacerbation during the pregnancy.

Gestational age is another influencing factor. From 24th to 36th weeks are by far the most susceptible period for asthmatic women. However, asthma is manifested less during the 37 th-40th weeks and its etiology is still remained unknown. (1,14)

We have also found a significant relationship between multigravidity (≥ 3) and asthma improvement after the pregnancy.

Fetal status was assessed by means of ultrasonography and neonatal condition was evaluated as well. LBW and prematurity are strongly associated with asthma severity during pregnancy; meanwhile, a significant relationship was seen between maternal age and asthma exacerbation. (15)

Asthma is one of the most well known risk factors of prematurity and post term delivery in pregnant women (16). In the present study of 44 pregnancy outcomes, prematurity was reported in one (2.2%) and abortion was also seen in one (2.2%). The later was occurred in a 16-year old woman, thus maternal age seems to play more effective role. Furthermore, no correlation was found between prematurity or abortion and asthma severity. Other studies have highly recommended frequent sonographic assessment for fetal growth in case of moderate to severe asthma (7).

REFERENCE

1. Reavenscraft SA, Lupo VR, Asthma. Management during pregnancy.**Semin Respir Critic Care Med** 1998;19(3);221-229

2. Gluck JC, Gluck P. The effects of pregnancy on asthma: A Prospective study. **Ann Allergy** 1976;37:164-168

3. Wendel PJ, Ramin SM, Barnett –Hamm C. Asthma treatment in pregnancy: A randomized controlled study. **Am J Obstet Gynecol** 1996;175(1):150-4

4. Georg MR, O'Dowd LC, Martin I, et al. A comprehensive educational program improves clinical asthma in pregnancy and asthma. **Arch Intern Med** 1999;159(15):1710-6

5. Felten ML, Mercier FJ, Behamou D. Development of acute and chronic respiratory disease during pregnancy. **Rev Pneumol Clin** 1999;55(5):325-34

6. Warner JA, Jones CA, Warner JO. Prenatal origins of allergic disease. **J Allergy Clin Immunol** 2000;105(2):493-8

7. Schatz M, harden K, Farsythe A. The course of asthma during pregnancy, postpartum and,with successive pregnancies: A prospective study. **J Allergy Clin Immunol** 1998;81:509-517.

8. With RJ, Coutt II, Gibbs CY. A prospective study of asthma during pregnancy and the puerperium. **Resp Med** 1989:83:103-106

9. Vermeire P. Environmental influences in asthma. **Verh K Acad Geneeskd Belg** 1999:61(5):593-606

10. Brown MA, Halonen M. Prenatal events in the development of asthma. **Curr Opin Pul Med** 1999;5(1):4-9

11. Wahlgren DR,Hovel MF,Meltzer EO. Involuntary smoking and asthma. **Curr Opin Pulm Med** 2000;6(1):31-6.

12. Gillilard FD, Berhan K, et al. Maternal smoking during pregnancy, environmental tobacco smoke exposure and childhood lung function. **Thorax** 2000;55(4):271-6.

13. Chen J, Millar WJ. Birth outcome, the social environment and child health. **Health Resp** 1999;10(4):57-67.

14. Rasanen M, Kaprio J, Laitinen T, et al. Perinatal risk factors for asthma in Finish adolescent twins. **Thorax** 2000;55(1):25-.

15. Custovic A, Simpson BM, Simpson A, et al. Manchester Asthma and Allergy study: low-allergen environment can be achieved and maintained during pregnancy and in early life. **J Allergy Clin Immunol** 2000;105(2):252-8.