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Comparison of both Static and Dynamic Pulmonary Function Test Parameters in Indian Pregnant and Non-Pregnant Women

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Abstract

Background: Pregnancy is characterized by sequence of dynamic physiological changes that impact on multiple organ system functions and is associated with various changes in pulmonary anatomy and physiology.

Methods: This was an observational study. A total of 30 pregnant women of 20–30 years of age in their third trimester of normal pregnancy (study group) and 30 nonpregnant women (control group) volunteered for the study.

Results: The difference in mean values of forced vital capacity (FVC), forced expiratory volume at the end of first second (FEV1), and FEV1 /FVC% in pregnant and non-pregnant women was not significant statistically ($p > 0.05$).

Conclusion: Pregnancy has important effects on pulmonary functional parameters in each trimester. But the susceptibility to such alterations are variable.

Keywords: Pregnancy, Pulmonary Functional Test, Forced Vital Capacity (FVC).

Introduction

Pregnancy is characterized by sequence of dynamic physiological changes that impact on multiple organ system functions and is associated with various changes in pulmonary anatomy and physiology. Three important changes in the configuration of the thorax that occur during pregnancy were an increase in the circumference of the lower chest wall (with increases in anteroposterior and the transverse diameters); elevation of the diaphragm (a cephalad displacement of approximately 4 cm to 5 cm) and a 50% widening of the costal angle . These changes peak around the 37th week of pregnancy and normalize within 6 months after delivery. Pulmonary function is affected by changes of the airway, thoracic cage, and respiratory drive[1,2].

Additionally, capillary engor-gement throughout the respiratory tract results in mucosal edema and hyperemia. Multiple bioc-hemical alterations like increase in progesterone, estrogen, prostaglandins, corticosteroid and cyclic nucleotide levels occur concomitantly during the course of pregnancy[3].

Materials and Method

This was an observational study. A total of 30 pregnant women of 20–30 years of age in their third trimester of normal pregnancy (study group) and 30 nonpregnant women (control group) volunteered for the study. The study group were from middle socioeconomic status who came for their regular antenatal visit in the hospital. The age, height, and socioeconomically matched volunteers in the control group were relatives accompanying the pregnant women and also among the students and hospital staff who volunteer for this study.

Detailed medical as well as obstetric histories regarding the present & previous pregnancies were obtained from each participant. The participants did not have a history of respiratory or any cardiovascular illness. None of them were taking any medication except vitamins, iron & calcium supplement. There was no history of smoking/alcohol/drug abuse. Pregnancy with diabetes, hypertension and with multiple pregnancies were excluded from this study.

Before recording the PFT, the procedure was explained and demonstrated in detail till proper understanding. Doubts, if any was answered to their satisfaction and instructions about the importance of nose clip and maintaining a tight seal with the lips around the mouth piece while preforming the tests was given. Comfort of each participant was ensured during the procedure of recording the PFTs.

Results

The study and control group had very similar physical characteristics and statistical difference between the two groups was not significant. The only notable difference was that, while one group of women was pregnant, the other group of women was nonpregnant.

Table 1: Standard deviation, mean, and difference in mean values of forced vital capacity (FVC), forced expiratory volume at the end of first second (FEV1) and FEV1/FVC% in pregnant and nonpregnant women

Variables	Pregnant women	Non pregnant women	p-value
FEV1(liters)	2.18 ± 0.22	2.16 ± 0.18	>0.05
FVC	2.43 ± 0.31	2.36 ± 0.42	>0.05
FEV1/FVC	91.23 ± 0.98	90.16± 0.96	>0.05

The difference in mean values of forced vital capacity (FVC), forced expiratory volume at the end of first second (FEV1), and FEV1 /FVC% in pregnant and non-pregnant women was not significant statistically ($p > 0.05$).

Discussion

Present study could not demonstrate any significant difference in FEV1/FVC ratio between the groups, This was similar with previous observations which showed that there is no change in timed vital capacity parameters from 1st trimester till term, which suggests that normal pregnancy does not induce any alteration in large airway function.[5]

During pregnancy, progesterone, corticosteroids and relax in all together cause bronchomotor tone reduction and smooth muscle relaxation. Respiratory muscle function remains normal despite the alteration of thoracic configuration.Thus the mechanical disadvantage to the respiratory apparatus induced by advancing pregnancy is compensated by decrease in airway resistance and an improved airway conductance.[6,7,8]

Conclusion

Pregnancy has important effects on pulmonary functional parameters in each trimester. But the susceptibility to such alterations are variable.

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