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Asthma in pregnancy: association between the Asthma Control Test and the Global Initiative for Asthma classification and comparisons with spirometry



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ABSTRACT

Objective: The aim of this study was to identify a possible association between the assessment of clinical asthma control using the Asthma Control Test (ACT) and the Global Initiative for Asthma (GINA) classification and to perform comparisons with values of spirometry.

Study design: Through this cross-sectional study, 103 pregnant women with asthma were assessed in the period from October 2010 to October 2013 in the asthma pregnancy clinic at the Clinical Hospital of the Federal University of Pernambuco. Questionnaires concerning the level of asthma control were administered using the Global Initiative for Asthma classification, the Asthma Control Test validated for asthmatic expectant mothers and spirometry; all three methods of assessing asthma control were performed during the same visit between the twenty-first and twenty-seventh weeks of pregnancy.

Results: There was a significant association between clinical asthma control assessment using the Asthma Control Test and the Global Initiative for Asthma classification ($p < 0.001$). There were also significant associations between the results of the subjective instruments of asthma (the GINA classification and the ACT) and evidence of lung function by spirometry.

Conclusions: This study shows that both the Global Initiative for Asthma classification and the Asthma Control Test can be used for asthmatic expectant mothers to assess the clinical control of asthma, especially at the end of the second trimester, which is assumed to be the period of worsening asthma exacerbations during pregnancy. We highlight the importance of the Asthma Control Test as a subjective instrument with easy application, easy interpretation and good reproducibility that does not require spirometry to assess the level of asthma control and can be used in the primary care of asthmatic expectant mothers.

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Introduction

Asthma is likely the most common chronic medical condition during pregnancy, with a worldwide prevalence estimated to be between 8 and 13% [1]. Often identified by dyspnea, asthma can be confused with the physiological dyspnea of pregnancy, but it differs from this condition by presenting with other signs and symptoms, such as cough, wheezing and/or tightness of the

chest [2]. The worsening of asthma symptoms during pregnancy is more common among women who have inadequate control of the disease before pregnancy, and the final period of the second trimester is considered critical for acute exacerbations [3]. Approximately 9–11% of asthmatic pregnant, even those under the care of experts in the treatment of asthma, have acute exacerbations of the disease and require emergency care or hospitalization [4].

Many asthmatic pregnant women consider their asthma to be well-controlled, although they have frequent symptoms that require the physician specifically to question various manifestations of the disease over the course of the pregnancy. Those patients who fail to recognize or do not realize the severity of symptoms are at a higher risk of complications and exacerbations

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of asthma [5]. Several unfavorable obstetric and perinatal outcomes have been described as more frequent among pregnant women who fail to achieve clinical control of asthma, such as pre-eclampsia, prematurity, low birth weight, intrauterine growth restriction, congenital malformations and perinatal death. Given this lack of perception of worsening and the need to maintain clinical control of asthma, spirometry stands out as a tool for diagnosis, evaluation and control of asthma in pregnant women and has an inestimable value of great applicability in clinical practice [6].

The subjective evaluation of unstructured asthma control might fail to distinguish between controlled and uncontrolled patients and lead to insufficient treatment or excessive use of medications [7]. Currently, Asthma Control Questionnaires validated for the Portuguese language are available [5,8]. One of these questionnaires, the Asthma Control Test (ACT), was developed in 2004 by Nathan, can be self-administered and is composed of five items [9]. This instrument is considered a helpful tool in the identification of poorly controlled asthmatic patients during and treatment and follow-up [10]. Recently, the ACT has been used in pregnant women with asthma, and its ability to identify controlled and uncontrolled asthma was validated in the Portuguese language, Brazilian version [11].

The current study aimed to identify a possible association between clinical asthma control as assessed by the ACT and the GINA classification and to compare these with an objective instrument for measuring pulmonary function, spirometry, at the end of the second trimester of gestation, a period considered to be the time of the highest risk of clinical worsening and exacerbations of asthma. This study was carried out in the Brazilian outpatient asthma pregnancy clinic, where obstetrical and pulmonary specialists work together in a pioneering way to create an environment that is favorable for the most efficient and appropriate diagnosis and treatment of these women.

Materials and methods

This was a cross-sectional study involving 103 asthmatic pregnant women who were assessed in the period from October 2010 to October 2013 in the asthma pregnancy clinic at the Clinical Hospital of the Federal University of Pernambuco. These patients had a previous diagnosis of asthma and were referred to the asthma clinic from the same hospital or from other hospitals. The inclusion criteria were: single pregnancy, diagnosis of asthma prior to pregnancy, early prenatal care from the 6th week of pregnancy and completion of at least one clinical control assessment by the GINA classification, ACT and spirometry, at the same time, during the period between the twenty-first and the twenty-seventh weeks of pregnancy. While carrying out the examinations, each patient had no knowledge of the results and was only given results after the conclusion of the three exams in order not to influence (by overestimating or underestimating) the responses to the questionnaire (Fig. 1). The exclusion criteria were: lung diseases

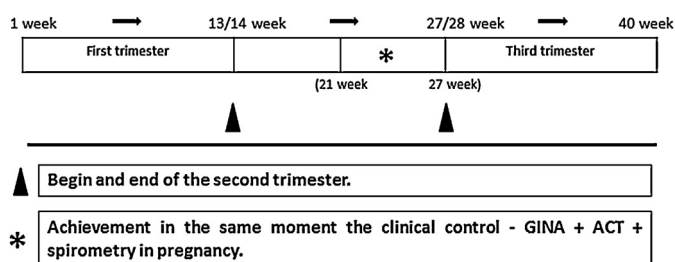


Fig. 1. Flowchart of the clinical exams and clinical attendance for asthmatic expectant mothers.

other than asthma, heart disease or anatomical alterations of the chest, inability to provide information properly or attend consultations due to intellectual or cognitive difficulty, current participation in a test or any other clinical intervention study and intention of abortion.

Clinical factors

Data related to the frequency of symptoms (number of days with no asthma symptoms, number of nights that asthma interfered with sleep, number of days that asthma interfered with usual activities) were obtained at monthly visits.

To confirm pregnancy, positive β -human chorionic gonadotropin (β -hCG) and obstetric ultrasound examination were used. The diagnosis of asthma during pregnancy was substantiated by the presence of one or more symptoms of dyspnea, chronic cough, wheezing, tightness in the chest or thoracic discomfort, particularly at night or in the early morning hours; episodic symptoms; spontaneous improvement with the use of specific medications for asthma (bronchodilators, corticosteroids); three or more episodes of wheezing in the last year; seasonal variability of symptoms and positive family history of asthma or atopy. The diagnosis of asthma was confirmed by the identification of reversible airflow limitation by pulmonary function test results such as the spirometric finding of obstructive airways characterized by reduced forced expiratory volume in the first second (FEV₁) below 80% predicted and its relation to forced vital capacity (FVC) below 75% in adults or airflow obstruction, which disappears or improves significantly after bronchodilator use [12]. Asthmatic pregnant women with a report and/or referral from a pulmonologist, regardless of the presence of symptoms in the last year, were considered. Asthma in pregnancy was classified as intermittent, mild persistent, moderate or severe, as adapted from the National Heart, Lung, and Blood Institute [13].

The treatment of asthma during pregnancy included no treatment, use of short-acting beta-agonists, short-acting beta-agonists and inhaled corticosteroids (ICS), and ICS and long-acting beta-agonists (LABA). At the end of the second trimester of pregnancy, after having undergone consultations in the asthma clinic, asthma control was classified as controlled, partially controlled and uncontrolled according to the GINA classification [12]. The information related to symptom frequency (number of days with no asthma symptoms, number of nights that asthma interfered with sleep, number of days that asthma interfered with usual activities) was obtained at monthly visits. The two categories of the validated ACT controlled asthma and uncontrolled asthma were considered to correspond to partially controlled and uncontrolled asthma (GINA, 2010).

The ACT has already been validated among pregnant women, with the following classifications: controlled (≥ 16 points) and uncontrolled (< 16 points) (Fig. 2). The most accurate cut-off point was 16, with a sensitivity of 95.4%, specificity of 68.8%, negative predictive value of 91.7% and positive predictive value of 80.5%. The positive and negative likelihood ratios were 3.052 and 0.067, respectively. The questionnaire was found to be highly effective for discriminating between controlled and uncontrolled asthma, with an area under the receiver operating characteristic (ROC) curve of 0.846 (95% CI: 0.74–0.92) [11].

This study was approved by the Ethics Committee of the Federal University of Pernambuco with the CAEE 27133914.0.0000.5208. Written informed consent was obtained from the pregnant women with asthma who were enrolled in the study, and written permission from parents and/or caregivers was obtained for asthmatic pregnant women aged < 18 years.

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