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Diagnosis of Asthma during Pregnancy

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Description

Asthma during pregnancy is a serious health problem. Physiological changes and treatment compliance during pregnancy can have variable impacts on asthma management, and asthma control and asthma medication side effects are linked to worse perinatal outcomes for both mother and foetus. To provide new guidelines for physicians, obstetric joint doctors, and health care practitioners, this paper presents an update on the available literature regarding the alleviating or aggravating mechanism of asthma in pregnancy, diagnosis, disease assessment, and systematic management.

Asthma in pregnancy is a common respiratory disorder whose prevalence has steadily increased worldwide, making it one of the most prevalent public health issues. During pregnancy, asthma control levels frequently vary. One-third of asthma patients are thought to be aggravated by pregnancy, with the majority of cases occurring in the middle of the pregnancy; one-third improves, and the remaining 1/3 shows no significant changes. However, according to a recent multicase-control study, the percentage of asthma worsening during pregnancy is 18.8%, which is lower than prior statistics, and the worsening is linked to the severity of the disease. There are also numerous issues with asthma control during pregnancy. According to studies, 65 percent of patients have poor asthma control during pregnancy, 64.4 percent of inhaler technology is incorrect, only 38 percent of patients understand the difference between asthma relievers and controlled medications, 12.7 percent of patients receive a written asthma action plan, 17 percent of patients have spirometry in the last 5 years, and 3.8 percent of patients have a peak expiratory flow metre at home [1].

SGA (small for gestational age), LBW (low birth weight), congenital malformations (cleft lip or cleft palate), increased perinatal mortality, PB (premature birth), maternal preeclampsia, gestational hypertension, gestational diabetes, prenatal haemorrhage, caesarean section, urinary tract infection, excessive amniotic fluid, and premature membrane rupture have all been linked to maternal asthma. The physiological or pathological changes generated by pregnancy, primarily the mechanical alterations caused by uterine enlargement and the direct or indirect effects of hormonal changes throughout pregnancy, are linked to asthma remission or worsening during pregnancy [2].

The diaphragm is lifted by 4-5 cm when the uterus and abdominal pressure rises, the subcostal angle increases by 50% (from 68° to 103° from early to late pregnancy), and the transverse and anteroposterior diameter of the thoracic increases. The foregoing modifications are somewhat offset by the ribs' ligamentous attachments relaxing, resulting in a decrease in thoracic compliance. As a result, total lung volume is reduced by 5%, while FRC (functional residual capacity) is reduced by 20%.Additionally, increasing body weight results in a bigger neck circumference and a smaller oropharyngeal region, both of which contribute to dyspnea during pregnancy. During pregnancy, a series of essential changes in hormone levels occur to satisfy the needs of maternal and foetal metabolism, including a noticeable rise in progesterone, oestrogen, cortisol, and prostaglandin, all of which have different impacts on the development of asthma. Progesterone is a respiratory dynamics stimulant that can raise the sensitivity of the respiratory centre to carbon dioxide, whereas oestrogen can raise the sensitivity of the progesterone receptor in the respiratory centre, resulting in a shift in respiratory function. The minute ventilation increases by 30%-50%, owing to a 40% increase in tidal volume, although there is no substantial change in the tidal volume [3].

TLC (total lung capacity), VC (vital capacity), lung compliance, and DLCO (diffusion capacity) are the same as before. There are no significant changes in FVC (forced vital capacity), FEV1 (forced expiratory volume in 1 second), the ratio of FEV1 to FVC, or PEFR (peak expiratory flow rate) during pregnancy compared to non-pregnancy. As a result, spirometry can be used to detect dyspnea in healthy pregnant women and to track changes in respiratory disorders. Progesterone, in addition to working on the respiratory centre, can mediate mucosal vasodilation and congestion, leading to an increase in the prevalence of pregnant rhinitis and epistaxis, as well as oropharyngeal and laryngopharyngeal airways, which contribute to asthma attacks during pregnancy.

Estradiol can boost maternal innate immunity as well as adaptive immunity mediated by cells or humour. Estradiol in low concentrations can boost CD4+Th1 cell responsiveness and cell-mediated immunity. Estradiol in high concentrations can boost CD4+Th2 cell responsiveness and humoral immunity. Progesterone suppresses the maternal immune system and alters the balance of Th1 and Th2 responses. Although cell-mediated immunity plays a larger role in respiratory viral infections, the transition of Th1 to Th2 immunity is thought to be a key process in asthma caused by pregnancy hormones [4].

During pregnancy, women have hypercortisonism, and the placenta secretes both CRH (corticotropin-releasing hormone) and ACTH (adrenocorticotropic hormone), resulting in an increase in free cortisol and conjugated cortisol. Increased free cortisol causes an increase in beta-adrenoceptors, which worsens bronchiectasis. Increased release of prostaglandin E2 (PGE2) during pregnancy protects against asthma through anti-inflammatory, reduction of smooth muscle cell proliferation, bronchial relaxation, and other mechanisms. Progesterone can potentially cause bronchiectasis by altering airway smooth muscle tension. Asthma remission during pregnancy is linked to these factors. In general, the effects of mechanical and biochemical changes on a pregnant woman's respiratory system are complicated, particularly the effects of various hormones on the respiratory centre, peripheral airway, and immune system, resulting in nonasthmatic pregnant women experiencing varying degrees of dyspnea during pregnancy. It is critical for asthmatic pregnant women to improve their asthma control during pregnancy in order to avoid maternal hypoxia and preserve appropriate foetal oxygenation.

Diagnosis of asthma in pregnancy

The effects of mechanical and biochemical changes on a pregnant woman's respiratory system are complicated in general, especially the effects of various hormones on the respiratory centre, peripheral airway, and immune system, resulting in nonasthmatic pregnant women experiencing varying degrees of dyspnea during pregnancy. To avoid maternal hypoxia and maintain optimal foetal oxygenation, asthmatic pregnant women must improve their asthma control during pregnancy [5].

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Asthma in pregnancy has clinical symptoms that are comparable to ordinary asthma. If a pregnant woman merely has shortness of breath or chest tightness, we must be cautious in making a diagnosis based on her medical history. Because of the physiological changes that occur during pregnancy, approximately two-thirds of pregnant women have some kind of shortness of breath or chest tightness. Furthermore, doing a bronchial provocation test to prevent maternal hypoxia and foetal discomfort is not recommended.

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Conflict of Interest

The author shows no conflict of interest towards this manuscript.

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