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Editorial

# Asthma and Cesarean Section

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## Editorial

Asthma is chronic disease of multifactorial etiologic and exposure perinatal factors can determine the development of airway inflammation. High prevalence of asthma in developing countries accompanies the increase in the Cesarean Section (CS) rate in the same period [1,2]. Cesarean births in some countries of Latin America reach the 50% prevalence, in the Brazilian, public and private health services the rate CS is considerate highest in the world [3,4 ]. However, the association between CS and asthma is still a controversial issue with conflicting data in the literature due to potential confounding of several other determinants of asthma [5].

The mechanism to explain its association between CS and asthma refers to the hygiene hypothesis. Decrease exposure to certain types of microorganisms early in life would lead to insufficient stimulation of T1 lymphocytes and consequences predominance of allergic response of the type T2, responsible for the development of asthma and allergic reactions [6]. In children born CS the initial colonization of intestinal micro flora is composed by bacteria from colonization of the skin and those related to the hospital environment and these bacteria are capable of modulating the type of immune response to the type T2 [7].

The EPIC hypothesis (Epigenetic Impact of Childbirth) has also been proposed for explain the association between CS and asthma; this suggests that the genome of fetus undergoes remodelling in chromantin architecture and DNA methylation during the intrapartum period and cause susceptibility to diseases. Children born CS have higher DNA methylation than children born of vaginal delivery [8]. The third hypothesis to explain the association between CS and asthma is the lowest rate of onset and duration of exclusive breastfeeding in children born cesarean, the maternal milk would have a protective effect for asthma due to the immunomodulators, low proportion of IL10 and more of IL13 and gamma interferon [9].

Studies that assessed the association between CS and asthma presented different results. Association between asthma and CS was reported by Roduit, et al. [10], in a prospective cohort study of 2.917 children, found a significant association between delivery by CS and asthma OR = 1.77 CI 95% (1.03-1.32) and the risk was increased in the presence of parental history of atopy. Almqvist, et al. [11] evaluated a retrospective cohort of 87,500 cesarean births and risk of asthma in children and adolescents CS was associated with the use of asthma drugs OR: 1.13; 95% CI (1.04-1.24) and diagnosis of asthma OR: 1.20 95% CI (1.05-1.37), adjusted by family history of atopy, weight at birth, gestational age, gender, Apgar score and age maternal. Tollanes, et al. [12] found a high risk for asthma in children born of emergency CS with OR: 1.42; CI 95 (1.12-1.62) and elective CS with OR 1.59; 95% CI (1.44-1.55) being the highest risk for asthma in preterm infants. Kero, et al. [13] evaluated records of 59,927 children and found association between CS and asthma with OR: 1.21; CI 95% (1.08-1.36) and atopic asthma OR: 2.2; 95% CI (1.06-4.64), adjusted for maternal age, gender and born. Salam et al. [14]. Evaluated a cohort of 3,464 children born ≥37 weeks of gestation and birth weight ≥2,500 kg and a structured asthma questionnaire was applied. CS represented risk factor for asthma OR: 1.33; CI 95% (1.01-1.75). Bager, et al. [15] evaluated 9,722 women from a cohort in the Denmark for type of delivery, gestational age, weight and height at birth, asthma and rhinitis obtained by the local registry system and CS associated with asthma OR: 1.33;CI 95% (1.2-1.74) but not allergic rhinitis OR: 1.16; 95% CI (0.90-1.49). Gessner and Chimonas 23 evaluated 37,349 children aged 5-9 years of a retrospective birth cohort. Asthma was confirmed by the Standard International Classification of Diseases 9th Revision codes. Asthma was associated with preterm birth but not with small for gestational age status. CS represented risk factor for asthma or hospitalizations for asthma OR: 1.4; 95% CI (1.08-2.2).

In a prospective cohort study of 12,367 children Maitra, et al. [16]. Found no association between delivery by CS and asthma (OR= 1.14; 95% CI 0.9–1.4). Brandão, et al. [17] evaluated 672 children with asthma and allergic rhinitis found no association between CS and asthma however there was association between CS and allergic rhinitis, adjusted for the main confounding variables for asthma. Mallen, et al. [18] using population-based registers evaluated conditions of birth and asthma, allergic rhinitis, eczema and hay fever in 567 adults. CS was not associated with asthma OR: 1.71; 95% CI (0.76-6.84), rhinitis, eczema or hay fever. Vonk, et al. [19] evaluated 597 adults using birth data on labour for delivery type and diagnosis for asthma and atopy after 20-year follow-up, CS was not risk factor for asthma OR: 1.77; 95% CI (0.98-3.51). Bernsen, et al. [20] evaluated 1,797 children in a cohort through birth data records on type of birth and asthma, eczema and allergy at six years of age. CS was not a risk for asthma OR: 1.03; 95% CI (0.51-2.08). Nathan, et al. [21] evaluated 156 children in a control case study at the age of 3-15 years. Seventy-eight children with diagnosis of asthma and seventy-eight controls were evaluated for CS. There was no association between CS and asthma OR: 1.21; 95% CI (0.6-2.41). Rusconi, et al. [22] performed a cross-sectional study in 15,609 children diagnosed with asthma less than five years old of age. CS was associated with asthma and atopy. The association was of greater magnitude in children of no atopic parent. The perinatal variables, gestational age and low birth weight had low frequency in children of the CS.

A meta-analysis study [24] found association between CS and atopy, the proportion of cases attributed the CS was 1% to 4%, suggesting that the increase in CS in the last decades may have




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contributed to high prevalence of allergic diseases. Gestational age is an important confounding variable to be considered in the association between CS and asthma. Children born premature have a higher risk of asthma compared to children born to term. The frequency of gestational age <37 weeks was evaluated in several studies in children born cesarean and vaginal delivery. Some of these studies [10,15] verified the relationship between prematurity and risk of asthma, while others studies [23,25] evaluated the association between CS, asthma and gestational age. Children born of low age gestational, disorders present early respiratory distress and risk of respiratory infection and asthma [23]. Maternal smoking in pregnancy or environmental smoking is a risk factor to asthma [26].

CS was associated with asthma and atopy in most studies and the low gestational age, smoking during pregnancy, breastfeeding and low birth weight are associated risk factors to asthma but were not evaluated together as confounding variables in studies. The positive association between CS and asthma, remaining controversial.

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