Respiratory Medicine (2014) 108, 1260–1267

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/rmed

Systemic corticosteroids for the treatment of asthma exacerbations during and outside of pregnancy in an acute-care setting

Benoit Cossette [a,b], Marie-France Beauchesne [a,b,c,d], Amélie Forget [a,e], Catherine Lemière [e,f], Pierre Larivée [c,g], Évelyne Rey [f,h], Marie Couturier [i], Claudie Rodrigue [i], Lucie Blais [a,c,d,e,*]

[a] Faculty of Pharmacy, Université de Montréal, Montréal H3C 3J7, Canada
[b] Pharmacy Department, Centre hospitalier universitaire de Sherbrooke, Sherbrooke J1H 5N4, Canada
[c] Centre de recherche Clinique Étienne-Le Bel, Centre hospitalier universitaire de Sherbrooke, Sherbrooke J1H 5N4, Canada
[d] Endowment Chair, AstraZeneca in Respiratory Health, Montréal H3C 3J7, Canada
[e] Research Center, Hôpital du Sacré-Coeur de Montréal, Montréal H4J 1C5, Canada
[f] Faculty of Medicine, Université de Montréal, Montréal H3C 3J7, Canada
[g] Faculty of Medicine, Université de Sherbrooke, Sherbrooke J1H 5N4, Canada
[h] Department of Obstetrics and Gynecology and Research Center, Centre hospitalier universitaire Ste-Justine, Montréal H3T 1C5, Canada
[i] Department of Pharmacology, Faculty of Medicine, Université de Sherbrooke, Sherbrooke J1H 5N4, Canada

Received 18 March 2014; accepted 1 July 2014
Available online 11 July 2014

KEYWORDS
Asthma;
Exacerbations;
Pregnancy;
Corticosteroids;
Beta-agonist;
Cohort

Summary
Background: Asthma exacerbations are common during pregnancy with a prevalence as high as 51.9% among women with severe asthma.
Objective: To compare the treatment of asthma exacerbations in an acute-care setting during and outside of pregnancy.
Methods: We formed a cohort of women who sought medical care for an asthma exacerbation at a teaching hospital during or in the year preceding pregnancy, between 1998 and 2008. An exacerbation was composed of one or more medical encounters in an acute-care setting (hospital-based outpatient clinic, emergency department, or during hospitalization). Data were retrieved from medical charts and health administrative databases. We compared the use of

* Corresponding author. Université de Montréal, Faculté de pharmacie, C.P. 6128, Succursale Centre-ville, Montréal, Québec H3C 3J7, Canada. Tel.: +1 514 346 1110x3786; fax: +1 514 343 6057.
E-mail address: lucie.blais@umontreal.ca (L. Blais).

http://dx.doi.org/10.1016/j.rmed.2014.07.001

systemic corticosteroids (SCSs) during and outside of pregnancy with a Cox proportional hazards model.
Results: The cohort was formed of 39 women who had 40 exacerbations during and 39 exacerbations outside of pregnancy. Use of SCSs to treat exacerbations was less frequent (adjusted hazard ratio: 0.51; 95% CI: 0.31—0.84) during pregnancy. Moreover, upon the first medical encounter related to the exacerbation, SCSs, when administered, were given less frequently to women when pregnant than when non-pregnant (83% vs. 100%). The SCS prescription was filled at the community pharmacy 65% and 67% of the time when it was prescribed at discharge to women when pregnant than when non-pregnant, respectively.
Conclusion: We observed a reduced and delayed use of SCSs for the treatment of asthma exacerbations in women when pregnant than when non-pregnant, with similar numbers of women in both conditions filling their SCSs prescription in pharmacies.

Introduction

Asthma is one of the most common potentially serious medical conditions encountered during pregnancy affecting 3.7—8.4% of pregnancies [1,2]. Asthma exacerbations are common during pregnancy, with 12.6%, 25.7%, and 51.9% of women with mild, moderate, or severe asthma experiencing an exacerbation, respectively [3]. Current asthma guidelines recommend equivalent treatment of exacerbations for pregnant and non-pregnant women [4,5]. The guidelines emphasize the safety of asthma medications compared to the risk of poorly controlled asthma for the fetus, since uncontrolled asthma during pregnancy was found to be associated with increased risks of perinatal complications [4—10]. These notions were already present in the National Asthma Education and Prevention Program guidelines of 1997 [11]. Despite these recommendations, two American studies reported that the percentage of systemic-corticosteroid (SCS) use for the treatment of an asthma exacerbation was about 20% less at the emergency department (ED) and at discharge between pregnant and non-pregnant women [12,13]. These studies did not evaluate medical visits at a hospital-based outpatient clinic, or hospitalizations.

The main purpose of this study was to compare SCS use for the treatment of asthma exacerbations during and outside of pregnancy in a non-US acute-care setting, including medical visits at a hospital-based outpatient clinic, ED visit, and/or hospitalization. The study was undertaken because the literature reports that prescribing ED practices to treat asthma exacerbations differ between US and non-US centers [14].

Methods

Study design

From a cohort of pregnant asthmatic women giving birth in the province of Quebec, Canada, between 1998 and 2008 we identified women who had an asthma exacerbation managed at the Centre hospitalier universitaire de Sherbrooke (CHUS),—a teaching hospital—during or in the year preceding pregnancy [15]. The inclusion criteria for this cohort were: (1) singleton delivery between 1998 and 2008, (2) a medical encounter (medical visit at a hospital-based outpatient clinic, ED visit, and/or hospitalization) for an asthma exacerbation at the CHUS one year prior to or during pregnancy, (3) 45 years of age or younger at the time of delivery, (4) having at least one diagnosis of asthma (International Classification of Diseases [ICD], ICD-9 code: 493 [except 493.2] or ICD-10 code: J45) and at least 1 prescription for an asthma medication filled in the year before or during pregnancy, and (5) being covered by the RAMQ drug-insurance plan for at least one year before the exacerbation and to the end of pregnancy. If a woman contributed several pregnancies, we kept only the two most recent. Information on in- and outpatient care provided in the province of Quebec was obtained from two administrative databases: the *Régie de l'assurance-maladie du Québec* (RAMQ) (providing information on medication prescriptions (i.e. SCSs) filled in community pharmacies, outpatient medical visits, and ED visits) and MED-ECHO (providing information on asthma-related hospitalizations). To determine pregnancy duration, we retrospectively identified the date of the first day of the subject's last menstrual period and the date of delivery for each pregnancy using gestational age at birth and offspring date of birth.

Asthma exacerbations and hospital data collection

An asthma exacerbation was defined as one or more medical encounters related to the condition when no more than 14 days elapsed between two adjacent visits. A medical encounter was considered to be due to an asthma exacerbation when one of the following terms was found in the medical chart: bronchospasm, asthma exacerbation, asthma crisis, status asthmaticus, or decompensated asthma. Two persons (MC and CR) independently assessed whether or not each medical encounter was due to an asthma exacerbation. All medical encounters were reviewed whether or not an ICD-9 code for asthma was present. Discordant cases were resolved by a consensus review by two pharmacists (BC and MFB). For each medical encounter due to an asthma exacerbation, we collected the visit's starting and ending dates as well as its location (hospital-based outpatient clinic, ED, and/or hospitalization) from the hospital electronic health