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Original Article

Incidence and Triggers of Asthma Exacerbations Attended in the Emergency Department as a Level of Care Indicator (ASMAB III, 2005 and ASMAB IV, 2011)☆

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ABSTRACT

Introduction: The identification of asthma exacerbations (AE) seen in emergency departments and in the home is proposed as a parameter of asthma control and for monitoring environmental triggers.
Patients and methods: All AEs seen in 2005 and 2011 in the reference hospital of the region and in the patients' homes by the Emergency Medical Services were identified.
Results: The incidence of AE was 1.93/10^6 inhabitants/day during 2005, and 2/10^6 inhabitants/day in 2011. The most common triggers were slow onset common cold of more than 24 h duration in 104/219 (47%) AEs in 2005 and 107/220 (49%) in 2011; prior bronchial symptoms with cough, expectoration and fever were recorded in 41/219 (19%) in 2005 and in 57/220 (26%) AEs in 2011. In total, 49% (2005) and 74% (2011) of the AEs had onset more than 24 h before admission.
Conclusions: No significant differences were observed in the rate of attendance in the emergency department due to AE between 2005 and 2011. The most common triggers were common cold and bronchial symptoms with expectoration and fever. AE had begun more than 24 h previously in at least half of cases. These findings appear to suggest that there may be a scope for improvement in the outpatient care of the asthmatic patient.

Incidencia y desencadenantes de las agudizaciones asmáticas atendidas en Urgencias como muestra del nivel asistencial (ASMAB III, 2005 y ASMAB IV, 2011)

Palabras clave:
Agudizaciones asmáticas
Servicios de urgencias
Epidemiología del asma

RESUMEN

Introducción: Se propone la identificación de las agudizaciones asmáticas (AA) atendidas en el Servicio de Urgencias y en el domicilio como parámetro de control y vigilancia de la actuación de desencadenantes ambientales.
Pacientes y métodos Se identificaron todas las AA atendidas durante los años 2005 y 2011 en el hospital de referencia de la zona y en el domicilio de los pacientes por el Servicio de Emergencias Médicas.
Resultados: La incidencia fue de 1,93 AA/10^6 habitantes/día en el año 2005 y de 2 AA/10^6 habitantes/día en el 2011. Los desencadenantes más frecuentes fueron: un catarro nasal de instauración lenta de más de 24 h en 104/219 (47%) de las AA en 2005 y en 107/220 (49%) en 2011; un cuadro bronquial previo con tos, expectoración y fiebre se registró en 41/219 (19%) en el año 2005 y en 57/220 (26%) de las AA en 2011. En conjunto, el 49% (2005) y el 74% (2011) de las AA se habían iniciado más de 24 h antes de su admisión.

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Conclusiones: No se han observado cambios significativos de la tasa de frecuentación en los servicios de urgencias por AA entre los años 2005 y 2011. Los desencadenantes más frecuentes fueron el catarro nasal y un cuadro bronquial con expectoración y fiebre. La instauración de la AA fue de más de 24 h en al menos la mitad de las AA. Estos hallazgos parecen indicar que existe un margen de mejora en la asistencia ambulatoria del paciente asmático.

Introduction

Asthma exacerbations (AE) are considered serial, either due to poor baseline control, or to the activation of a trigger.[1] It is therefore believed that proper treatment and avoidance of known triggers will lead to good disease control and prevent flare-ups.[1]

Several studies in recent years have concluded that following international recommendations on background therapy averts flare-ups and reduces the use of healthcare resources.[2] In fact, a study by Molfino et al.[3] showed that a follow-up program for asthmatic patients that included optimal treatment and self-monitoring was associated with better survival, which is directly related with avoidance of AEs. Similarly, the continuous use of inhaled steroids is known to be associated with a decrease in exacerbations and reduction in mortality.[4,5] In short, appropriate background therapy and a written action plan to deal with flare-ups (that includes oral corticosteroids) is known to improve patient control and prevent AEs.[6] It was also recently shown that after adjusting treatment to GINA recommendations, just 2 short educational campaigns reduced the number of visits to the family doctor and the emergency department.[7]

Given the difficulty of identifying all AEs as a parameter of the degree of control in a particular population, we followed the protocol of previous studies (ASMAB I[8] and II[9]) and only identified a proportion of exacerbations: those treated in the emergency department of a tertiary hospital and those treated in the patient's home by the emergency medical service (EMS). In fact, our group had already carried out this research in Barcelona in the ASMAB I study[8] (autumn 2001 to winter 2002) and the ASMAB II study (autumn of 2003),[9] where we were able to show that the daily AE rate was 0.53 and 0.37 exacerbations per 10^5 inhabitants/day, respectively, i.e. between 4 and 5 patients treated daily per million inhabitants.

Insight into the incidence of AEs may serve 2 purposes: first, to determine the degree of control of a local asthmatic population, and secondly, to evaluate and compare incidence of AEs due to an environmental triggering agent with that of ordinary days. This was the case in Barcelona in 1981–1987, when a cargo of soybeans unloaded in the port resulted in high numbers of patients attending emergency departments for an AE.[10] This same type of study could be used, for example, to determine whether AEs increase on days with a high level of pollution in cities.

We conducted 2 new studies in 2005 and 2011 with the primary objective of re-determining the incidence of AEs. Both were carried out using the same data collection protocol, in the same area and at the aforementioned care levels: home and hospital emergency department. As secondary objectives, AE triggering factors and the characteristics of the onset were also examined.

Materials and Methods

Study Design

The present study included 2 prospective studies conducted in 2005 (ASMAB III) and 2011 (ASMAB IV). Both were designed to calculate the rate of AEs in individuals aged between 14 and 70 years, who had been seen in the emergency department of the only tertiary hospital in the area. AEs treated in the patients' own homes during the same period were also identified. Patient data was treated confidentially in accordance with the Spanish Data Protection Act in force at that time. The study was approved by the hospital Ethics Committee.

Study Population

According to the census of the city of Barcelona, 453,196 inhabitants were registered in the catchment area of the tertiary hospital in 2005. The population aged under 14 years accounted for 10.9%, and those over 70 years for 15.52%; therefore, the population aged between 14 and 70 years was made up of 333,462 individuals. In 2011, there were a total of 404,972 inhabitants, of which the population aged under 14 years accounted for 12.3% and those over 70 years for 15.77%, giving a catchment population of 291,296 inhabitants.[11]

Methods for Identifying Patients With Asthma Exacerbation Seen in the Hospital and Inclusion Criteria

The data collection protocol designed for the previous studies (ASMAB I and ASMAB II) was used to identify the AEs seen in the hospital.[8,9] This consisted of an *ad hoc* list containing the personal details of each patient, date, time from onset to treatment in the emergency department, and the main trigger. Details of patients attended in their own home were provided by the EMS, as in the previous studies.

In summary, all AE episodes seen in the emergency department were identified weekly by the physicians in charge of both studies (TG in 2005 and IO in 2011). The medical records of individuals who presented any of the following diagnoses were reviewed: bronchial asthma, bronchospasm, bronchial hyperresponsiveness, asthmatic bronchitis, spastic bronchitis, wheezing, status asthmaticus, acute or severe asthma attack and severe asthma exacerbation. The diagnosis of asthma was accepted if the patient, in addition to the diagnosis of asthma made in the emergency department, met the clinical criteria established by GINA,[1] i.e. history of episodes of dyspnea, wheezing and chest tightness, as well as variability in these symptoms; a family history consistent with asthma and atopy supported the diagnosis. Relapse criterion was readmission within 15 days of discharge from the emergency department; if readmission was after this period, it was counted as a new episode.

Statistical Analysis

The incidence rate for AEs seen in the emergency department of the hospital in 2005 and 2011 was calculated using the following formula:

$$\text{Rate} = \left[\frac{\text{number of episodes}}{(\text{population at risk} \times \text{number of days})}\right] \times 10^6$$