Outcomes Following Admission to Intensive Care for Asthma

PURPOSE OF THE STUDY. To describe the subsequent course of children who are admitted to an ICU for asthma.

STUDY POPULATION. All children with asthma aged 2–18 years admitted to the ICU at the Royal Children’s Hospital Melbourne between 1990 and 2004.

METHODS. Data were collected by reviewing medical records and through telephone interviews.

RESULTS. A total of 410 children were identified, with a mean duration of follow-up of 10.3 ± 4.6 years. Twelve patients (1.8%) subsequently died of asthma (5% of those who required ventilation at their index admission). Risk factors for mortality were multiple ICU admissions (adjusted odds ratio [aOR]: 5.0; 95% confidence interval [CI]: 1.3–19) and mechanical ventilation (aOR: 4.5; 95% CI: 1.3–15.7). Sixty-seven percent of patients were readmitted to the hospital for asthma at least once, with 17% readmitted to the ICU. Risk factors for ICU readmission were admission for asthma in the preceding year (aOR: 4.7; 95% CI: 2.4–9.3) and mechanical ventilation (aOR: 2.4; 95% CI: 1.0–5.3).

CONCLUSIONS. Admission to the ICU for asthma is a predictor of hospital readmission. Those who require ventilation are at significant risk of mortality.

REVIEWER COMMENTS. Although asthma mortality has declined to some extent in recent years, children continue to die of this disease. Most of these deaths are almost certainly preventable. Children who have required admission to the ICU and especially those who have required mechanical ventilation are at much higher risk and deserve close monitoring and follow-up in a specialty clinic.


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Adherence to Inhaled Corticosteroids: An Ancillary Study of the Childhood Asthma Management Program Clinical Trial

PURPOSE OF THE STUDY. To compare subjective and objective measurements of adherence to inhaled corticosteroids versus placebo and to determine if adherence to study medications modified treatment-related outcomes.

STUDY POPULATION. One hundred forty children aged 5 to 12 years who were diagnosed with mild or moderate asthma were enrolled from 3 of 8 sites from the Childhood Asthma Management Program (CAMP) study.

METHODS. This was a prospective study over a 4-year study period. The study population was categorized with mild or moderate asthma based on criteria established in the CAMP trial. Subjects were randomly assigned to receive either placebo, budesonide, or nedocromil twice daily over 4 years; those in the placebo and budesonide arms were included in this ancillary adherence report from 3 centers. Adherence measures were categorized as either self-reported or objective. Self-reported adherence consisted of daily diary entries by patient or caregiver that were reviewed at follow-up visits every 4 months. Objective adherence measures included counting the doses remaining in the Turbuhaler device (ie, doses dispensed).

RESULTS. Objective adherence measurements were significantly lower than self-reported adherence measurements. There was poor agreement between self-reported and objective measures of adherence, with 75% of participants demonstrating <80% adherence by objective measurements, whereas only 5.8% of self-reported adherence values were <80%. Self-reported adherence overestimated objective adherence measures by 30% (93.6% vs
60.8%, \( P < .0001 \)) during the 4-year study period. Adherence reporting was similar between placebo and budesonide treatment groups. Only the “high-adherence” budesonide group was associated with improved outcomes (change in forced expiratory volume in 1 second before and after bronchodilator use), a finding that may have impacted the overall CAMP study findings.

CONCLUSIONS. Self-reported adherence data overestimated objectively measured adherence by 30%, making self-reported medication use misleading during clinical trials.

REVIEWER COMMENTS. This study adds to the evidence base that self-reporting of adherence is erroneous and may result in misleading outcome reporting in clinical trials. This study also provides information that can be useful to the practicing clinician regarding the use of objective, rather than self-reported, adherence during clinical decision-making when possible.


**Antibiotic Prescribing During Pediatric Ambulatory Care Visits for Asthma**


PURPOSE OF THE STUDY. To determine how frequently antibiotics are prescribed during pediatric asthma visits without documented coexisting diagnoses that justify their use.

STUDY POPULATION. Pediatric patients <18 years of age seen in outpatient offices and emergency departments in the United States for asthma between 1998 and 2007.

METHODS. Data from the National Ambulatory Medical Care Surveys and the National Hospital Ambulatory Medical Care Survey were examined for patients seen for asthma in clinics and emergency departments. Each visit was assessed with regard to reason for visit and diagnoses (by using International Classification of Diseases, Ninth Revision, Clinical Modification codes), medications prescribed, physician specialty, participation of allied health professionals, patient demographics, and performance of asthma education (after 2001). Multivariable logistic regression models then were used to assess associations with the prescription of antibiotics.

RESULTS. Antibiotics were prescribed during 15.6% of 5198 ambulatory care visits for asthma without a coexisting diagnosis to justify treatment. This finding equates to ~1 million pediatric ambulatory patient visits per year in the United States, in which patients with asthma are treated with antibiotics without documentation of a reason for doing so. Macrolides were prescribed nearly 50% of the time, followed by aminopenicillins (26.3%) and cephalosporins (20.6%). Multivariate analysis revealed that antibiotics were prescribed more in the winter (odds ratio [OR]: 1.92; 95% confidence interval [CI]: 1.05–3.52), and when systemic steroids were also prescribed, the OR = 2.69 (95% CI: 1.68–4.3). Treatment in an emergency department was associated with decreased likelihood of antibiotic prescribing (OR: 0.48; 95% CI: 0.26–0.89), whereas in the office-based setting, asthma education during the visit was associated with reduced antibiotic prescribing (OR: 0.46; 95% CI: 0.24–0.86).

CONCLUSIONS. Approximately 1 of every 6 pediatric patients evaluated for asthma in an ambulatory care setting is prescribed antibiotics without a documented indication, which indicates a need for either better documentation or more education and interventions to prevent the unindicated use of antibiotics for asthma exacerbations.

REVIEWER COMMENTS. Although guidelines for asthma management do not support routine antibiotic therapy for asthma exacerbations, this study showed that it is a fairly common practice in ambulatory care settings. Educational programs to increase awareness of inappropriate antibiotic prescriptions should be developed. Previous publications have shown that multifaceted interventions, such as physician education, patient education, community-wide programs, and provider feedback are more likely to be successful than single interventions alone.


**Increased Risk of Pertussis in Patients With Asthma**


PURPOSE OF THE STUDY. Pertussis infection remains a major public health problem with reported cases increasing more than 27-fold since 1976. The prevalence of asthma has also increased, with up to 17% of children affected. The purpose of this retrospective study was to determine if patients with asthma were at increased risk of pertussis.

STUDY POPULATION. This population-based, case-controlled study compared asthma history in adults and children with documented pertussis (positive polymerase chain reaction [PCR]) to that of matched controls suspected of having pertussis but with negative PCRs.

METHODS. Pertussis PCRs during a 2-year outbreak in Olmstead County, MN, were used to identify 223 pertussis-positive cases; 164 patients were eligible for inclusion. From a pool of 5537 pertussis-negative patients, 328 age- and sex-matched controls were identified. A previously validated formula was used to estimate the population attributable risk percentage of asthma for pertussis infections.
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Jennifer Petitto and Stacie M. Jones
Pediatrics 2012;130;S37
DOI: 10.1542/peds.2012-2183JJJ

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*Pediatrics* 2012;130;S37
DOI: 10.1542/peds.2012-2183JJJ

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