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Asthma Severity Is a Risk Factor for Acute Hypersensitivity Reactions to Contrast Agents : A Large-scale Cohort Study

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The American College of Chest Physicians (ACCP) has taken concrete steps to provide training in thoracic ultrasonography in the United States. Training in thoracic ultrasonography is a key component in the numerous courses that the college has given to > 2,000 clinicians over the past 7 years. The ACCP has developed a comprehensive critical care ultrasonography training program that includes lung and pleural ultrasonography. This Certificate of Completion program requires 7 days of course work, a 20-h Internet training component, and a mandatory 250 image portfolio collection, followed by a hands-on and image-based examination that includes thoracic ultrasonography. The image portfolio, which is reviewed by the faculty, allows an experienced ultrasonographer to provide meaningful feedback to the learner, thereby increasing skill level.

In addition to the national ACCP program, we have developed a local ultrasound training course for fellows. Each summer, 80 first-year pulmonary/critical care fellows from New York City receive an intensive 3-day course in general critical care ultrasonography, including thoracic ultrasonography. Standardized training early in fellowship training ensures that, moving forward, these fellows will disseminate this valuable skill.

Finally, we could not agree more that point-of-care bedside thoracic ultrasonography performed by the treating pulmonologist must be integrated with the clinical history and physical examination. In this regard, thoracic ultrasonography is a powerful extension of the physical examination, providing immediate diagnostic and therapeutic benefit.

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Asthma Severity Is a Risk Factor for Acute Hypersensitivity Reactions to Contrast Agents

A Large-scale Cohort Study

To the Editor:

CT imaging has become a common diagnostic tool because of its utility. However, adverse events from contrast agents have also increased.¹ Controversy exists as to whether asthma is a risk

factor for acute hypersensitivity reactions to contrast agents.^{2,3} Additional data and evaluations are required to reach definitive conclusions. This study aims to evaluate the risk of hypersensitivity reactions to contrast agents in patients with asthma by the severity of asthma.

A retrospective cohort study of all adult patients who underwent contrast-enhanced CT imaging tests with IV contrast agents from 2004 through 2011 was conducted at St. Luke's International Hospital. All parameters that are potentially related to acute hypersensitivity to contrast agents, including asthma history, were collected before testing. The patients with asthma were divided into five groups by severity, according to the GINA (Global Initiative for Asthma) guidelines.⁴ According to the guideline, patients in step 1 were treated without steroids. Patients in steps 2 through 4 were prescribed inhaled steroids. Patients in step 5 were mostly treated with oral steroids. Acute hypersensitivity reactions to contrast agents were defined according to the anaphylaxis criteria as occurring within 24 h.⁵ This study was approved by Research Ethics Committee of St. Luke's International Hospital (11-R133).

According to the result of univariate analyses and clinical importance, variables were included in the logistic regression model. The acute hypersensitivity reactions of patients with asthma in each GINA step were compared with the patients without asthma. Analyses were conducted using SPSS (SPSS Inc) and Stata (Statview).

CT imaging with contrast was performed on 36,472 patients. Four hundred eighty of these patients (1.3%, 95% CI: 1.2-1.4) had an acute hypersensitivity reaction. A total of 10 patients (2.1%, 95% CI: 1.0-3.8) had asthma (step 1: eight; step 2: one; step 3: one; step 4: 0; and step 5: 0) in the hypersensitivity reaction group; a total of 266 patients (0.7%, 95% CI: 0.7-0.8) had asthma (step 1: 151; step 2: 25; step 3: 33; step 4: 20; and step 5: 37) in the no-reaction group. In the hypersensitivity reaction group, there were only a few patients in steps 2 to 5; therefore, we combined steps 2 to 5 in logistic regression. As compared with patients who

Table 1—The Results From the Multivariable Logistic Regression

	OR	95% CI	P Value
Age, y	0.98	0.98-0.99	< .01
Male sex	1.03	0.85-0.24	.77
Total iodine compound amount, g	1.01	1.00-1.02	< .01
Allergic history to contrast agents	6.13	4.60-8.17	< .01
Allergic history to any drugs	1.73	1.32-2.27	< .01
Medical history			
Asthma	...	...	.01
No asthma	Reference	Reference	
GINA step 1	3.28	1.50-7.15	< .01
GINA steps 2-5	0.98	0.22-4.43	.98
Urticaria	2.52	1.90-3.34	< .01
Atopic dermatitis	0.51	0.22-1.20	.12
Medication			
Oral steroid users	0.58	0.25-1.31	.19
without asthma			
Inhaled steroid users	0.91	0.48-1.73	.78
without asthma			
NSAID users	0.91	0.75-1.11	.36
β-Blocker users	1.25	0.82-1.92	.30
ACE inhibitor users	0.69	0.38-1.26	.23
Antihistamine users	1.37	0.96-1.95	.08

ACE = angiotensin-converting enzyme; GINA = Global Initiative for Asthma; NSAID = nonsteroidal antiinflammatory drug.

did not have asthma, patients who were treated with GINA step 1 had a high risk (OR 3.28). However, there were no significant differences among patients with steps 2 to 5 asthma (OR 0.98) (Table 1). Patients with GINA step 1 asthma may have a higher risk of hypersensitivity reactions to contrast agents for CT imaging. Further evaluations are needed for patients classified as GINA steps 2 to 5.

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